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AN EMPIRICAL EVALUATION OF FIVE CIRCULAR ERROR PROBABLE ESTIMATION TECHNIQUES AND A METHOD FOR IMPROVING THEM

THESIS

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THESIS

Presented to the Faculty of the School of Engineering
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Preface

This study compared several circular error probable (CEP) estimation techniques to evaluate the various means of comparison and to identify the "best" of the CEP estimators examined. Over the range of the parameters considered in the study, all of the estimators were found to be biased and quite variable. Using least squares regression, this study reduced the bias of one of the techniques analyzed, and produced an improved CEP estimation technique. Sponsored by HQ ACC/JSG, this study should prove useful in future attempts to estimate CEP using small samples.

I must acknowledge several individuals without whom this study would never have been completed. Mr. Dave Berg sponsored this thesis and provided invaluable FORTRAN subroutines of different CEP estimators. Dr. Edward Mykytka's astute criticism of this document increased its readability tremendously. For pouring out his time, effort, energy, and enthusiasm, Lt Col Paul Auclair brought my entire educational experience into focus. As advisor, he imparted not only his expertise in ICBM accuracy issues, but demonstrated a caring style of leadership which I can only hope to emulate. For their understanding, I thank my children, Wesley and Kaylee. For her unwavering support and loyalty over the last 14 years, and for her *de facto* stint at single parenthood over the last eight months, I thank my wife, Sharon. No man could ever merit a better partner. Finally, I must thank God for putting these people in my life. The infinitesimal probability of so many caring individuals intersecting my path by mere chance demonstrates the guiding hand of a loving creator.

William L. Tongue

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Abstract

This study compared five CEP estimation techniques under the assumption that the crossrange and downrange miss distances of the sample data follow a bivariate normal distribution. The analysis determined the sensitivities of these models to changes in sample size, bias, correlation, and ellipticity in terms of three measures of effectiveness: Mean relative error (RE), variance of RE, and mean squared error (MSE) of RE. In general, it was found that sample size was the most significant parameter in determining the best CEP method. Mean RE provided a "strong" distinction between estimators, while variance and MSE provided "weak" distinctions between estimators. An attempt to improve one of the better estimation techniques using least squares regression proved quite successful.

AN EMPIRICAL EVALUATION OF FIVE CIRCULAR ERROR PROBABLE ESTIMATION TECHNIQUES AND A METHOD FOR IMPROVING THEM

I. Introduction

The USAF measures Intercontinental Ballistic Missile (ICBM) accuracy in terms of Circular Error Probable (CEP). CEP is the radius of a circle, centered on an ICBM target, expected to contain half the warheads delivered to the target [23:1]. Clearly, a smaller circle, signified by a smaller CEP, implies a more accurate missile. Unfortunately, a weapon system's operational CEP is generally unknown; one may only infer a missile's CEP from a statistical analysis of flight test data. Given the many statistical techniques available to estimate CEP, the choice of technique could significantly affect a missile's reported accuracy. This thesis examines, under varying conditions, the precision of some techniques used to estimate CEP.

1.1 Data Collection

Air Combat Command (ACC) annually launches a small number of ICBMs from Vandenberg AFB, California towards Kwajalein, a South Pacific atoll, as part of its Follow-on Operational Test and Evaluation Program (FOT&E). Each ICBM tested carries from one to nine re-entry vehicles (RVs), and each RV has an assigned aimpoint in the Kwajalein area [7]. Comparing the impact point of each RV with its intended aimpoint provides crossrange and downrange miss distances. ACC defines the miss distances in terms of a Cartesian coordinate system where

- The origin corresponds to the target (or intended aimpoint).

- The crossrange miss (or error) is measured on the x axis. Misses to the right of the aimpoint are positive. Misses to the left of the aimpoint are negative.
- The downrange miss (or error) is measured on the y axis. Misses beyond the aimpoint are positive. Misses before the aimpoint are negative

Figure 1.1 shows this coordinate system and the CEP of 1000 feet used as a reference point in this study. Actual, or operational, CEP values may differ from this reference CEP, which is simply a convenient measure selected for illustrative purposes. If 2000 RVs with this CEP impacted about the aimpoint depicted in Figure 1.1, one could expect 1000 to fall inside and 1000 to fall outside the circle.

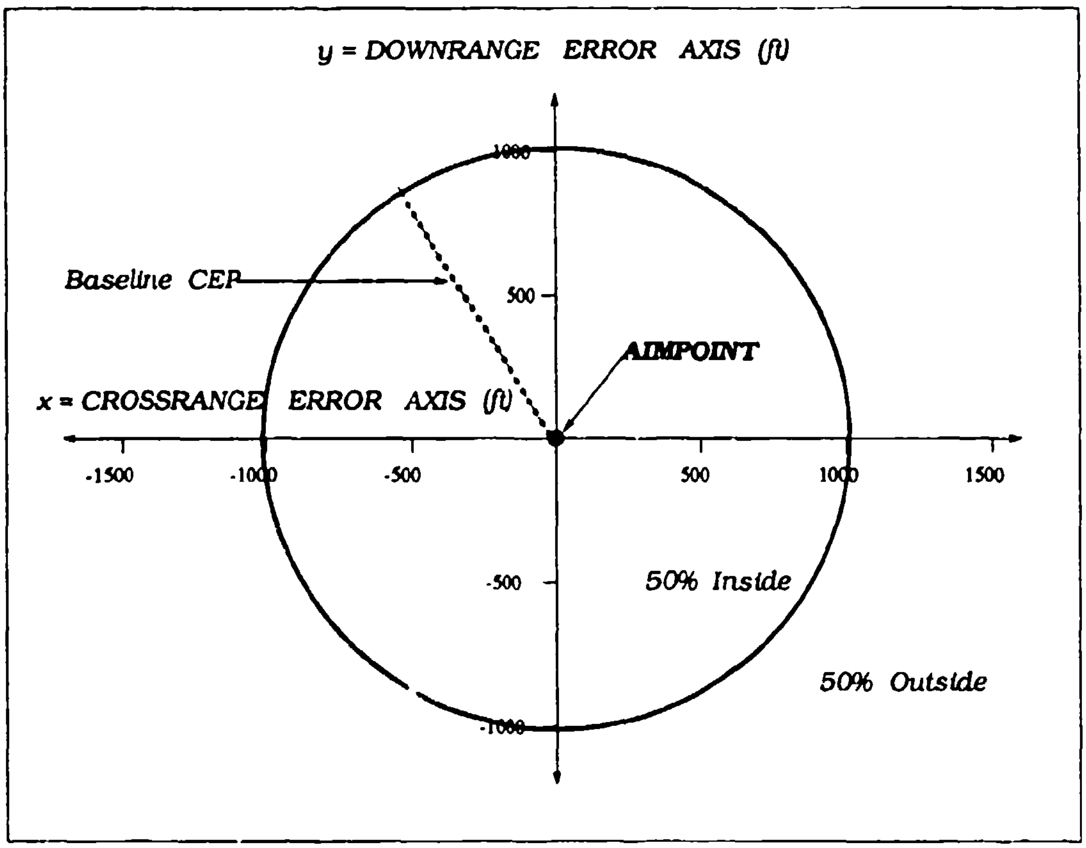


Figure 1.1. Crossrange & Downrange Error Axes

Clearly, not all 1000 RVs inside the circle in Figure 1.1 will land exactly on the aimpoint. Most will not. The distance by which an RV misses the target along each axis is represented by the error coordinates, (x, y). The i^{th} RV strike depicted in Figure 1.2 has error coordinates (300, 400), since it fell 300 feet crossrange and 400 feet downrange from the target. The next RV to impact (the $i^{th} + 1$ strike) has error coordinates (-1000,-500).

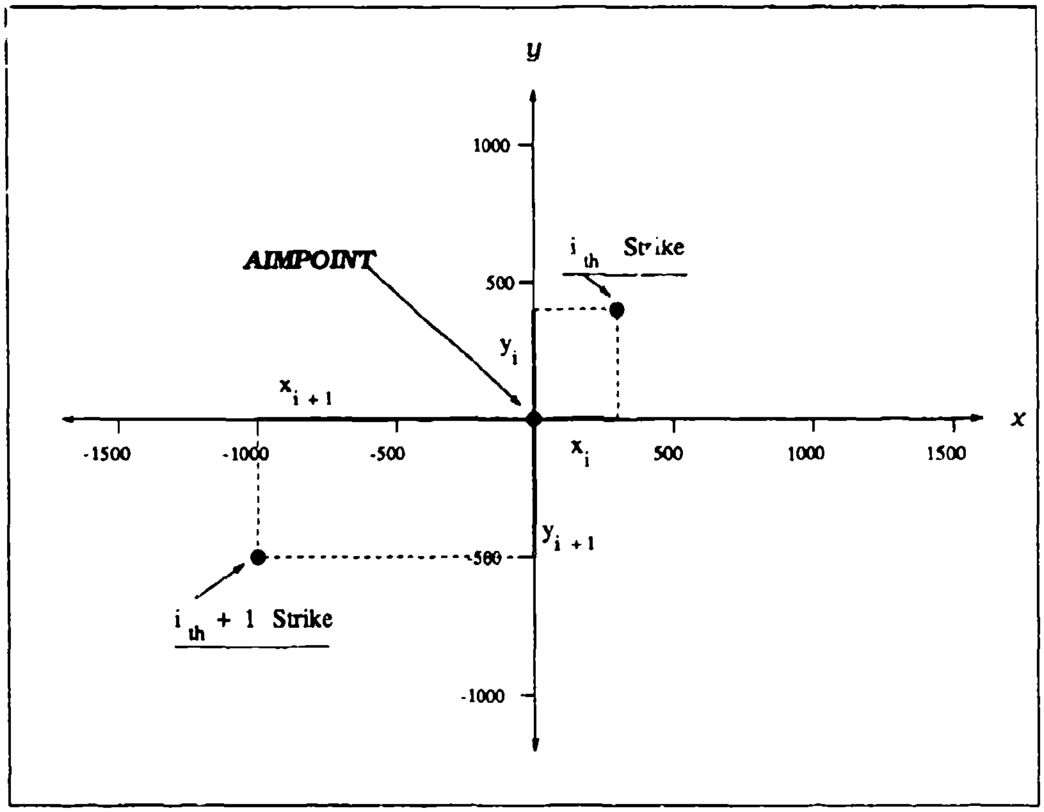


Figure 1.2. Error Coordinates

1.2 Assumptions

We assume that the downrange and crossrange miss distances follow a normal distribution. If we picture a large number of RVs "stacking up" as they land about the same aimpoint, we would expect to see a rounded "hill" of RVs centered on the mean point of impact (MPI). The MPI is simply the coordinate pair $(\bar{x}, \bar{y})$ corresponding to the mean miss distances on the x and y axes, respectively, where, for n RV impacts,

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} \tag{1.1}$$

and

$$\bar{y} = \frac{\sum_{i=1}^{n} y_i}{n}. \tag{1.2}$$

Figure 1.3 shows the "hill", or distribution of RV miss distances described above. Figure 1.3 also shows the "contours" of the "hill" in its base. We will take advantage of this two-dimensional representation in Chapter II. In this illustration, the CEP is slightly less than 500 ft. One should note that the MPI in Figure 1.3 is (0,0), the

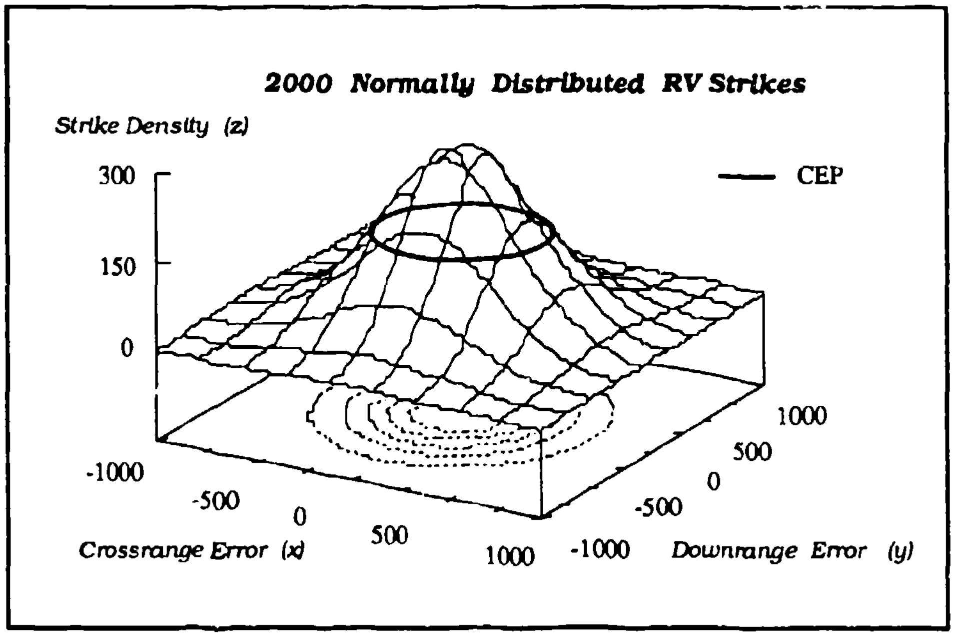


Figure 1.3. 2000 "Stacked" RV Impacts

aimpoint. In practice, the aimpoint and MPI rarely coincide. In all cases, however, the distribution of miss distances centers on the mean point of impact (MPI), whereas CEP centers on the aimpoint.

1.3 Bivariate Normal Distribution

Based on the assumption of normally distributed miss distances along each axis, we can describe the joint distribution of the downrange and crossrange miss distances with the bivariate normal (BVN) distribution [2:936]. The joint probability density function (PDF) of this distribution is

$$f(x,y) = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho_{xy}^2}}\left[exp(-\Omega)\right] \tag{1.3}$$

where

$$\Omega = \frac{1}{2(1-\rho_{xy}^2)}\left\{\left[\frac{x-\mu_x}{\sigma_x}\right]^2 - 2\rho_{xy}\left[\frac{(x-\mu_x)(y-\mu_y)}{\sigma_x\sigma_y}\right] + \left[\frac{y-\mu_y}{\sigma_y}\right]^2\right\},$$

x is normally distributed with mean, μ_x, and variance, σ_x^2,

y is normally distributed with mean, μ_y, and variance, σ_y^2,

and ρ_{xy} is the correlation between x and y.

1.4 CEP

The probability density function $f(x,y)$ tells us how "high" the "hill" is at a given point. The higher the elevation point on the hill, the greater the likelihood associated with those coordinates in the (x,y) plane. The vertical axis in Figure 1.4 gauges the likelihood associated with the miss distance coordinates.

However, for a continuous distribution function, like the BVN, the probability associated with any particular coordinate is zero [13:145]. Thus, probabilities for continuous PDFs are defined over a range of the coordinate space. For the BVN distribution given above, a range of the coordinate space describes an area in the x,y plane. The probability associated with any particular area in the x,y plane is the volume contained by the "hill", or PDF, over that area. We compute that probability by integrating the PDF over the limits designated by the particular area in the x, y plane. Figure 1.5 demonstrates this concept [13:203].

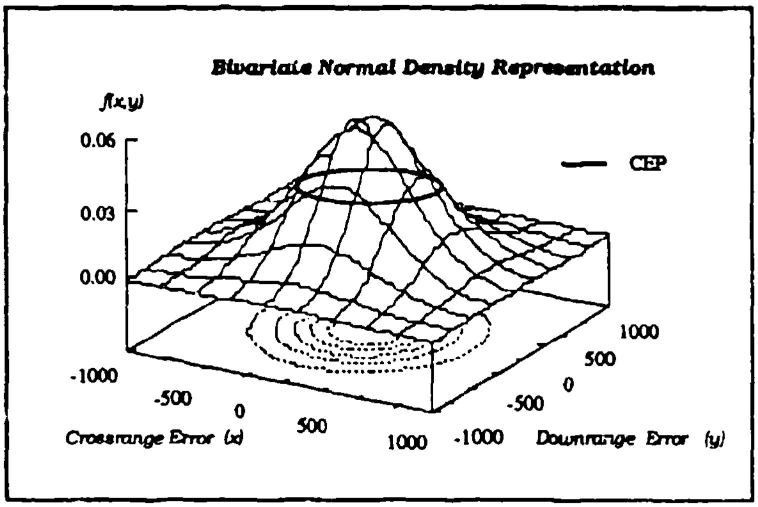


Figure 1.4. Three Dimensional Bivariate Normal Representation

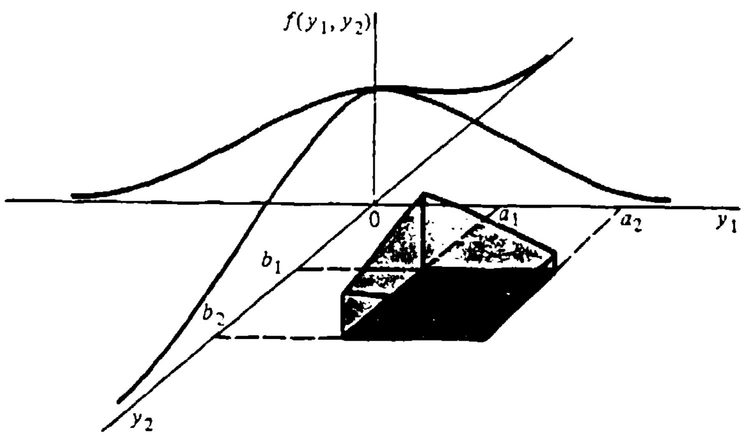


Figure 1.5. Volume under BVN surface associated with rectangular limits of integration b_1 *to* b_2 and a_1 *to* a_2.

Since the total volume under a continuous probability surface is one [13:145], integrating the PDF of the BVN over the rectangular region defined by $-\infty < x < +\infty$ and $-\infty < y < +\infty$ yields a value of one. In estimating CEP, we integrate over a circular region. Furthermore, we are not interested in the volume under the entire surface; only the 50% of it closest to the target. Thus, we define CEP as the radius of a circle, centered on the aimpoint, containing 50% of the volume of the associated density function.

1.5 Sample Parameters

As mentioned on page 1-1, we generally do not know an operational ICBM's CEP exactly, which results from not knowing the population parameters ($\mu_x, \mu_y, \sigma_x^2, \sigma_y^2$, and ρ_{xy}) of its assumed BVN distribution of miss distances. Operationally, we must estimate these population parameters from samples of that population based on a sample size of n, using

$$\hat{\mu}_x = \frac{\sum_{i=1}^{n} x_i}{n}, \tag{1.4}$$

$$\hat{\mu}_y = \frac{\sum_{i=1}^{n} y_i}{n}, \tag{1.5}$$

$$\hat{\sigma}_x^2 = \frac{\sum_{i=1}^{n} (x_i - \hat{\mu}_x)^2}{n-1}, \tag{1.6}$$

$$\hat{\sigma}_y^2 = \frac{\sum_{i=1}^{n} (y_i - \hat{\mu}_y)^2}{n-1}, \tag{1.7}$$

$$\hat{\sigma}_{xy} = \frac{\sum_{i=1}^{n} (x_i - \hat{\mu}_x)(y_i - \hat{\mu}_y)}{n-1}, \tag{1.8}$$

and

$$\hat{\rho}_{xy} = \frac{\hat{\sigma}_{xy}}{\hat{\sigma}_x \hat{\sigma}_y}. \tag{1.9}$$

The sample means, $\hat{\mu}_x$ and $\hat{\mu}_y$, estimate the population means, μ_x and μ_y, respectively. Likewise the population variances, σ_x^2 and σ_y^2, are estimated by the sample variances $\hat{\sigma}_x^2$ and $\hat{\sigma}_y^2$. Finally, the sample correlation ($\hat{\rho}_{xy}$) uses the sample estimator of covariance ($\hat{\sigma}_{xy}$) in estimating the population correlation (ρ_{xy}). Each of

$\hat{\mu}_x, \hat{\mu}_y, \hat{\sigma}_x^2, \hat{\sigma}_y^2$, and $\hat{\rho}_{xy}$ are sufficient, minimum variance, unbiased estimators, while $\hat{\mu}_x$ and $\hat{\mu}_y$ are also maximum likelihood estimators [8:343-351].

1.6 CEP Estimation Techniques

Many different estimators exist for estimating CEP on the basis of the miss distances observed in a sample of RV strikes. We will discuss the categories of CEP estimation techniques, with examples, in Chapter III. For our current discussion it is most important to understand a broad characteristic of all statistical estimators, including those that estimate CEP: variability. Estimates of parameters obtained from randomly-drawn samples vary from sample to sample, not because of some inherent variability in the estimator, but from the inherent variability in the process of random sampling [13:67].

If we assume that m different CEP estimation techniques exist, then we could identify each with the superscript i, where $i = 1, 2, 3, ..., m$. Throughout this study, we will use CEP^i to denote a sample estimate of a population's CEP obtained from estimation technique i. If we randomly draw samples from a population of RV strikes, and use estimator i on each sample to estimate the population CEP, the many CEP^is will be random, making CEP^i a random variable. As a random variable, CEP^i has a mean ($\overline{CEP}^i$) and variance ($\hat{\sigma}^2_{CEP^i}$). As we shall see, characterizing each estimator in terms of its mean and variance offers special advantages when performing analysis on the estimators.

On the other hand, if we know the population parameters, which is the case when we simulate a population of RV strikes, we can calculate the population CEP ($CEP_{pop.}$) exactly by simply integrating the known population distribution, as mentioned earlier in the chapter. Our ability to compare the CEP of a population with many simulated sample CEP estimates from that population opens avenues for distinguishing between CEP estimation techniques.

1.7 *Measures of Effectiveness for CEP Estimation Techniques*

1.7.1 Relative Error. One of three measures of effectiveness (MOE) used to distinguish between techniques in recent studies is the average bias or mean Relative Error ($\overline{RE}$). Using $CEP_{pop.}$ as a simulation benchmark, $\overline{RE}$ for the i^{th} estimator is the normalized difference between its mean estimate of the CEP ($\overline{CEP}^i$) and $CEP_{pop.}$ [19:1-2]. Thus, the mean relative error for the i_{th} estimation technique is

$$\overline{RE}^i = \frac{\overline{CEP}^i - CEP_{pop.}}{CEP_{pop.}}. \qquad (1.10)$$

Figure 1.6 shows the hypothetical distributions of the sample CEP estimates for two approximation methods. Note that $CEP_{pop.}$ identifies the known CEP of the population from which the sample CEPs were estimated.

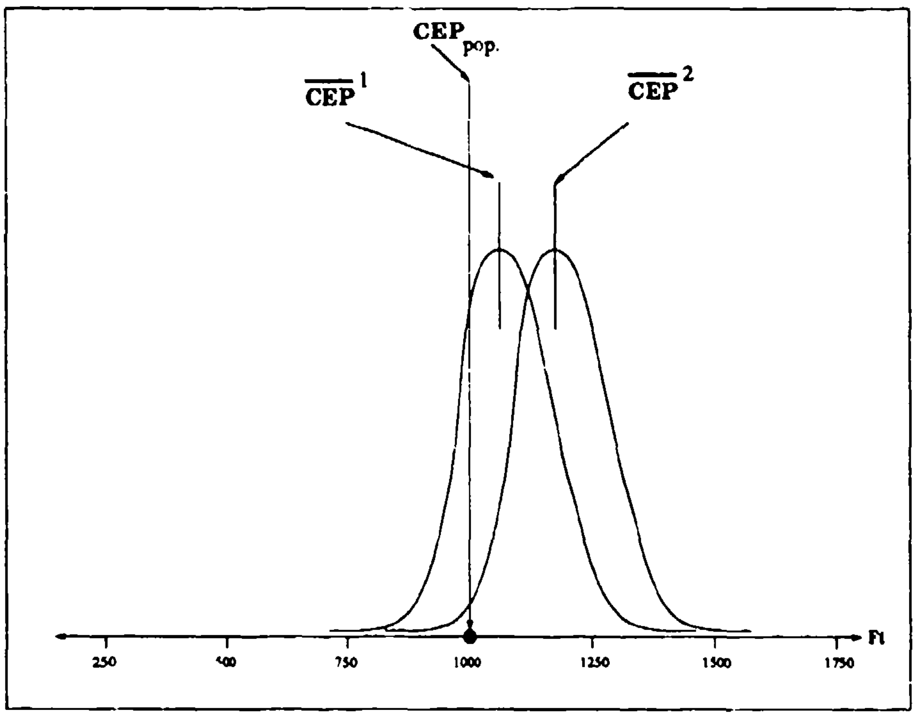


Figure 1.6. Estimator Bias Comparison

$\overline{RE}$ comparisons are obviously appropriate in this case since the two sample estimators have identical distributions except for the location of their respective $\overline{CEP}^i s$. Since $\overline{CEP}^1$ is closer to $CEP_{pop.}$ than $\overline{CEP}^2$, it has the smaller average bias. Using $\overline{RE}$ as the MOE would have us choose the less biased estimator CEP^1 as the better of the two.

1.7.2 Efficiency. A second basis for comparing *unbiased* estimators (i.e. those with $RE = 0$), is efficiency. Efficiency is the ratio of the variances of unbiased estimators.

> Given two unbiased estimators, $\hat{\theta}_1$ and $\hat{\theta}_2$, of a parameter θ, with variances VAR($\hat{\theta}_1$) and VAR($\hat{\theta}_2$), respectively, the efficiency of $\hat{\theta}_1$ relative to $\hat{\theta}_2$ is defined to be the ratio
>
> $$efficiency = \frac{VAR(\hat{\theta}_2)}{VAR(\hat{\theta}_1)} \tag{1.11}$$
>
> If $VAR(\hat{\theta}_1) < VAR(\hat{\theta}_2)$, then $\hat{\theta}_1$ is a better unbiased estimator than $\hat{\theta}_2$. [13:390]

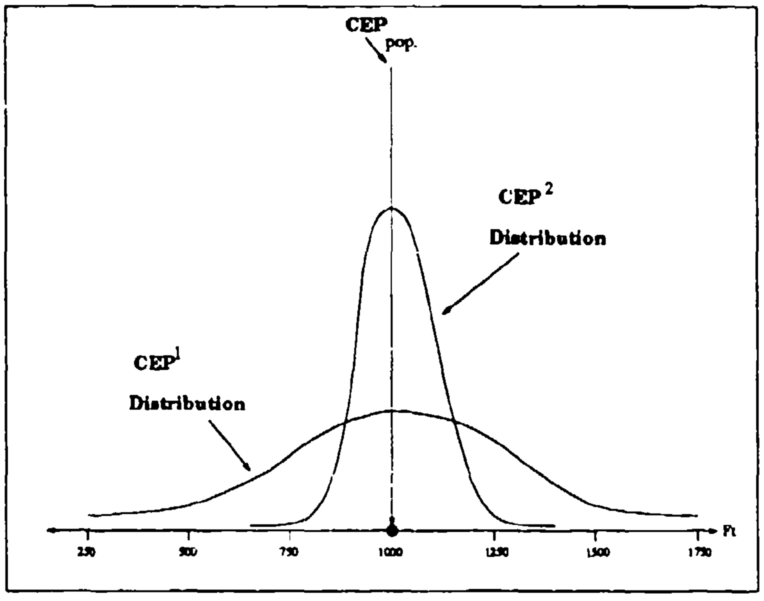


Figure 1.7. Estimator Efficiency Comparison

While two techniques may, on average, estimate CEP quite accurately, the estimates from one technique may vary greatly about that average, while the other technique's estimations vary only slightly. Despite having equal $\overline{RE}s$, one would prefer the technique with less variability on the basis of its greater efficiency. Figure 1.7 depicts the distribution of two estimates of CEP. Both have mean relative errors of zero, but they exhibit widely different variances. Comparisons based on efficiency would select CEP^2 as the better estimator due to its much smaller variance.

1.7.3 Computer Processing Time. The third distinction between CEP estimation techniques is the time required for computer processing. Until recently, some techniques occasionally required several hours to run on an 8088-chip based personal computer [5:5-3]. Other methods could generate CEP estimates in about two seconds or less [5:1-2]. Thus a distinction grew between "fast" and "slow" estimation techniques. This author implemented one of the "slow" techniques on a 25 MHz, 386-class PC with a math co-processor, using the MathCAD software package. It calculated a CEP value in 20 seconds. The same implementation on a SUN workstation took only 10 seconds. A FORTRAN implementation of a "slow" technique on a SUN workstation calculated 11 different CEPs in less than 10 seconds. Given the current, widespread availability of high-speed PCs, and the growing popularity of workstations, this measure of effectiveness is no longer significant.

1.8 Problem

Aside from the question of processing time, research efforts to date have distinguished between CEP estimators in one of two ways. They have focused on either estimator bias, measured in terms of $\overline{RE}$, or estimator variance, measured in terms of efficiency. The first case does not address the variance of the different techniques, while the second case ignores, by definition, estimator bias. Both approaches suffer by failing to consider both bias and variance in their measures of effectiveness. Consider Figure 1.8.

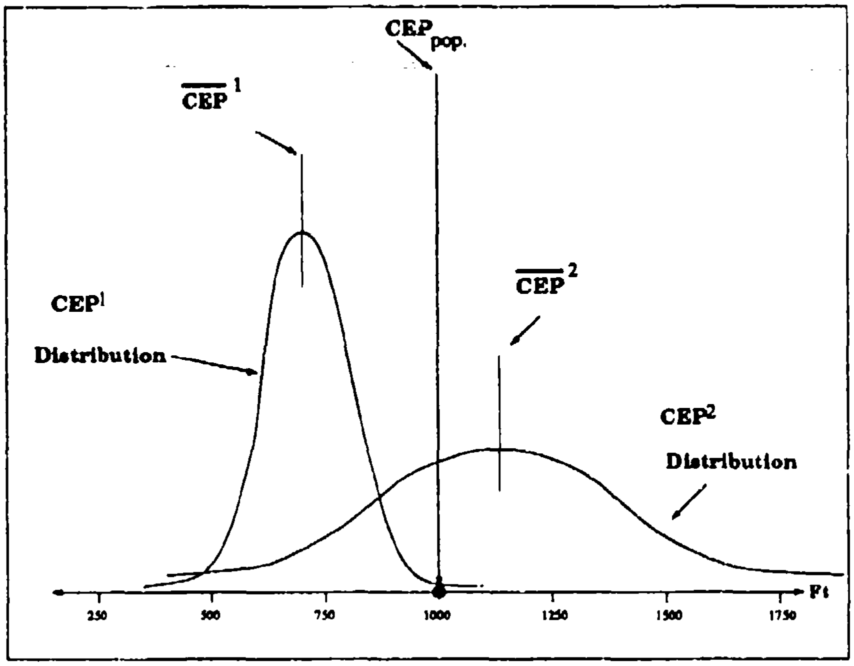


Figure 1.8. Estimator Bias and Variance

Using only $\overline{RE}$ to discriminate between estimators, one would select CEP^2 since $\overline{CEP}^2$ is much closer to $CEP_{pop.}$ than $\overline{CEP}^1$. Notice, however, that the distribution of CEP^2 has a large variance relative to CEP^1 , and is thus obviously inferior. On the other hand, using efficiency to discriminate between these two estimators assumes they are unbiased ($\overline{RE} = 0$) and ignores research that directly challenges such an assumed lack of bias [19:4-15][23]. Like $\overline{RE}$, efficiency alone is also a questionable measure of merit. Performance assessments of CEP estimation techniques have yet to consider a measure that combines the issues of estimator bias and variance.

Two well-established measures that simultaneously consider the bias and variance of a statistic are mean square error (MSE) and the Taguchi signal to noise ratio (SNR). MSE is defined as the expected value of the squared difference between an estimated parameter and its true value. MSE may be represented as the sum of the variance and squared bias of the i_{th} CEP estimator (CEP^i) [13:339]. Thus, the MSE of the i_{th} CEP estimator is

$$MSE(CEP^i) = (\overline{CEP}^i)^2 + VAR(CEP^i). \tag{1.12}$$

However, stating this MOE in terms of a specific CEP hinders our ability to make broad conclusions regarding the overall acceptability of a particular CEP estimation technique. $MSE(CEP^i)$ depends on the specific $CEP_{pop.}$ to which it is being compared. Conclusions drawn from such an MOE would only be valid for that particular $CEP_{pop.}$. Only a scaled MOE, such as RE, provides the ability to

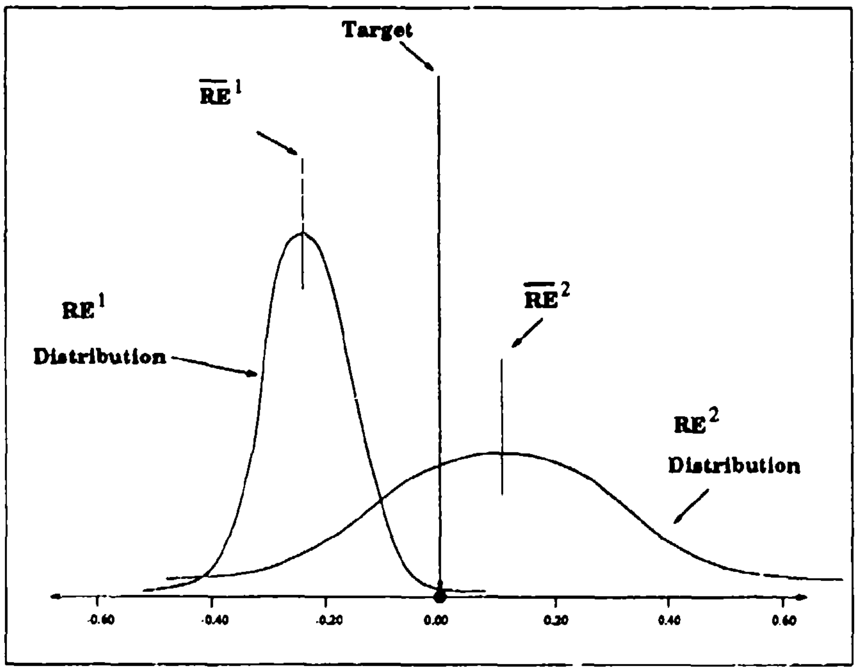


Figure 1.9. Scaled Measures of Effectiveness

make conclusions about a CEP estimator regardless of $CEP_{pop.}$. Since each CEP^i is a random variable, the relative error associated with each CEP estimated by estimator i (RE^i) is also a random variable, with a mean ($\overline{RE^i}$) and variance ($\hat{\sigma}^2_{RE^i}$). Figure 1.9 depicts a comparison between the relative errors from two different techniques. RE^i

can vary from -1.0 to $+\infty$. Restating equation (1.12) in terms of RE^i yields

$$MSE(RE^i) = (\overline{RE^i})^2 + VAR(RE^i). \tag{1.13}$$

The Taguchi signal to noise ratio technique (SNR) also combines information about the bias and variance of an estimator in its MOE index. It interprets the bias of an estimator as a "signal" and its variance as "noise". The two Taguchi ratios we considered were SNR_s, and SNR_n. We employ the first when a smaller response is desirable, and the second when a nominal or target response is preferred [15:534,536]. In our case, these ratios are computed as

$$SNR_n = 10 \log\left(\frac{(\overline{RE^i})^2}{\hat{\sigma}^2_{RE^i}}\right), \tag{1.14}$$

and for n sample estimates from the same population,

$$SNR_s = -10 \log\left[\frac{1}{n}\sum_{j=1}^{n}(RE^i_j)^2\right]. \tag{1.15}$$

Montgomery has shown that optimizing the ratios in equations (1.14) and (1.15) is equivalent to minimizing the variance and MSE, respectively [14:270-271]. Thus, we will not use them as MOEs in this research. However, as part of this research, we did generate these Taguchi ratios and checked them for consistency with the variance and MSE MOEs. As expected, they showed extremely high agreement with variance and MSE.

Finally, research efforts must recognize the constraint posed by sample size limitations. At a cost of \$12.5 million per Minuteman test launch, and \$35 million per Peacekeeper test launch, [1] it is not surprising that yearly test launches total no more than seven [7]. Still, some studies of CEP estimation techniques use simulated sample

[1] 1991 figures

sizes no smaller than 40 [25] with which to gauge estimator performance. Most estimators perform very well with sample sizes greater than 20, but it would take years of test launches to collect such large samples of identically configured ICBMs [7]. Any analysis of CEP estimators should recognize this sample–size constraint.

1.9 Open Questions

This thesis effort seeks to answer a number of questions. First, we examine which measure of CEP estimator quality, bias ($\overline{RE}$) or variance ($VAR(RE^i)$), provides the best means for distinguishing between techniques. In other words, do the estimators compared in this study have very similarly distributed RE^i (like Figure 1.6), or are they primarily unbiased (like Figure 1.7)? In the former case, distinctions based on $\overline{RE}$ alone are appropriate. In the latter case, we would be more concerned with $VAR(RE^i)$. Possibly both measures or a combination of the two, as in $MSE(RE^i)$, must be applied to ascertain the best CEP estimation technique. In any event, future research should benefit from a better understanding, if not a potential reduction, in the MOEs used to evaluate CEP estimation techniques.

Another area of interest concerns the estimators themselves. Which one is best? Does one estimator dominate the field, or are there separate conditions under which different estimators perform best? What factors increase or decrease the RE of CEP estimation techniques? Do the assumptions underlying different techniques cause them to perform like other estimators built from the same assumptions? Are some techniques more robust than others? Is there a means of improving a good technique?

Thanks to the increase in available computing power, we can consider the "slow" techniques along with those considered "fast". How well will the former compete with the latter in terms of estimator bias and variance, measures previously only applied to the techniques considered "fast"?

1.10 Experimental Approach

To answer these questions, we perform a simulation experiment in which we first calculate $CEP_{pop.}$ for 175 different populations. We then generate 2000 values from each of those populations, an'. group these into sample sizes ranging from 3 to 15. For each of these small samples, we estimate CEP using each CEP estimation technique. Comparing those sample CEP estimates to their corresponding $CEP_{pop.}$ yields the MOEs of $\overline{RE^i}$, $VAR(RE^i)$, and $MSE(RE^i)$. We apply factor analysis, and response surface analysis to these MOEs in order to address the questions posed by this research effort. In Chapter 6 we propose a method for estimator improvement using regression analysis.

II. Factors Affecting CEP

2.1 Purpose

In this chapter we turn our attention to the factors affecting CEP. Having defined CEP as the radius of a circle, centered on the aimpoint, containing 50% of the volume of the associated density function, it should not surprise us that the factors that affect the shape and location of the BVN distribution also affect CEP. These are nothing more than the parameters ($\mu_x, \mu_y, \sigma_x^2, \sigma_y^2$, and ρ_{xy}) of the BVN. As we shall see, varying the parameters of a BVN distribution can cause some distinctly interesting changes to the nicely symmetric hill observed in Figure 1.3.

2.2 Characteristic Terms: b, STDR, ρ

Since referring to all five parameters can be somewhat cumbersome, we introduce here two terms, or characteristics, that can help economize our discussion while still capturing the general effects caused by varying the BVN parameters. The first term, bias (b), is simply the distance from the aimpoint to the mean point of impact (MPI). Using the Pythagoreum theorem, bias is given as

$$b = \sqrt{\mu_x^2 + \mu_y^2} \tag{2.1}$$

The second term, the ratio of standard deviations ($STDR$), is a measure of the ellipticity of the miss-distance distribution, and is given as

$$STDR = \frac{\sigma_x}{\sigma_y}. \tag{2.2}$$

If we always place the smaller standard deviation in the numerator in equation (2.2), then $STDR$ varies between 0.0 and 1.0.

The astute reader will note, however, that this section's title listed three characteristic terms. We use correlation (ρ), previously identified as a parameter of the BVN density function, as the third characteristic, where

$$\rho = \frac{\sum_{i=1}^{n}(x_i - \mu_x)(y_i - \mu_y)}{\sqrt{[\sum_{i=1}^{n}(x_i - \mu_x)^2][\sum_{i=1}^{n}(y_i - \mu_y)^2]}}. \tag{2.3}$$

Although mathematically equivalent to equation (1.9), equation (2.3) presents a computationally useful definition. In either case, correlation varies between -1.0 and 1.0, and measures the strength of the linear relationship between the x_i and y_i random variables.

While these characteristics provide a convenient way for describing the shape and location of miss-distance distributions, as we shall see in Figures 2.1 through 2.5, they do confound some of the information contained in the parameters. Bias describes only the distance to the MPI, not its direction from the aimpoint. $STDR$ and ρ measure an elliptical effect along an axis, the identity of which is lost. We will more fully discuss the strengths and weaknesses of the characteristic terms once we have a better grasp of their impact on CEP.

2.3 Varying Data Characteristics

Figure 2.1 through Figure 2.5 demonstrate how variations in the three characteristics affect the shape and location of the miss distance distribution, or "hill", shown in Figure 1.3. In each case, the viewpoint is from above the "hill", looking down the z axis at the (x, y) plane [17:398].

Figure 2.1 represents the nominal, or "ideal" case in terms of all three characteristics. Ideally, we want the impacts to center on the aimpoint, as they do here. We refer to this as the "unbiased" case since the bias equals zero. With equal standard deviations along both axes ($STDR = 1.0$), and no correlation, contours of the bell-shaped surface look perfectly circular from above. Furthermore, with $STDR = 1.0$,

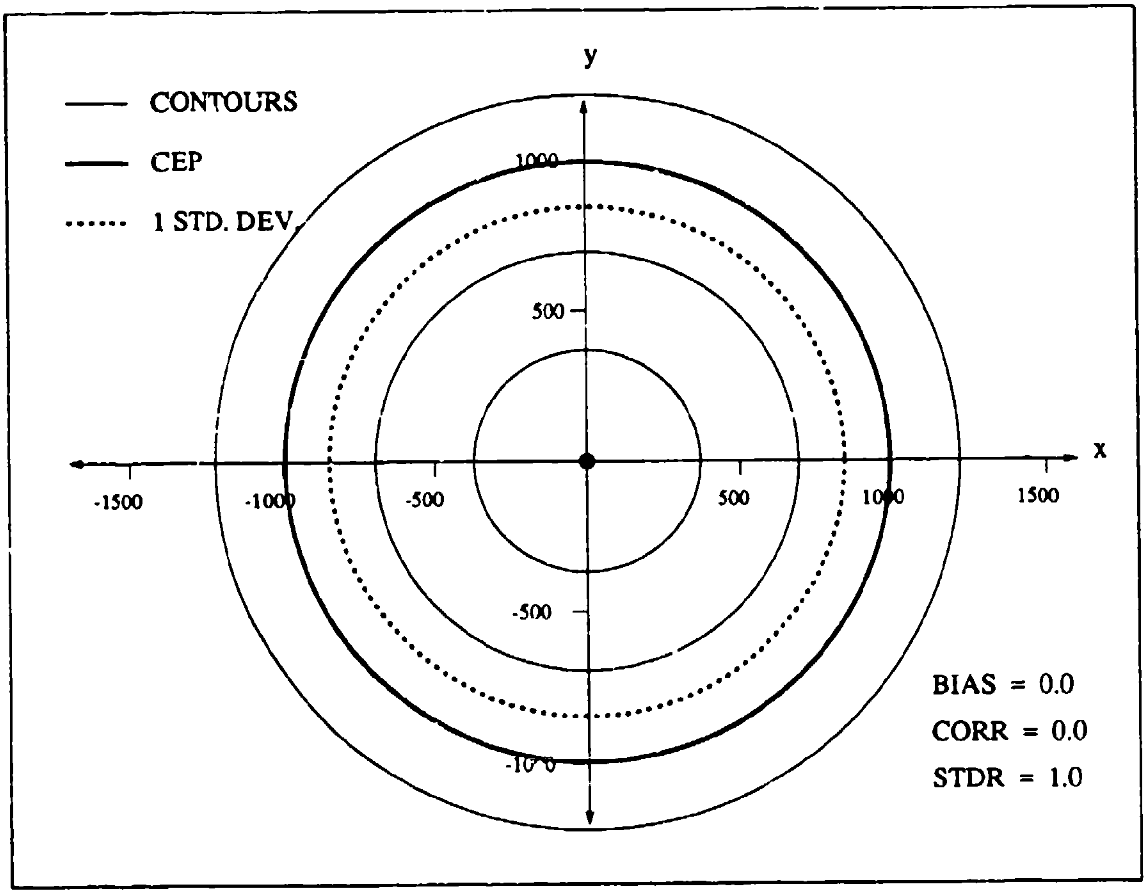


Figure 2.1. Ideal Data: $b = 0, \rho = 0, STDR = 1$

$\rho = 0.0$, and $b = 0.0$, no information is lost when transforming parameters to characteristics. As we will see in Chapter III, the estimation of CEP is greatly simplified for the ideal case. In Figure 2.1, CEP = 1000 ft.

Figure 2.2 shows the effect of bias, i.e. a nonzero value for b. Since $STDR$ and ρ maintain their nominal values, the "hill" retains its circular shape, but its center has changed. Here, the bias, or distance from the aimpoint to the MPI, is 425 ft. The CEP in Figure 2.2 is 1063 ft., demonstrating that, with all other parameters remaining constant, CEP increases with increasing values of b. To motivate why larger biases tend to inflate the CEP, superimpose the 1000 ft. CEP from Figure 2.1 onto the origin in Figure 2.2. As the center of the distribution moves away from the aimpoint, the 1000 ft. CEP contains less and less of the volume under the BVN distribution. Thus, to "capture" the nearest 50% as b increases, CEP must also increase.

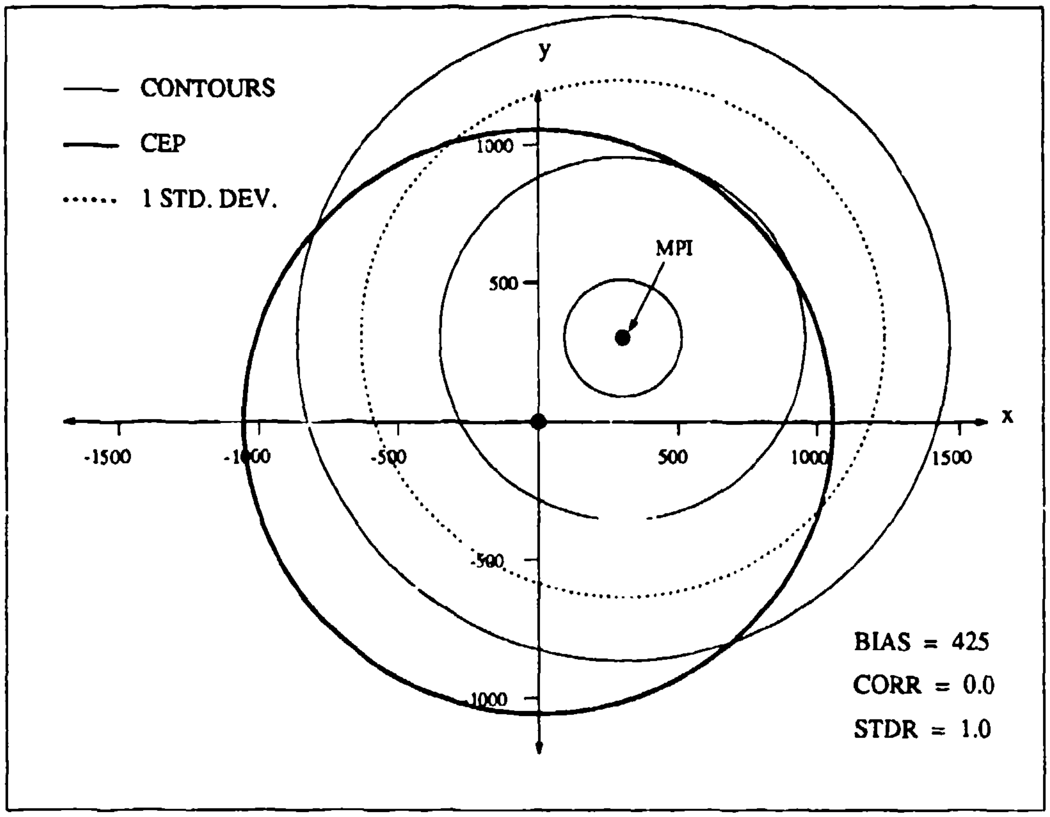


Figure 2.2. Biased Data: $b = 425, \rho = 0, STDR = 1$

In Figure 2.3 we retain nominal values for b and ρ, and demonstrate a different setting for STDR. Here σ_y has decreased, giving the "hill" a "pinched" appearance along the x axis. The result is that the "hill" looks elliptical from above. Counter-intuitively, one speaks of ellipticity "increasing" as $STDR$ decreases in magnitude from 1.0 to 0.0. Thus, low values of $STDR$ depict highly elliptical distributions, while values of $STDR$ approaching 1.0 represent approximately circular distributions. In Figure 2.3, the smaller σ_y increases the likelihood of miss coordinates being

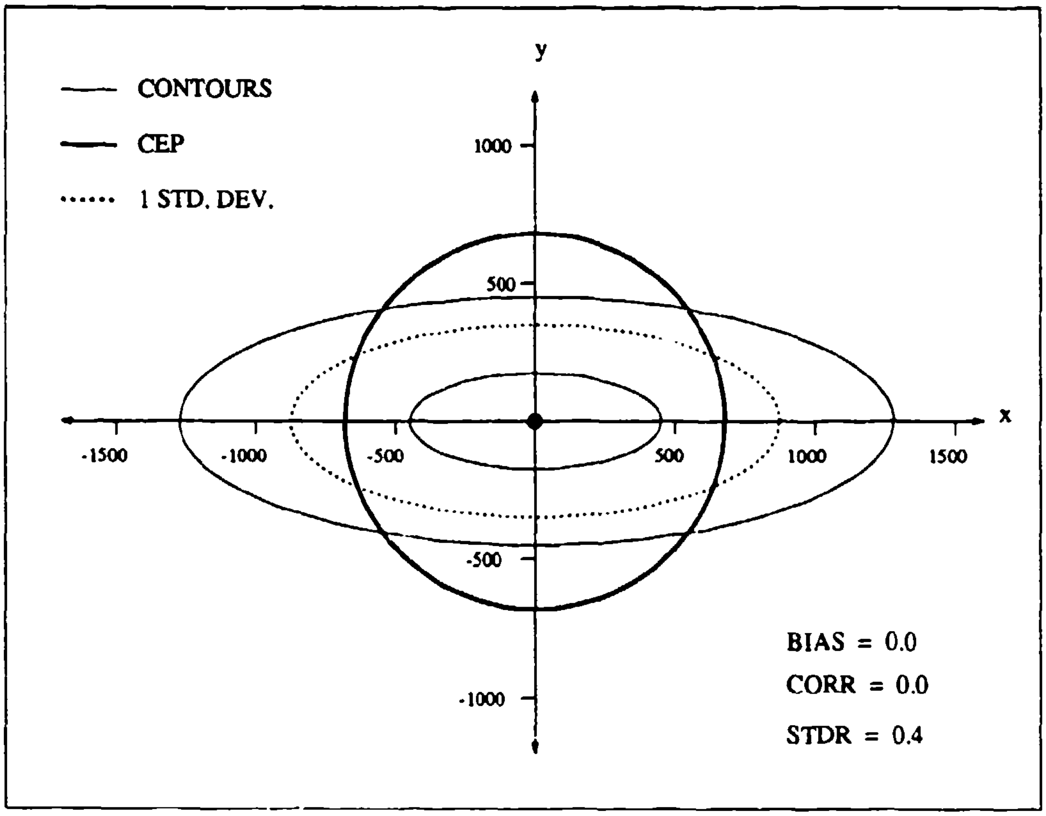


Figure 2.3. Elliptical Data: $b = 0, \rho = 0, STDR = 0.4$

closer to the MPI. That is, the "hill" gets higher at its center. Thus, a smaller CEP defines the circular region centered on the aimpoint that contains 50% of this miss distance distribution. In this case, CEP is 686 ft. Note that if σ_y was the larger of the two variances in Figure 2.3, then the elliptically-shaped "hill" would instead lie along the y axis.

In Figure 2.4, the distributional characteristics remain nominal with the exception of correlation, which is set to 0.8. As one can see, correlation represents the same "drawing out" effect as found from lower values of $STDR$, although along different axes. CEP decreases as $|\rho|$ increases and other characteristics remain "ideal". In Figure 2.4, CEP decreases to 870 ft. to account for the "hill's" increased volume about the MPI.

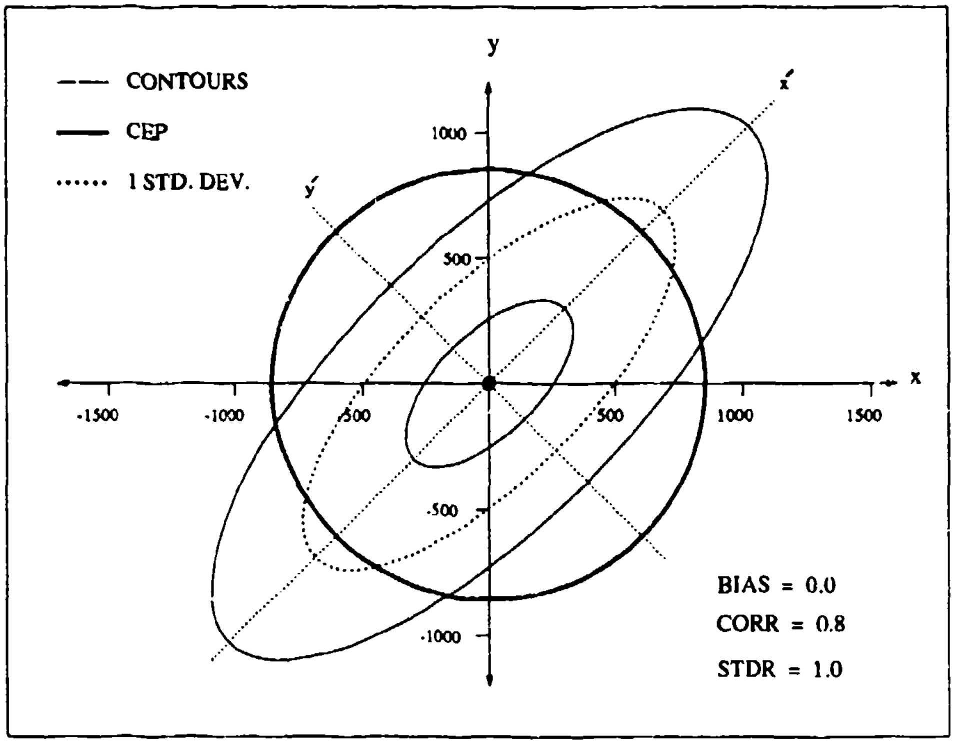


Figure 2.4. Correlated Data: $b = 0, \rho = 0.80, STDR = 1$

Since they have a similar effect on the shape of the "hill", one might not be surprised that with a simple transformation of axes, the elliptical effect induced by correlation can be entirely explained by $STDR$. Consider the axes (x', y') in Figure 2.4. As one can plainly see, the (x', y') axes correspond to the major and minor axes of the eilipse. If we rotate the (x, y) axes until they align with (x', y'), we will have a similar-looking configuration of characteristics as found in Figure 2.3, where $\rho = 0$.

Finally, in Figure 2.5 we see the combined effect of varying all three characteristics. With $STDR$ decreasing and ρ increasing, the ellipse becomes more elongated. Also note the interactive effect of varying $STDR$ and ρ. Operating together, $STDR$ and ρ work to vary the angle of the ellipse 360 degrees about the MPI. With a bias of 425 ft., the MPI is clearly not on the aimpoint. Although CEP tends to increase

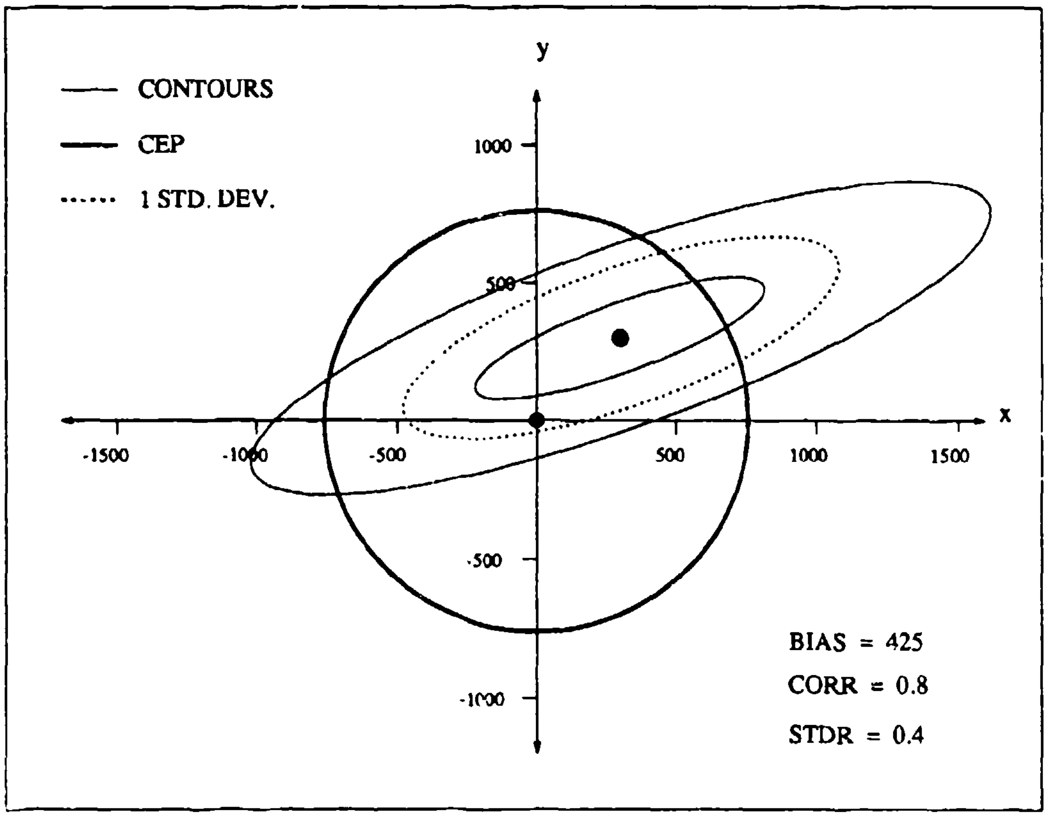


Figure 2.5. Biased, Correlated, and Elliptical Data: $b = 500ft, \rho = 0.8, STDR = 0.4$

with b, this effect is moderated here by the effects from both $STDR$ and ρ. Thus, in Figure 2.5, the CEP decreased from 1000 ft. in the ideal case to approximately 770 ft. to account for the changes in bias, correlation, and the standard deviation ratio.

2.4 Scaled Characteristics

By scaling all the factors affecting CEP, we can make generalizations regarding the effect these factors have on CEP, and on the methods used to estimate CEP. Some studies of CEP estimation techniques have used specific values of the parameters of the BVN distribution to make conclusions about CEP and CEP estimation techniques [5]. By doing so, these studies could only make conclusions regarding the specific distributions considered. No general conclusions could be made.

The good news is that all but one of our characteristics, bias, is a scaled, unitless term. In Chapter one, we identified bias in terms of the distance from the aimpoint to the MPI. To achieve a unitless representation of bias, it has been expressed in units of standard deviations about the MPI [23]. Thus, a bias of two units in the nominal case ($\sigma_x = \sigma_y = 849.33$) would mean the MPI was centered $(2)(849.33) \approx 1700 ft.$ from the aimpoint. Since the downrange and crossrange standard deviations rarely equal one another, operationally or in this experiment, we chose to use a pooled estimate of the common standard deviation [11:273] to scale b, where now

$$b = \frac{\sqrt{\mu_x^2 + \mu_y^2}}{\sigma_{pooled}}, \tag{2.4}$$

and

$$\sigma_{pooled} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}}. \tag{2.5}$$

2.5 Summary

The factors which affect CEP are those which affect the miss-distance distribution: the parameters of the BVN density function ($\mu_x, \mu_y, \sigma_x^2, \sigma_y^2$, and ρ_{xy}). Reducing the essential information in these parameters down to scaled terms, or characteristics affords us an economic set of factors with which to make generalizable conclusions regarding CEP and CEP estimation techniques.

III. CEP Estimation Techniques

3.1 Overview

This chapter categorizes the different types of CEP estimators available, and reviews previous efforts to establish a means of comparison between them.

3.2 Estimator Categories

Smith [23:2] proposed the following categories of CEP estimation techniques listed below.

1. Non-parametric methods
2. Parametric methods
   (a) Closed-form integration of the bivariate normal density function
   (b) Numerical integration of the bivariate normal distribution function
   (c) Algebraic approximation of CEP
   (d) Monte Carlo sampling techniques [5:2]

A review of these will show the variety available when choosing a CEP estimator.

3.2.1 Non-parametric Methods.

Parametric methods are those in which the distribution of a population is "specified except for a finite number of parameters" [13:672]. To apply parametric methods, we first determine the sufficient statistics of a sample distribution (like $\hat{\mu}, \hat{\sigma}$, and $\hat{\rho}$), and use them to estimate CEP. Non-parametric techniques assume no underlying distribution, and thus have a limited set of parameters with which to describe their populations. Non-parametric methods most often provide a means to rank-order a set of data.

3.2.1.1 Median of Rank-Ordered Radial Miss Distances. Calculating the radial miss distance (r) is one of the most basic transformations of miss distance data to prepare it for ordering. The radial miss distance is the distance between the aimpoint and the location where the RV actually impacts. Noting that each strike has an x and y component, this distance is calculated using the Pythagorean theorem as

$$r_i = \sqrt{x_i^2 + y_i^2}. \tag{3.1}$$

Figure 3.1 shows an individual RV strike (the i^{th} strike) that fell 400 feet downrange and 300 feet crossrange. Using equation (3.1), we can easily calculate its radial miss distance as $r_i = \sqrt{300^2 + 400^2} = 500 ft$.

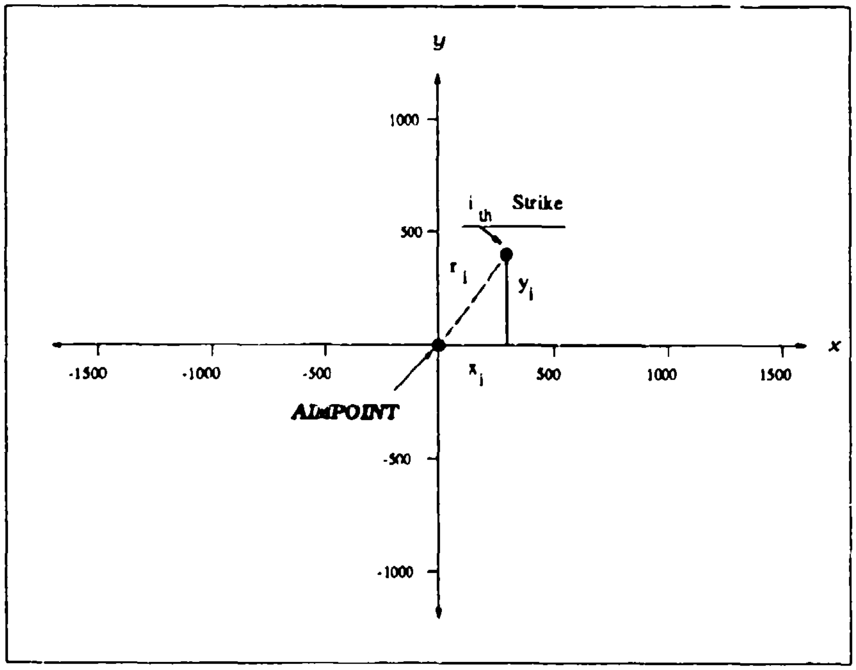


Figure 3.1. Radial Miss Distance

An intuitively appealing non-parametric technique rank-orders the radial miss distances from smallest to largest [23:2]. The median (or middle) value on this list coincides with the radius of a circle that captures the inner 50% of the observed miss distances. For example, if we targeted 1999 RVs at an aimpoint, calculated each radial miss distance (r_i), and sorted these from smallest to largest, then the middle (1000th) radial miss distance (r_{1000}) on that list would represent a good approximation of the CEP. If we launched 2000 RVs, we would simply take the average of the two middle radial miss distances, or $\frac{1}{2}(r_{1000} + r_{1001})$.

Ten years ago, Smith concluded that

> For large sample size[s,] the sample median of $\{r_i\}$ is a good estimate of the population median and, hence, CEP. In flight test analysis, however, large sample sizes occur infrequently. [23:2]

Since then, the test launch rate for ICBMs has decreased by almost 60%, further limiting the applicability of this technique [7]. Thus, we will not consider this technique in this study.

3.2.1.2 Ethridge Estimator. Another technique that makes use of the radial miss distances is the Ethridge Estimator [6:22-27]. This estimator begins by taking the natural logarithm of the radial errors, or

$$t_i = ln(r_i). \tag{3.2}$$

Ethridge used this transformation to formulate a robust estimator of CEP (CEP^{ETH}). CEP^{ETH} is based on the Logarithmic Generalized Exponential Power (LogGEP) distribution, and, as such, is technically a parametric technique. However, the departure this technique makes from the normality assumption, common to all the remaining techniques, and its emphasis on the population median, make this section a more logical setting for its discussion.

CEP^{ETH} is constructed using the following expressions, where $\bar{t}$ is the sample mean of the t_i, or

$$\bar{t} = \frac{\sum_{i=1}^{n} t_i}{n}; \tag{3.3}$$

s_t^2 is the sample variance of the natural logarithms of radial errors, or

$$s_t^2 = \frac{\sum_{i=1}^{n}[t_i - \bar{t}]}{n-1}; \tag{3.4}$$

and k_s is the sample kurtosis of the t_i, or

$$k_s = \frac{n\sum_{i=1}^{n}(t_i - \bar{t})^4}{[\sum_{i=1}^{n}(t_i - \bar{t})^2]^2}. \tag{3.5}$$

From the above expressions, we construct a weighting factor (w_i), where

$$w_i = \frac{\frac{1}{d_i}}{\sum_{i=1}^{n}(\frac{1}{d_i})}, \tag{3.6}$$

$$d_i = max[1 - \frac{(.03)(k_s - 3)^3(t_i - \dot{t})^2}{s_t^2}, 0.01], \tag{3.7}$$

and $\dot{t}$ is the sample median of the t_is. This weighting factor (w_i) is then used to take a weighted sum of the t_i, or

$$\hat{\mu} = \sum_{i=1}^{n} w_i t_i. \tag{3.8}$$

Ethridge noted that $\hat{\mu}$ "was one of the best estimators of the population median" [6:23]. Since the median of the *population* of radial errors defines CEP, he selected $\hat{\mu}$ for his robust estimator of CEP. Of course, one final transformation is required. Using the exponential function to "reverse" the effect of the natural logarithm, we have

$$CEP^{ETH} = e^{\hat{\mu}}. \tag{3.9}$$

This is one of the five estimation techniques this study analyzes with respect to estimator bias and variance. Since it does not rely on the normality assumptions from which the other techniques are constructed, we might expect superior performance from CEP^{ETH} when the data are not normally distributed about the aimpoint. For a more detailed description of this method, refer to Ethridge's ACSC report [6:23-27].

3.2.2 Parametric Methods.

3.2.2.1 Closed-form Integration of the Bivariate Normal Density Function. In Section 1.4, we discussed integrating a probability density function over a particular region of the coordinate space as a way to determine the probability associated with that region. If the population is distributed bivariate normal, then the joint probability density function is described by

$$f(x,y) = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho_{xy}^2}}\Big[exp(-\Omega)\Big], \tag{3.10}$$

where

$$\Omega = \frac{1}{2(1-\rho_{xy}^2)}\Big\{\Big[\frac{x-\mu_x}{\sigma_x}\Big]^2 - 2\rho_{xy}\Big[\frac{(x-\mu_x)(y-\mu_y)}{\sigma_x\sigma_y}\Big] + \Big[\frac{y-\mu_y}{\sigma_y}\Big]^2\Big\}.$$

Integrating equation (3.10) over some subset of the (x,y) space provides the probability (between 0.0 and 1.0) of an RV striking within that region. However, when estimating CEP, we iteratively search for the limits of integration that yield a circular region with a probability of 0.50. Letting $f(x,y)$ be the PDF expressed in equation (3.10), we represent this integration as

$$F(x,y) = \int\int_{C_{CEP}} f(x,y)dxdy = 0.5. \tag{3.11}$$

We usually start the iterative search with an initial estimate of CEP and use a search strategy that varies the limits of integration until $F(x,y)$ converges to 0.50. Initial values that are fairly close to the CEP accelerate the convergence process; poor initial estimates have the opposite effect.

Care must be exercised when setting the limits of integration. If we simply let x and y each vary over some fixed range, we will integrate over a rectangular region, as in Figure 3.2. Square limits of integration do not properly represent the 50% of the PDF closest to the aimpoint. The square limits presented in Figure 3.2 might contain 50% of the miss-distance distribution, but obviously not the 50% closest to the aimpoint. To correctly set the limits, we use the definition of a circle centered

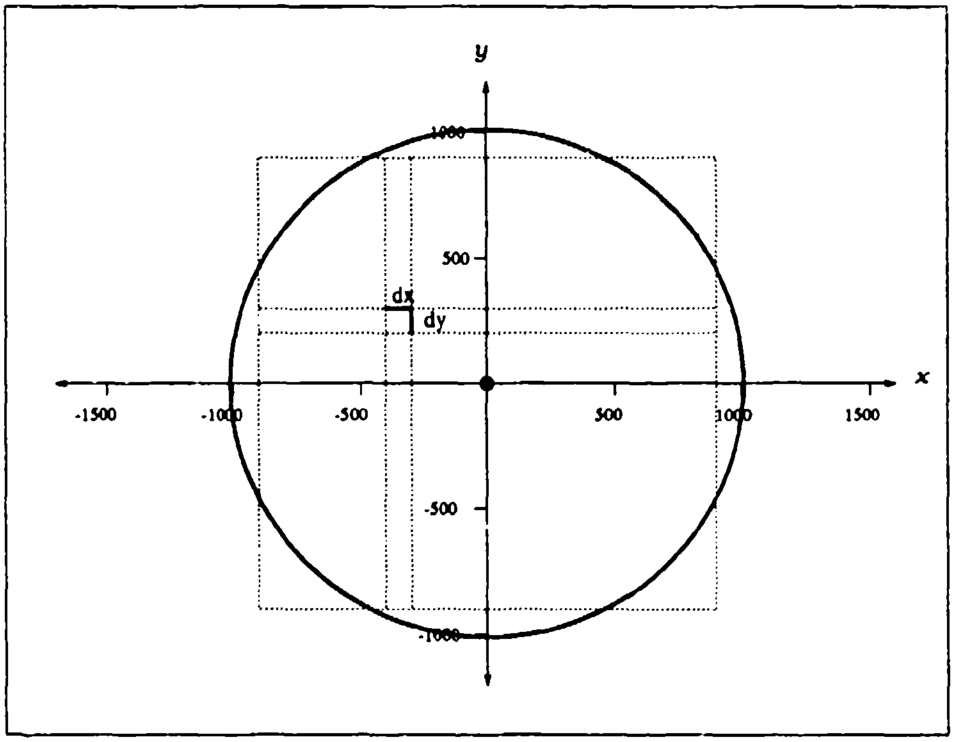


Figure 3.2. Rectangular Limits of Integration

on the origin ($r^2 = x^2 + y^2$) where r is the guessed-at radius. We then make one variable (x) a function of the others (y and r), and use our guess ($\pm r$) for the outer limits of integration, as in equation (3.12).

$$F(x,y) = \int_{-r}^{r} \int_{-\sqrt{r^2-y^2}}^{\sqrt{r^2-y^2}} f(x,y)dxdy \qquad (3.12)$$

Figure 3.3 shows the properly formed limits, where $r = 1000$.

Except for the nominal case depicted in Figure 2.1, no general, closed-form solution to equation (3.12) exists [13:160]. In the nominal case, $bias = 0$, $correlation = 0$,

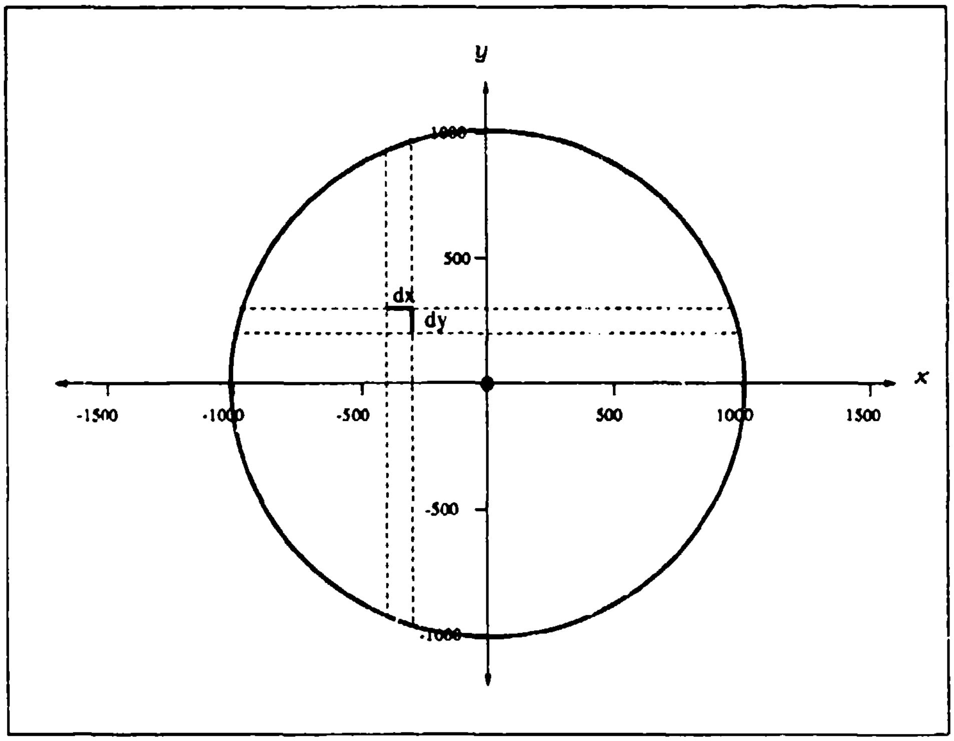


Figure 3.3. Circular Limits of Integration

and $STDR = 1.0$. Since $STDR = 1.0$, we can define a common standard deviation (σ) to represent the equivalent down and cross range standard deviations (σ_x, σ_y), and greatly simplify equation (3.10) to

$$f(x,y) = \frac{1}{2\pi\sigma^2} \exp\left(-\frac{x^2 + y^2}{2\sigma^2}\right). \tag{3.13}$$

Even with this simplification, we still need to transform from rectangular to polar coordinates (r, θ) in order to integrate equation (3.13). The polar limits of integration are represented in Figure 3.4. Substituting r^2 for $x^2 + y^2$ (equation (3.1)) yields [1:3]

$$F(r) = \frac{1}{2\pi\sigma^2} \int_0^{2\pi} \int_0^r \exp\left(\frac{-r^2}{2\sigma^2}\right) r\,dr\,d\theta. \tag{3.14}$$

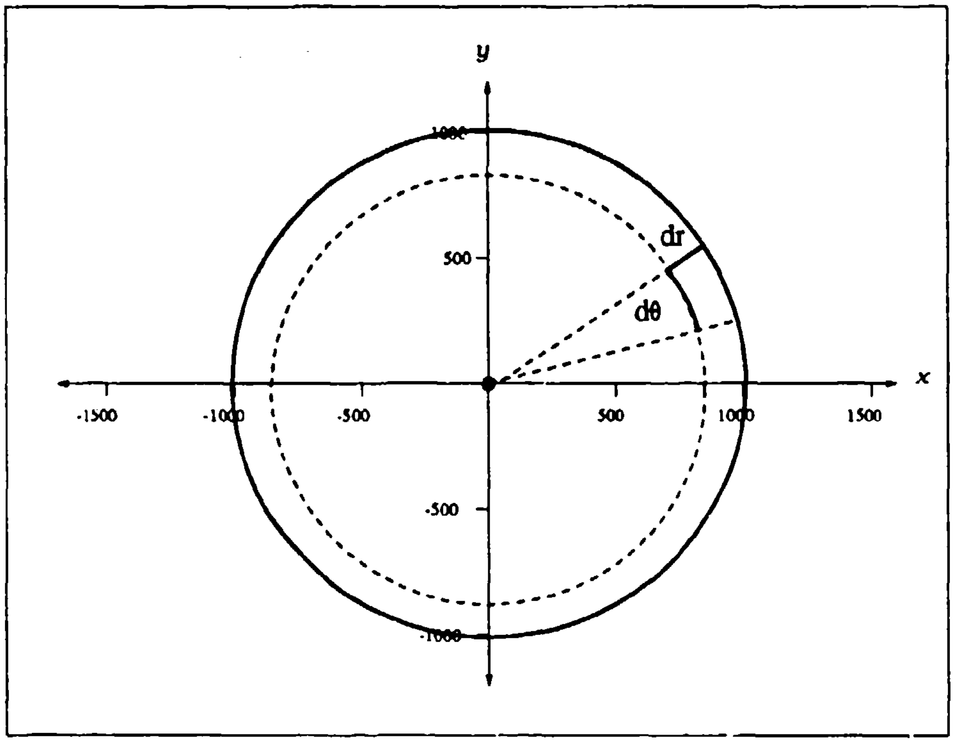


Figure 3.4. Polar Limits of Integration

Since we will integrate over the entire circle, the integral over θ becomes a scalar multiple, 2π. Now the double integral of equation (3.13) is simply a function of r, where

$$F(r) = \frac{2\pi}{2\pi\sigma^2} \int_0^r \exp\left(\frac{-r^2}{2\sigma^2}\right) r\,dr, \tag{3.15}$$

which reduces to

$$F(r) = \int_0^r \frac{r}{\sigma^2} \exp\left(\frac{-r^2}{2\sigma^2}\right) dr. \tag{3.16}$$

The integrand of equation (3.16) is the Rayleigh probability density function of radial errors [6:8] which can be integrated in closed form. Setting equation (3.16) equal to 0.50 yields

$$0.50 = 1 - \exp\left\{-\frac{r^2}{2\sigma^2}\right\}, \tag{3.17}$$

which, after some algebraic manipulation, becomes

$$ln(2) = \frac{r^2}{2\sigma^2}, \tag{3.18}$$

or

$$\sigma\sqrt{2ln(2)} = r, \tag{3.19}$$

where r is the radius capturing 50% of the volume of the miss distance distribution. Thus, in the nominal case, CEP is

$$CEP^{nominal} = 1.1774\sigma, \tag{3.20}$$

merely a function of the common standard deviation.

This expression for $CEP^{nominal}$ is an important relationship for establishing one of the experimental parameters used in this study. Since we selected a baseline CEP of 1000 ft. (pg. 1-2) as the starting point for this study, the baseline standard deviation (σ) for that CEP must be

$$\sigma_{baseline} = \frac{1000}{1.1774} = 849.33ft. \tag{3.21}$$

This baseline σ will be used throughout the study. A circle with $\sigma_{baseline}$ as its radius is depicted by the dotted line in Figure 2.1.

To apply this technique, one must be dealing with a miss distance distribution centered on the aimpoint. Then, one must rotate the error coordinates until no correlation exists between x and y. Then one must assume that any difference between the downrange and crossrange standard deviations is trivial. This assumption would allow for pooling the σ_x and σ_y parameters in some fashion, like equation (2.5). Since the common standard deviation term is the only independent variable in equation (3.20), calculating CEP is a simple matter of multiplication. This technique appears much easier to apply than Ethridge's (or any that follow, for that matter), but one should recall the restrictive assumptions necessary to arrive at this expression for CEP. Analysts in search of a more broadly applicable technique turned to numerical integration techniques.

3.2.2.2 Numerical Integration of the Bivariate Normal Distribution Function. Like the closed-form integration described above, numerical integration provides the probability of impact for a circle of known radius, and also requires an iterative search scheme to find CEP. However, this technique suffers from none of the restrictions placed on the closed-form case.

This was the technique employed in the early years of CEP estimation to generate tables of numerical integration solutions which corresponded to different values of variance and bias [20]. However, as computers became more available in the 1970s and 1980s, numerical integration techniques, independent of any tables, were developed. Until recently, numerical integration techniques sometimes required hours to compute on available computers [5:5-2].

As mentioned in Section 1.7.3, computational efficiency is no longer a consideration for current generation computers. Puhek discovered that MathCAD provided the ability to directly integrate the bivariate normal density function from a graphical representation of its functional form. Furthermore, on a SUN workstation, MathCAD provided CEP estimates in 15 seconds or less [19:4-19]. This effectively eliminated the distinction between "quick" and "slow" estimators of CEP.

Three versions of this technique were employed in this study. Each entails an expansion of the the bivariate normal distribution function into a series of simpler algebraic expressions. These are the techniques alluded to in Chapter I which, when applied to a *known* miss distance distribution, yield the population CEP ($CEP_{pop.}$) exactly .

MathCAD: Appendix A contains a MathCAD template which runs a Romberg algorithm in the background to numerically integrate the BVN [12:257]. Appendix A also lists the results from two other versions (discussed below) of this technique. MathCAD's background implementation was unable to converge in all cases. This was especially true with increasing values of *bias*.

Taylor Series Expansion: Smith presented a Taylor series expansion of the bivariate normal, where the numerical approximation to the probability that a point lies within a circle of radius R is given by [24]

$$P(R) = \frac{R^2}{2} D \sum_{k=0}^{\infty} \sum_{j=0}^{\infty} w_k z_j \frac{(k+1)!(j+1)!}{(k+j+1)!} \tag{3.22}$$

where

$$D = \frac{1}{\hat{\sigma}_x \hat{\sigma}_y} exp\left[-\left(\frac{\hat{\mu}_x^2}{2\hat{\sigma}_x^2} + \frac{\hat{\mu}_y^2}{2\hat{\sigma}_y^2}\right)\right], \tag{3.23}$$

$$w_k = \frac{(2k)!}{(k+1)!(k!)^2} \left(\frac{-R^2}{8\hat{\sigma}_x^2}\right)^k \sum_{l=0}^{k} \frac{k!}{(k-l)!(2l)!} \left(\frac{-2\hat{\mu}_x^2}{\hat{\sigma}_x^2}\right)^l, \tag{3.24}$$

and

$$z_j = \frac{(2j)!}{(j+1)!(j!)^2} \left(\frac{-R^2}{8\hat{\sigma}_y^2}\right)^j \sum_{i=0}^{j} \frac{j!}{(j-i)!(2i)!} \left(\frac{-2\hat{\mu}_y^2}{\hat{\sigma}_y^2}\right)^i. \tag{3.25}$$

Notice that no expression for correlation appears in this estimator. We can ignore correlation with this estimator since a simple rotation of the error axes can reduce correlation to zero. We alluded to such a rotation in the discussion of Figure 2.4. We now specify the angle of rotation as θ, where

$$\theta = \frac{1}{2} arctan\left(\frac{2\hat{\rho}\hat{\sigma}_x\hat{\sigma}_y}{\hat{\sigma}_x^2 - \hat{\sigma}_y^2}\right), \tag{3.26}$$

and $\hat{\sigma}_x$ and $\hat{\sigma}_y$ are measured about the MPI. This axis rotation yields a new set of axes for down and cross range error (v, u), and each parameter must be defined in terms of the new coordinate system. Thus, the mean error coordinates ($\hat{\mu}_x$, $\hat{\mu}_y$), and their associated variances ($\hat{\sigma}_x$, $\hat{\sigma}_y$), take on new values, $\hat{\mu}_u$, $\hat{\mu}_v$, $\hat{\sigma}_u$, and $\hat{\sigma}_v$, respectively, where

$$\hat{\mu}_u = \hat{\mu}_x \cos\theta + \hat{\mu}_y \sin\theta, \tag{3.27}$$

$$\hat{\mu}_v = -\hat{\mu}_x \sin\theta + \hat{\mu}_y \cos\theta, \tag{3.28}$$

$$\hat{\sigma}_u^2 = \left(\frac{\hat{\sigma}_x^2 + \hat{\sigma}_y^2 + \sqrt{(\hat{\sigma}_x^2 - \hat{\sigma}_y^2)^2 + 4\hat{\sigma}_{xy}^2}}{2}\right), \tag{3.29}$$

and

$$\hat{\sigma}_v^2 = \left(\frac{\hat{\sigma}_x^2 + \hat{\sigma}_y^2 - \sqrt{(\hat{\sigma}_x^2 - \hat{\sigma}_y^2)^2 + 4\hat{\sigma}_{xy}^2}}{2}\right). \tag{3.30}$$

These transformed parameters (equations (3.27) through (3.30)) completely describe the miss distribution *sans* correlation. These parameters can be applied to the Taylor series expansions described in equations (3.22) through (3.25).

Appendix B contains a FORTRAN code listing of this technique. For a more detailed discussion of this method, refer to Smith's report [24:1-16]. We used this technique primarily as a check for the other numerical integrators used in this study. As noted by Elder, "for some highly elliptical distributions where the target centroid is not within 2 standard deviations of the mean point of impact" the Taylor series does not converge [5:4-6].

Correlated Bivariate Normal The correlated bivariate normal (CBN) technique is also a numerical integration of the BVN, but it offers some advantages over the other two techniques. Primarily, it solves all combinations of characteristic values listed in Appendix G, columns 6 through 8. The CBN technique did have trouble with a few isolated sets of sample parameters (out of literally hundreds of thousands of combinations), and these will be addressed in Chapter IV. For the most part, the flexibility and accuracy of the CBN method were outstanding.

L.S. Simpkins outlined this technique in "Calculation of Circle of Equiprobability for a Biased, Correlated, Bivariate, Normal Distribution" [22]. Simpkins used polar coordinates, which, in the case of numerical integration, appear as in Figure 3.5. As the number of "wedges" used in the numerical integration increases, the approximation converges to the exact value of the integral expression.

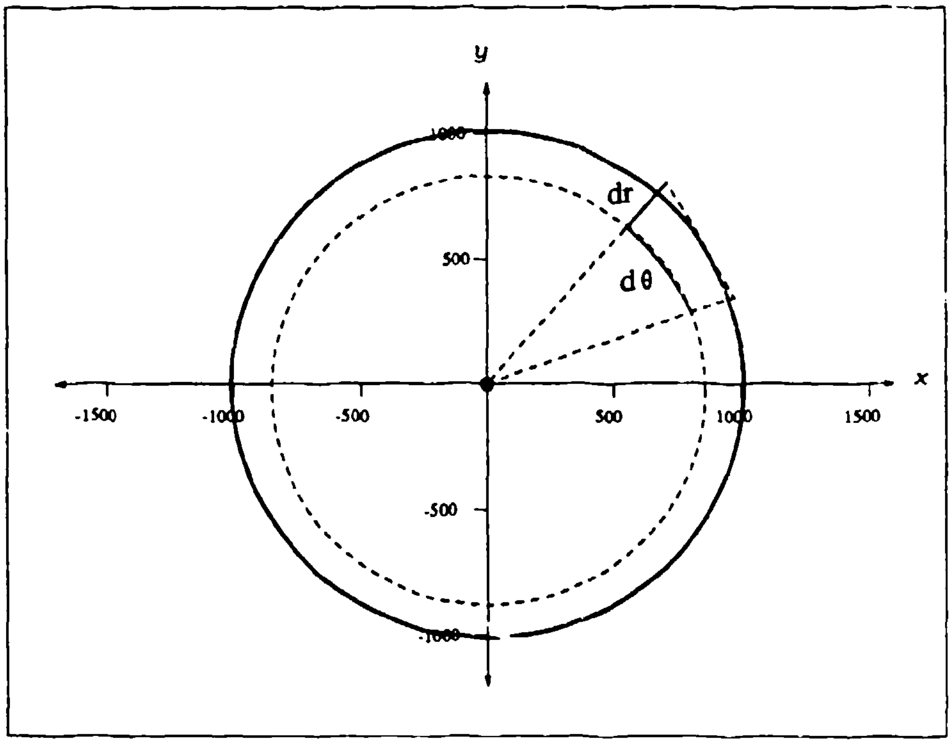


Figure 3.5. Circular Limits of Integration

Simpkins expressed the integral of the BVN in polar coordinates as

$$P(r^*) = \frac{1}{2\pi\sigma_R\sigma_T\sqrt{1-\rho^2}} \int_0^{2\pi}\int_0^{r^*} \exp(-(ar^2 + 2br + c))r\,dr\,d\theta, \qquad (3.31)$$

where

σ_R, σ_T are the Range and Track one sigma miss distance,

ρ is the correlation between Range and Track,

ζ is the angular measure about the target, and

r is the radial miss distance from the target, equation (3.1).

In terms of our familiar Cartesian coordinate parameters,

$$\sigma_R = \frac{\sigma_x}{\sqrt{\sigma_x^2 + \sigma_y^2}}, \tag{3.32}$$

$$\sigma_T = \frac{\sigma_y}{\sqrt{\sigma_x^2 + \sigma_y^2}}, \tag{3.33}$$

and

$$\rho = \frac{\sigma_{xy}}{\sigma_x \sigma_y}. \tag{3.34}$$

The remaining undefined terms from the closed-form expression above are also used in the series expansion, shown in equation (3.40). They are

$$a = \left[\frac{1}{2(1-\rho^2)}\right]\left[\left(\frac{sin(\theta)}{\sigma_R}\right)^2 - \frac{2\rho \sin(\theta) cos(\theta)}{\sigma_R \sigma_T} + \left(\frac{cos(\theta)}{\sigma_T}\right)^2\right], \tag{3.35}$$

$$b = \left[\frac{1}{2(1-\rho^2)}\right]\left[\left(\frac{\bar{R} sin(\theta)}{\sigma_R^2}\right) - \frac{\rho(\bar{T}\sin(\theta) + \bar{R} cos(\theta))}{\sigma_R \sigma_T} + \left(\frac{\bar{T} cos(\theta)}{\sigma_T^2}\right)\right], \tag{3.36}$$

and

$$c = \left[\frac{1}{2(1-\rho^2)}\right]\left[\left(\frac{\bar{R}}{\sigma_R}\right)^2 - \frac{2\rho \bar{T}\bar{R}}{\sigma_R \sigma_T} + \left(\frac{\bar{T}}{\sigma_T}\right)^2\right], \tag{3.37}$$

where $\bar{R}$ and $\bar{T}$ are the Range and Track impact bias defined as

$$\bar{R} = \frac{\mu_x}{\sqrt{\sigma_x^2 + \sigma_y^2}} \tag{3.38}$$

and

$$\bar{T} = \frac{\mu_y}{\sqrt{\sigma_x^2 + \sigma_y^2}}. \tag{3.39}$$

Now we have all the components of the CBN's numerical integral, shown in equation (3.40). The probability associated with a radius (r^*) is given as

$$P(r^*) = \frac{-\frac{2\pi}{N}}{4\sigma_R\sigma_T\sqrt{\pi}\sqrt{1-\rho^2}} \sum_{i=0}^{N}\Big\{X_i(Y_i + Z_i)\Big\}, \tag{3.40}$$

where

$$X_i = \frac{1}{a_i}\exp\left(\frac{b_i^2 - a_i c_i}{a_i}\right),$$

$$Y_i = \frac{b_i}{\sqrt{a_i}}\left[erf\left(\sqrt{a_i}(r^*) + \frac{b_i}{\sqrt{a_i}}\right) - erf\left(\frac{b_i}{\sqrt{a_i}}\right)\right],$$

$$Z_i = \frac{1}{\sqrt{\pi}}\left[\exp\left(-a_i(r^*)^2 - 2b_i r^* - \frac{b_i^2}{a_i}\right) - \exp\left(-\frac{b_i^2}{a_i}\right)\right],$$

and N is the number of wedges into which the integral plane is cut.

The error function ($erf(z)$) is given as

$$erf(z) = \frac{2}{\sqrt{\pi}}\int_0^z \exp(-x^2)dx, \tag{3.41}$$

and is estimated in the CBN routine by a polynomial approximation [2:297,299]. Finally, the search routine uses a modified secant method to arrive at the r^* associated with a probability of 0.50 [22:5]. Thus, if $P(r^*) = 0.50$, then

$$CEP^{CBN} = r^*. \tag{3.42}$$

3.2.2.3 Algebraic Approximation of CEP. This category of parametric methods includes the "quick" estimators of CEP. They have been particularly appealing for flight test analysis owing to their computational speed relative to the numerical estimation techniques. What appeared to be a slight cost in terms of one or two percent RE could not offset the convenience of these techniques. Three of the five CEP estimators analyzed in this study belong to this category.

Modified Rand R-234: In 1952, the Rand Corporation published tables which contained miss probabilities for a range of values for $\frac{bias}{\sigma}$, where σ is the common downrange and crossrange standard deviation for miss distance data with circular-only distributions [20]. These scaled bias values correspond to likewise-scaled CEP values, so that the tables are generally applicable, regardless of the magnitude of the bias. Until the widespread availability of computers, these tables were among the best means of estimating CEP.

In 1977, John Pesapane and Robert B. Irvine used a least squares fit to develop a third-order polynomial approximation of the Rand tables. Their approximation requires uncorrelated data, so one can either rotate the correlation out of the data using equations (3.26) through (3.30), or simply use equations (3.44) through (3.45). The resulting model has since become known as the Modified Rand-234 (R234) technique [18], and estimates CEP as

$$CEP^{R234} = CEP_{MPI}(1.0039 - 0.0528v + 0.478v^2 - 0.0793v^3) \qquad (3.43)$$

where CEP_{MPI} refers to the CEP centered on the mean point of impact, or

$$CEP_{MPI} = 0.614\hat{\sigma}_S + 0.563\hat{\sigma}_L,$$

$\hat{\sigma}_S$ is the smaller of the two rotated standard deviations, or

$$\hat{\sigma}_S = \sqrt{\frac{\hat{\sigma}_x^2 + \hat{\sigma}_y^2 - \sqrt{(\hat{\sigma}_x^2 - \hat{\sigma}_y^2)^2 + 4\hat{\rho}^2\hat{\sigma}_x^2\hat{\sigma}_y^2}}{2}}, \qquad (3.44)$$

$\hat{\sigma}_L$ is the larger of the two rotated standard deviations, or

$$\hat{\sigma}_L = \sqrt{\frac{\hat{\sigma}_x^2 + \hat{\sigma}_y^2 + \sqrt{(\hat{\sigma}_x^2 - \hat{\sigma}_y^2)^2 + 4\hat{\rho}^2\hat{\sigma}_x^2\hat{\sigma}_y^2}}{2}}, \qquad (3.45)$$

and

$$v = \frac{bias}{CEP_{MPI}}. \tag{3.46}$$

The boundary conditions for this technique are $\frac{\hat{\sigma}_S}{\hat{\sigma}_L} > 0.25$ and $v \leq 2.2$. Thus, this function offers much greater flexibility than the tables. Whereas the tables required circular distributions about the MPI, CEP^{R234} allows for a degree of bias and ellipticity in the miss-distance distribution [5] [18].

Grubbs-Patnaik/Wilson Hilferty: In 1964, Frank Grubbs offered an approximation technique now known as the Grubbs-Patnaik/Chi–Square method [9]. Assuming that the radial miss distances are distributed normally, then their squared sum is distributed χ^2 with n degrees of freedom [13:307]. This method, then, models the squared radial errors as chi–square random variables, where first we must compute

$$m = (\hat{\sigma}_x^2 + \hat{\sigma}_y^2 + \hat{\mu}_x^2 + \hat{\mu}_y^2), \tag{3.47}$$

and

$$v = 2(\hat{\sigma}_x^4 + 2\rho^2\hat{\sigma}_x^2\hat{\sigma}_y^2 + \hat{\sigma}_y^4) + 4(\hat{\mu}_x^2\hat{\sigma}_x^2 + 2\hat{\mu}_x\hat{\mu}_y\rho\hat{\sigma}_x\hat{\sigma}_y + \hat{\mu}_y^2\hat{\sigma}_y^2). \tag{3.48}$$

Then, the degrees of freedom associated with the χ^2 random variable is computed as

$$n = \frac{2m^2}{v}. \tag{3.49}$$

Using the appropriate degrees of freedom, we can obtain the percentage point associated with the 0.50 percentile from a table of χ^2 values [5:3-3], or

$$k = \chi^{-1}(0.5) \tag{3.50}$$

Using the expressions above, we estimate CEP by

$$CEP^{GPx} = \sqrt{\frac{kv}{2m}}. \tag{3.51}$$

In this study we analyzed an approximation to CEP^{GP_X}. The Wilson-Hilferty approximation transforms the chi-square to approximate normal variables, obviating the need for chi-square tables or functions required by Grubbs-Patnaik /Chi-Square. The Grubbs-Patnaik/Wilson-Hilferty CEP estimator examined in this study is given as

$$CEP^{GRBS} = \sqrt{m\left[1 - \left[\frac{v}{9m^2}\right]\right]^3} \tag{3.52}$$

Rayleigh Method: Earlier, we integrated the Rayleigh distribution (equation (3.16)), and found that CEP, in the nominal case, was a function of σ. Specifically, under those strict assumptions, $CEP = 1.1774\sigma$. If we calculate the expected value of the Rayleigh probability distribution, we get an expression in terms of the expected mean of the radial miss distance (MRM) [6:10].

$$MRM = \sqrt{\frac{\pi}{2}}\sigma \tag{3.53}$$

Substituting equation (3.53) into equation (3.20) yields

$$CEP = 1.1774\frac{MRM}{\sqrt{\frac{\pi}{2}}}, \tag{3.54}$$

which simplifies to

$$CEP^{RAYL} = .9394MRM, \tag{3.55}$$

where the Mean Radial Miss (MRM) distance,

$$MRM = \frac{\sum_{i=1}^{n} r_i}{n}, \tag{3.56}$$

is simply the average of the radial miss distances (r), as defined in equation (3.1).

The Rayleigh technique offers one of the simplest approximations of CEP available, but the assumptions underlying the Rayleigh density function appear somewhat limiting [6:10,11].

3.2.2.4 Monte Carlo Sampling Methods. Like numerical integration techniques, Monte Carlo sampling methods estimate the probability of impact for a circle of known radius. The approach, however, is empirical rather than analytical in nature. Given the parameters derived from sampling techniques, we start with an initial estimate of the CEP. Then, using computer simulation techniques, we "launch" a number RVs with these parameters at the same target. If half land inside our guessed-at CEP, we stop. If fewer than half land inside, we increase our CEP, and repeat the process. If more than half land inside, we decrease our current estimate of CEP, also repeating the process. Like the numerical integration techniques, these estimators were once thought too computationally intensive for flight test analysis [23:3]. However, given the current widespread availability of powerful desktop platforms, future research should consider these estimators as candidates for comparison. An added advantage to the Monte Carlo method is that we are not limited to miss distances distributed normally about the MPI.

3.3 Previous Work.

Since the late 1940s, the estimation of CEP has drawn a great deal of attention. "A Sensitivity Analysis of Circular Error Probabilities" offers an excellent review of the early years of CEP estimation [19:2-4,7]. To summarize, the mathematical work done until 1982 was primarily theoretical in nature. Comparisons between estimators concentrated on their underlying assumptions, properties, and their ease of use. This study is an outgrowth of more recent work with a more empirical focus, five representative examples of which are discussed below.

3.3.1 TRW Report: Smith. A 1982 TRW Corporation study entitled "Methods of CEP Calculation" compared CEP estimators on an empirical basis, using Relative Error (RE) as an MOE [23]. It distinguished between "quick" estimators and those requiring (at the time) "considerable computer time" [23:3]. To assess the effect of population parameters on the precision of various CEP estimators, it varied bias (b), ratio of standard deviations ($STDR$), and correlation (ρ) one at a time, while holding the others constant. Under certain configurations of the population parameters, some estimators exhibited relative errors as high as 23%.

The study did not investigate the effects of sample size or that of varying the population parameters simultaneously. By effectively assuming an infinite sample size, the study did not focus on the inherent variation in CEP^i, as discussed in Section 1.8.

3.3.2 Air Command and Staff College Report: Ethridge. A 1983 Air Command and Staff College report, "Robust Estimation of Circular Error Probable for Small Sample Sizes" compared 10 CEP estimators using efficiency (equation (1.11)) as an MOE [5]. The goal of the study was to develop a robust estimator; that is, one insensitive to assumptions concerning the underlying distributions of the data. It created 81 design points using sample size, STDR, and correlation as main factors, and compared each estimator's relative efficiency at combinations of those main factors. The Monte Carlo-designed experiment was the first to draw attention to CEP estimators operating under the constraint of small samples. Furthermore, it was the first study to focus on the variance of CEP estimators as an MOE.

To use efficiency as an MOE required the assumption that all ten estimators were unbiased. However, Smith's TRW report, completed one year earlier, demonstrated that two of the estimators included in Ethridge's report exhibit bias, even under conditions of infinite sample size. Furthermore, work done by Puhek [19:4-17,18] demonstrates that Ethridge's "robust" estimator had a dramatic bias relative to the other estimators Puhek considered in his study. While efficiency is not an appropriate measure for comparing biased estimators, Ethridge brought needed attention to the existence of a measurable and significant variability on the part of CEP estimation techniques.

3.3.3 Air Force Institute of Technology Thesis: Elder. Expanding on Smith's study [5] Elder's thesis addressed the following question:

> Given non-correlated sample impacts, how do common CEP approximation techniques... compare in accuracy and computational effort (measured by computer time) to the *exact* method... over the possible range of the parameters bias and ellipticity? [5:1-5]

The report compared CEP methods with respect to personal computer processing time [5:4-2,4-4,4-5]. By rotating the error axes, as demonstrated in Chapter I, it eliminated the correlation in the data. Thus, it was able to concentrate on varying only the characteristics of bias and ellipticity. Using *RE* as its MOE, the report found that the "Grubbs-Patnaik/chi-square is the most accurate for the greatest range of values of ellipticity and bias."[5:5-5] Like Smith, Elder set aside the issue of estimator variance. Furthermore, he also did not address the effect of sample size on an estimator's performance.

3.3.4 Air Force Institute of Technology Thesis: Puhek. Puhek's thesis, "A Sensitivity Analysis of Circular Error Probable Techniques," used *RE* as the MOE for comparing four "quick" CEP estimation techniques [19]. As such, his was the first study to address the issue of small sample size and its effect on *RE*. The thesis also considered non-zero values for correlation, simultaneously varying bias, ellipticity, correlation, and small sample size in the hopes of capturing their interactive effect.

Like Smith's and Elder's, Puhek's study considered only the bias of the estimator, as measured by RE, failing to consider the variance of the estimators under consideration. By considering its variance, future research may uncover a better criterion for selecting a CEP estimator.

3.3.5 JASA Article: Spall and Maryak. A recent study, "A Feasible Bayesian Estimator of Quantiles for Projectile Accuracy for Non-iid Data" continued the traditional emphasis exhibited by almost all previous work [25]. The study evaluated a candidate estimator in terms of its *RE* and computer processing time. Performing work most helpful for smaller, less expensive Navy ordnance, they considered sample sizes no smaller than 40. As such, they effectively ignored the problem of ICBM CEP estimation, which must deal with much smaller sample sizes.

3.4 Future Work

A review of previous research reveals that there are a number of CEP estimation techniques available, but their suitability as sample estimators has not been examined. Most notably, the variability of the estimators and the effect of small sample sizes on the quality of those estimators have yet to be established. Clearly, future research efforts should consider estimator variance, and, with ICBM accuracy in mind, the effect of small sample size on estimator performance. This study seeks to address a number of those issues that have been left unresolved by previous evaluations of CEP estimation techniques.

IV. Experimental Approach

4.1 Purpose

As mentioned in Section 1.9, this thesis seeks to answer the following questions:

1. Is there one "best" CEP estimation technique?
2. If not, are there specific conditions under which one estimation technique performs "best"?
3. Should we select our technique based on these specific conditions?
4. Which of the factors discussed in Chapter II, when varied, cause the greatest changes in $\overline{RE}^i$, $VAR(RE^i)$, and $MSE(RE^i)$?
5. Should future studies eliminate any of those factors from consideration?
6. Do the different measures of effectiveness (MOEs) lead us to select different "best" estimators?
7. Does one component of MSE, bias or variance, comprise such a large portion of MSE that MSE is virtually indistinguishable from it?

To answer these questions requires an experimental design that compares five different CEP estimation techniques under many different conditions. In this chapter we discuss the measures of effectiveness, the estimators to be compared, and the conditions under which we compare them. After outlining the experimental procedure, we address some of the problems encountered during the process, and how we resolved them.

4.2 Experimental Design.

4.2.1 Measures of Effectiveness. We will use the mean Relative Error ($\overline{RE}$) of the sample CEP estimators, variance of RE about $\overline{RE}$ ($VAR(RE^i)$), and mean squared error ($MSE(RE^i)$) as the MOEs for answering the above questions. For

$j = 1, 2, 3, ..., n$ samples of impact data, the relative error for the j^{th} sample and the i^{th} estimator is given as

$$RE_j^i = \frac{CEP_j^i - CEP_{pop.}}{CEP_{pop.}}. \tag{4.1}$$

The mean CEP estimate for the i_{th} estimator is

$$\overline{CEP}^i = \frac{\sum_{j=1}^{n}(CEP_j^i)}{n}. \tag{4.2}$$

Thus, the MOEs for the i_{th} estimator are

$$\overline{RE}^i = \frac{\sum_{j=1}^{n}(RE_j^i)}{n} = \frac{\overline{CEP}^i - CEP_{pop.}}{CEP_{pop.}}, \tag{4.3}$$

$$VAR(RE^i) = \frac{\sum_{j=1}^{n}(RE_j^i - \overline{RE}^i)^2}{n-1}, \tag{4.4}$$

and

$$MSE(RE^i) = (\overline{RE}^i)^2 + VAR(RE^i). \tag{4.5}$$

4.2.1.1 Calculation and Verification of $CEP_{pop.}$. An obviously important value with respect to our MOEs is $CEP_{pop.}$, the exact CEP value for each simulated population. Three numerical integration techniques were considered for computing these values: a Taylor series expansion, the Romberg algorithm, and the CBN technique. Appendix A lists $CEP_{pop.}$ values for eleven different populations using each numerical integration technique. Of the 11 populations, selected to cover a wide range of population characteristics, there were three at which the numerical integration techniques disagreed on the value of $CEP_{pop.}$. In each case, however, the difference in CEP estimates calculated by the three techniques was never larger than $\frac{1}{10}th$ of one percent. We assume that, since the three techniques yield nearly identical results, they accurately measure $CEP_{pop.}$. Thus, we can legitimately select one of these techniques based on other measures, such as convenience or processing time, without affecting the outcome of the study.

The ability of the numerical integration techniques to converge on the $CEP_{pop.}$ value was the determining factor in this selection process. Of the 175 populations examined in the experiment, the MathCAD version of the Romberg algorithm failed to converge about one fourth of the time. The FORTRAN implementation of the Taylor series expansion experienced a similar rate of convergence. The CBN algorithm, however, exhibited no convergence problem with the 175 populations whatsoever. In the cases where the Taylor series or Romberg algorithms converged, they never differed from the CBN value for $CEP_{pop.}$ by more than $\frac{1}{10}th$ of one percent. On the basis of accuracy and propensity to converge, we selected the CBN numerical integration technique to compute $CEP_{pop.}$.

The FORTRAN implementation of the CBN method[1] is contained in Appendix C, as well as in Appendix D as a subroutine of the EXPERIMENT program. In lieu of source code, the MathCAD template used to compute $CEP_{pop.}$ is included in Appendix A. MathCAD's Romberg algorithm runs in a background environment inaccessible to the user and is, therefore, unavailable for viewing or modification. The source code for the Taylor series expansion is given in Appendix B[2]. Time constraints prevented the programming effort required to attain convergence in all cases from the Taylor series implementation.

4.2.2 CEP Estimators. We will compare the Modified RAND R-234 estimator (R234), Grubbs-Patnaik/Wilson-Hilferty estimator (GRBS), Numerical Integration of the Correlated Bivariate Normal (CBN), Rayleigh distribution based estimator (RAYL), and Ethridge's "robust" estimator (ETH).[3] With the exception

[1]The particular version of the CBN method was written by Capt Ward of the 549th Weapon Systems Evaluation Squadron, and provided by Mr David H. Berg of the Joint Studies Group at Headquarters Air Combat Command.

[2]The source code for the Taylor Series expansion was written and provided by Mr David H. Berg.

[3]The FORTRAN source code for the all but the CBN and Ethridge estimators was written and provided by Mr. David H. Berg. As mentioned before, Mr. Berg provided the CBN source code, but it was written by Capt Ward.

of the CBN method, these have been compared in previous studies on the basis of $\overline{RE}^i$ or $VAR(RE^i)$ alone, making them logical choices for this study's attempt to consider both $\overline{RE}^i$ and $VAR(RE^i)$.

It may appear strange that we compare CEP^{CBN} to the $CEP_{pop.}$ calculated by CBN. One might expect this comparison to give the CBN method an unfair advantage with respect to the MOEs. Recall, however, that when operating on sample data, the CBN estimator is not necessarily better than any other technique. To our knowledge, this is the first instance in which a numerical integration technique has been compared on an equal basis with the "quick" estimators.

4.2.3 Experimental Factors. For the remainder of Section 4.2, we discuss the factors used to conduct the experiment. The four factors we selected were the characteristic values (b, $STDR$, and ρ), and sample size. Together, the four factors comprise the design space, where each design point consists of a unique combination of factor values. We chose to use Puhek's levels for each factor [19:3-7], as listed in Table 4.1. In Chapter II, we discussed the levels of the characteristics used, but not the levels used for sample size. The smallest sample size considered was three because the CBN method does not converge for smaller samples. The largest sample size was 15 because the upper confidence limit on CEP decreases only marginally for larger sample sizes. The points between three and 15 were selected to place greater emphasis on the lower than the higher end of the scale.

Table 4.1. Factor Values for Experiment

$SampleSizes(SS)$	3, 5, 7, 10, 15
$Bias(b)$	0, .25, .5, .75, 1, 1.5, 2
$STDR$	1, .8, .6, .4, .2
$Correlation(\rho)$	0, .4, .7, .85, 0.99

4.2.4 Design Space Coordinates. The coordinates for the first point in the design space are the first values for each factor in Table 4.1: $SS = 3$, $b =$

0.0, $STDR = 1.0$ and $\rho = 0.0$. The remaining coordinates are defined by a factorial design. Using a factorial design captures the interactive effect between factors [3:105-107]. For example, Figures 2.2 through 2.4 showed the effect from varying only one characteristic at a time. This explained a great deal about the individual characteristic effects, but it was Figure 2.5 that showed the interactive effect from varying all three simultaneously. The advantage to using a factorial-design experiment is that it isolates both individual and interactive effects.

With seven different values of *bias*, and five different values for both $STDR$ and *correlation*, the total number of different simulated populations is 175 ($5 \times 5 \times 7$). Furthermore, since we are testing the effect of taking five different sample sizes from each of those populations, we must use those 175 populations five separate times. The factor space, then, has 875 (5×175) different combinations of factors. This requires 875 experimental runs to test the effect due to the four factors and their various interactions.

4.2.5 Experimental Specifics. After organizing the factors into the 875 different combinations according to the factorial design (Appendix E), two issues remain unresolved: First, we will have to simulate the populations of miss-distance coordinates from which we draw the samples of size three through fifteen. How will we simulate the populations, and how large a sample of miss-distance coordinates do we need to faithfully represent the population? Second, the three input factors related to population distributions are in terms of characteristics (b, $STDR$, and ρ), but to create a simulated population we need to convert them to parameters ($\mu_x, \mu_y, \sigma_x, \sigma_y$, and ρ_{xy}). Given the discussion in Section 2.2, how do we relate the characteristics in the factorial design to the parameter values?

4.2.5.1 Generating Simulated Populations. Computer algorithms can be used to simulate a population of any size, given the necessary parameters. The IMSL STAT/Library of subroutines has a set of stand-alone subroutines perfectly designed for creating any number of normally distributed random variables [10:1033]. Listed in Appendix D, our modified version of this code comes under the subroutine heading SAMPLEMAKER. By changing the covariance matrix values, we can generate simulated populations of miss coordinates that are centered on the aimpoint and that have any degree of correlation or $STDR$. When a biased population is required, the bias is simply added to each of the crossrange miss distances.

4.2.5.2 Simulated Population Size. To assess the estimators' accuracy and variability at each of the 875 design points, we need to simulate enough data so that we have sufficient confidence that the simulated population accurately reflects the population characteristics described by each design point. Using Puhek's confidence interval study, where he determined the simulated size required to attain 95% confidence that $\overline{CEP}^i$ was within one half foot of the true mean, we selected 2000 as the number of pairs of miss coordinates to generate at each design point [19:3-10]. Ethridge also used 2000, noting that larger simulated populations did not significantly change the average error of his estimation, thus decreasing the marginal utility of sample sizes larger than 2000 [6:30].

To ensure that the simulated populations reflected the parameters from the 175 different combinations of distributional characteristics, we ran the routine listed in Appendix F. It first created 2000 miss coordinates according to the input characteristics, then calculated the characteristics from that simulated population. The resulting input and output characteristics, also included in Appendix F, indicate that the sample populations were generated properly.

4.2.5.3 Relating Characteristics to Parameters. As mentioned in Section 2.2, the characteristic values of bias and STDR obscure some of the inherent information contained in the underlying parameters μ_x, μ_y, σ_x, and σ_y. Therefore, we used the following rules for transforming characteristics and parameters.

STDR: This characteristic is the ratio between the downrange and crossrange standard deviations. As mentioned in Section 3.2.2.1, the baseline standard deviation is $\sigma_{baseline} = 849.33ft$. Using Puhek's design, we chose to induce the elliptical effect from $STDR$ along the x axis. Therefore, $\sigma_x = 849.33ft.$, and σ_y is simply the product of STDR and σ_x. While σ_x remains constant throughout the experiment, σ_y varies from 849.33 ($STDR = 1.0$) to 169.87 ft ($STDR = 0.2$).

BIAS: As did Puhek, we apply the scaled bias along the crossrange axis. Thus, the mean crossrange point of impact will be $\mu_x = (b)\sigma_{pooled}$, while the mean downrange point of impact will remain constant ($\mu_y = 0$).

4.2.6 Illustrated Simulated Populations. For a selected group of design points, we plot 2000 miss distance coordinates to more clearly illustrate the volume under the surface of the metaphoric "hill" alluded to in Chapter I. We also demonstrate the calculations involved in transforming characteristic input values into the parameters necessary to generate the simulated populations.

The simulated population of 2000 miss distance coordinates plotted in Figure 4.1 was used for design points 1, 176, 351, 526, and 701, where the sample size taken at each point was 3, 5, 7, 10, and 15, respectively. As in Figure 2.1, this simulated population was generated from a population with ideal characteristics ($b = 0.0, \rho = 0, STDR = 1$), and a CEP of 1000 ft. Applying the rules for deriving parameters from characteristics, we have

$$\sigma_x = 849.33ft.,$$

$$\sigma_y = (\sigma_x)(STDR) = (849.33)(1.0) = 849.33ft.,$$

$$\sigma_{pooled} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}} = \sqrt{\frac{849.33^2 + 849.33^2}{2}} = 849.33ft.,$$

$$\mu_y = 0.0ft.,$$

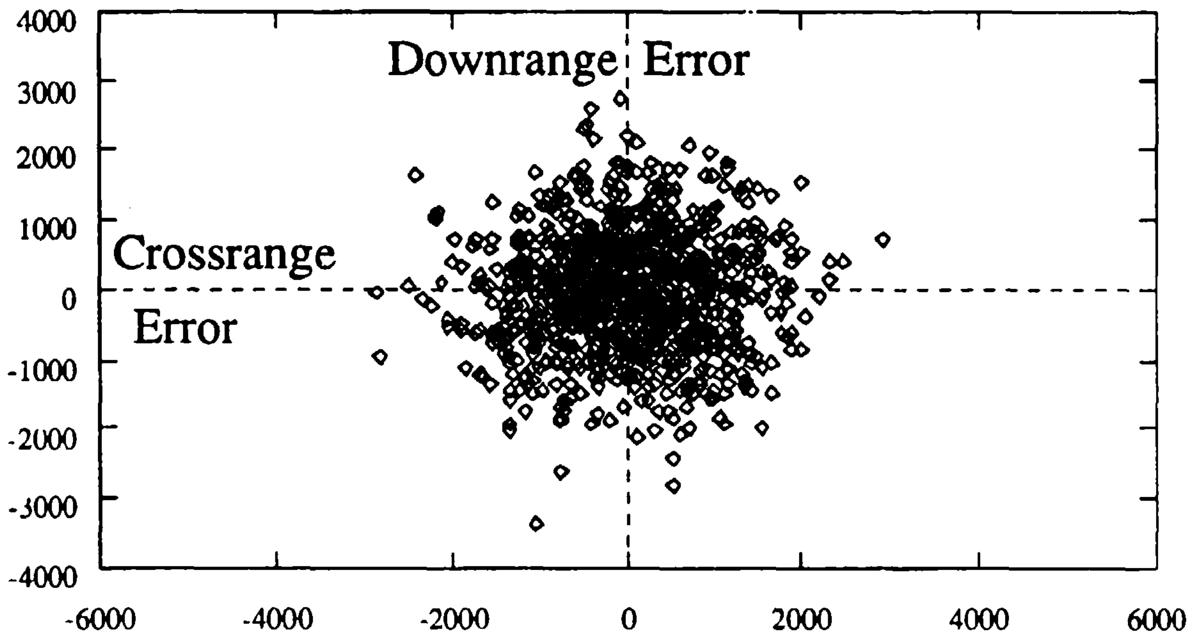


Figure 4.1. Nominal Sample of 2000 RV Impacts: $b = 0.0, \rho = 0, STDR = 1$

$$\mu_x = (\sigma_{pooled})(bias) = (849.33)(0.0) = 0.0ft.,$$

and

$$\rho = 0.0$$

Figure 4.2 shows the RV impacts simulated at design points 100, 275, 450, 625, and 800. Only one of the characteristics has a different value from design point one: bias. All the characteristic-to-parameter relationships remain the same except for μ_x, where

$$\sigma_x = 849.33ft.,$$

$\sigma_y = (\sigma_x)(STDR) = (849.33)($[illegible]$3ft.,$

$\sigma_{pooled} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}} = \sqrt{\frac{849.33^2 + 849.}{2}}$ [illegible] $849.33ft.,$

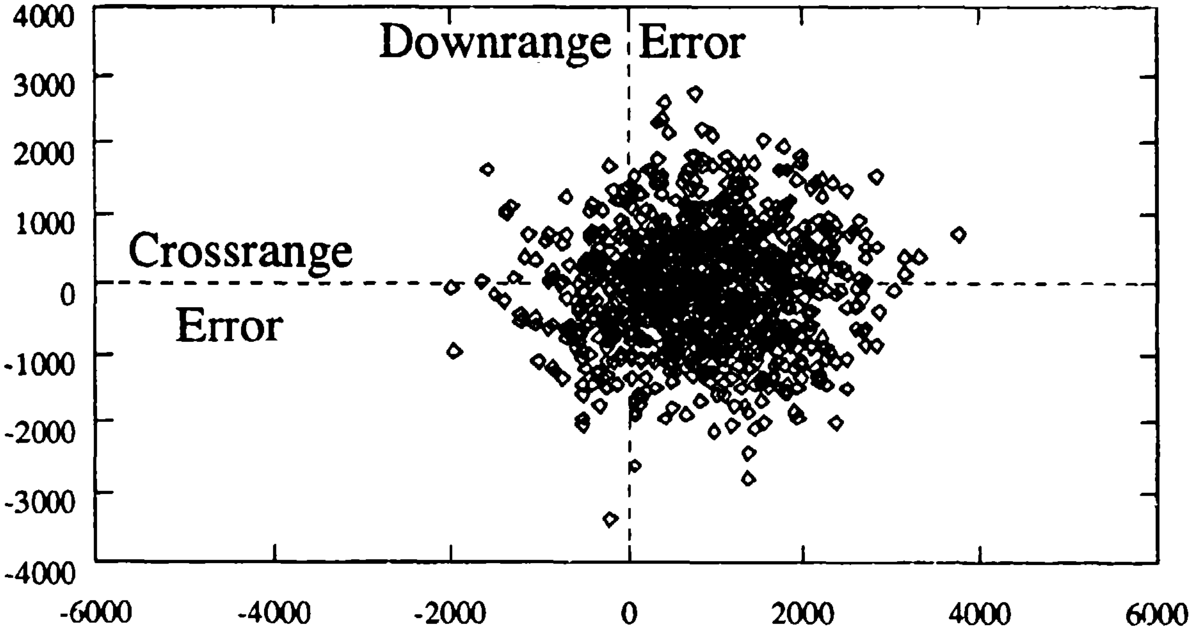


Figure 4.2. Biased Sample of 2000 RV Impacts: $b = 1.0, \rho = 0, STDR = 1$

$$\mu_y = 0.0ft.,$$

$$\mu_\mathbf{x} = (\sigma_{\mathbf{pooled}})(\mathbf{bias}) = (\mathbf{849.33})(\mathbf{1.0}) = \mathbf{849.33ft.},$$

and

$$\rho = 0.0$$

Thus the coordinates for the MPI are (0.0,849.33). In this case, $CEP = 1253ft.$

Figure 4.3 illustrates 2000 RV strikes from a population that is nominal in every respect except for STDR. This is the characteristic setting for design points 16, 191, 366, 541, and 716. With $STDR = 0.4$, we have

$$\sigma_x = 849.33ft.,$$

$$\sigma_\mathbf{y} = (\sigma_\mathbf{x})(\mathbf{STDR}) = (\mathbf{849.33})(\mathbf{0.4}) = \mathbf{339.7ft.},$$

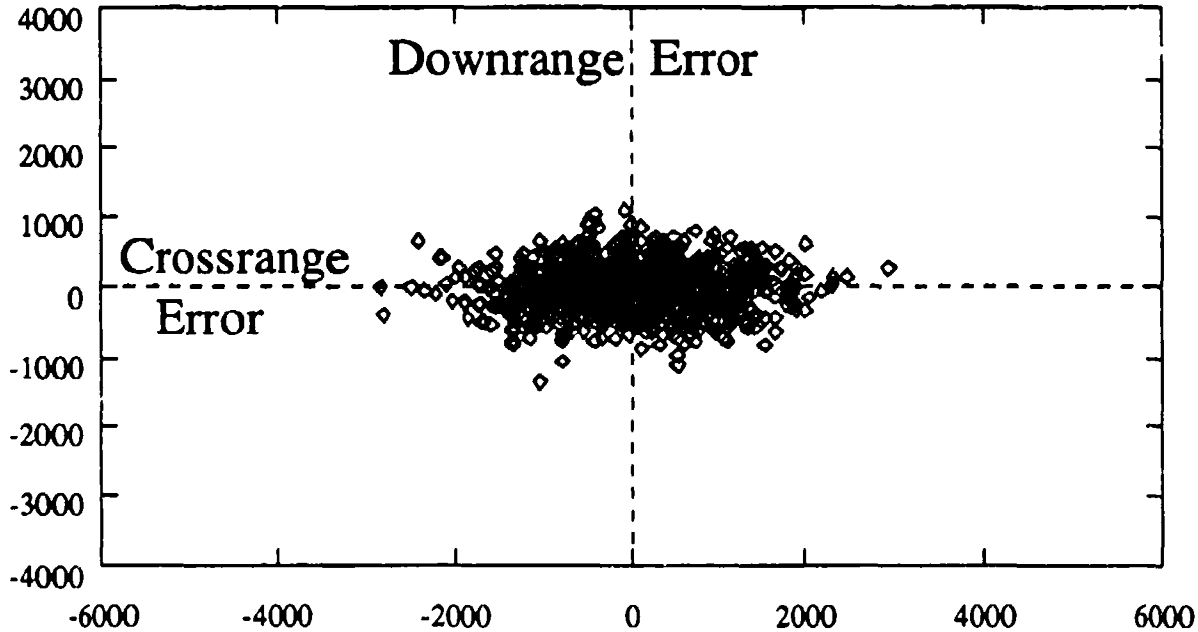


Figure 4.3. Non-Equal Standard Deviations Sample of 2000 RV Impacts: $b = 0.0, \rho = 0, STDR = 0.4$

$$\sigma_{\text{pooled}} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}} = \sqrt{\frac{849.33^2 + 339.7^2}{2}} = 690\text{ft.},$$

$$\mu_y = 0.0ft.,$$

$$\mu_x = (\sigma_{pooled})(bias) = (690)(0.0) = 0.0ft.,$$

and

$$\rho = 0.0,$$

giving this sample a decidedly elliptical shape. Note how much darker the area about the MPI has become with respect to the two previous figures. The darker region indicates more RVs landed closer to the MPI than in the two previous figures, increasing the elevation of the "hill" about the MPI (and the volume immediately about the MPI). Thus, the CEP in Figure 4.3 need only be 686 ft. to contain the 50% of the distribution closest to the aimpoint.

The sole characteristic in Figure 4.4 without a nominal setting is correlation (ρ). This configuration of characteristics occurs at design points 4, 179, 354, 529,

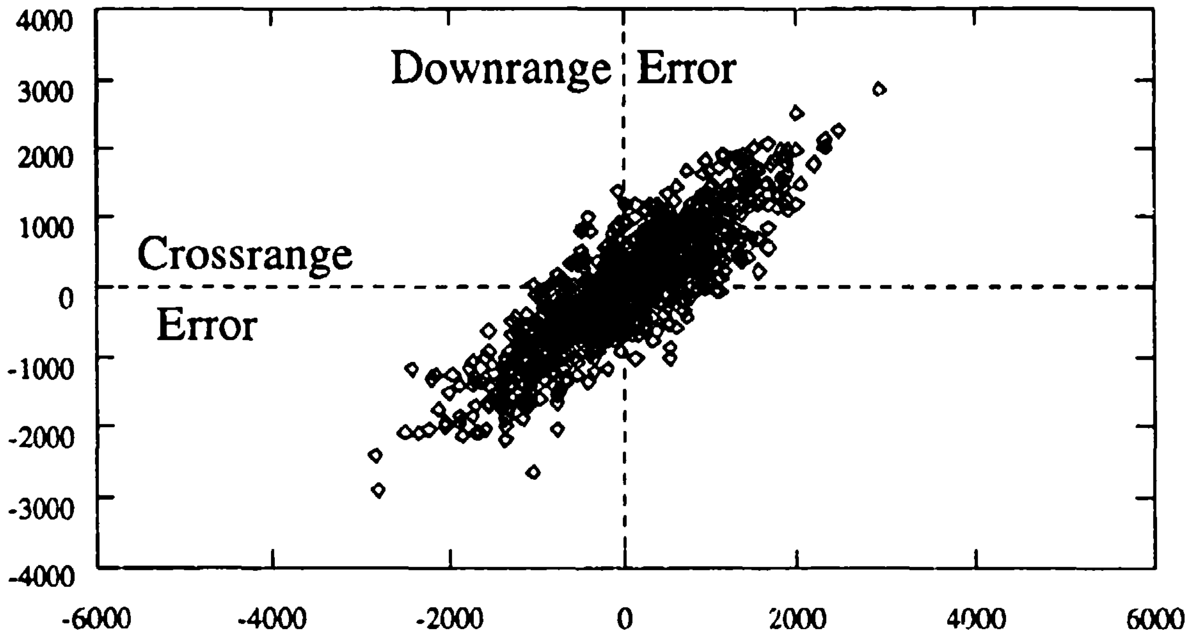


Figure 4.4. Correlated Sample of 2000 RV Impacts: $b = 0.0, \rho = 0.85, STDR = 1$

and 704, where

$$\sigma_x = 849.33 ft.,$$

$$\sigma_y = (\sigma_x)(STDR) = (849.33)(1.0) = 849.33 ft.,$$

$$\sigma_{pooled} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}} = \sqrt{\frac{849.33^2 + 849.33^2}{2}} = 849.33 ft.,$$

$$\mu_y = 0.0 ft.,$$

$$\mu_x = (\sigma_{pooled})(bias) = (849.33)(0.0) = 0.0 ft.,$$

and

$$\rho = 0.85,$$

Recall Figure 2.4, which displayed a population with similar parameter values. By rotating the cross and down range error axes until they coincide with the major and minor axes of the ellipse, we could then approximate this sample with b = 0.0, $STDR \approx 0.7$, and $\rho = 0.0$. For the sample in Figure 4.4, CEP = 857 ft.

Figure 4.5 shows the combined effect of simultaneously changing all three characteristics to the values individually displayed in Figure 4.2 through Figure 4.4, where

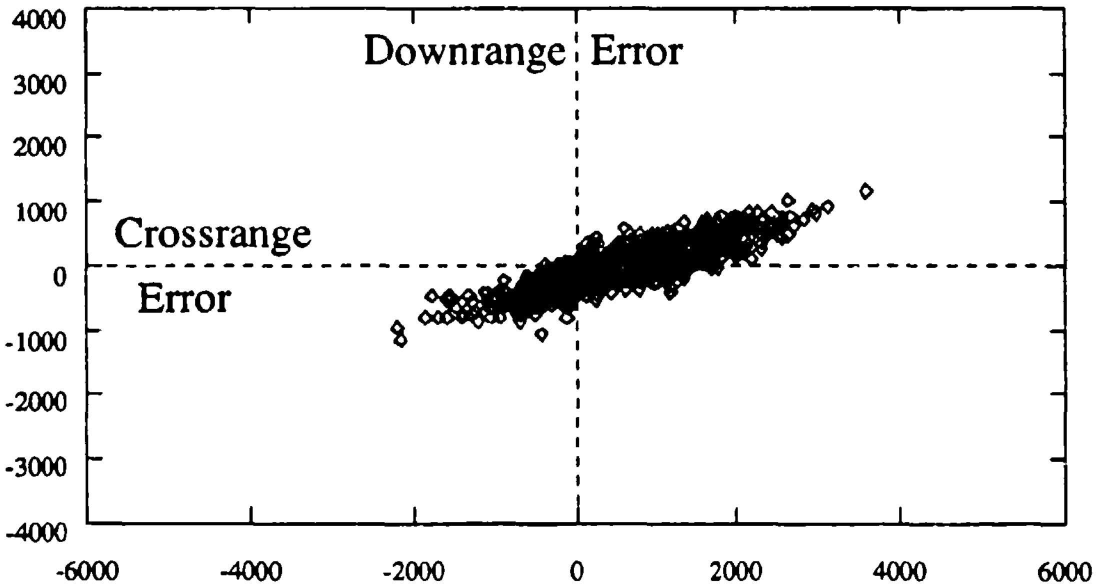


Figure 4.5. All Characteristics Varied: $b = 1.0, \rho = 0.85, STDR = 0.4$

$$\sigma_x = 849.33 ft.,$$

$$\sigma_{\mathbf{y}} = (\sigma_{\mathbf{x}})(\mathbf{STDR}) = (\mathbf{849.33})(\mathbf{0.4}) = \mathbf{339.7ft.},$$

$$\sigma_{\mathbf{pooled}} = \sqrt{\frac{\sigma_{\mathbf{x}}^2 + \sigma_{\mathbf{y}}^2}{2}} = \sqrt{\frac{\mathbf{849.33^2 + 339.7^2}}{2}} = \mathbf{690ft.},$$

$$\mu_y = 0.0 ft.,$$

$$\mu_{\mathbf{x}} = (\sigma_{\mathbf{pooled}})(\mathbf{bias}) = (\mathbf{690})(\mathbf{1.0}) = \mathbf{690ft.},$$

and

$$\rho = 0.85.$$

Note that the angle between the major axis of the ellipse and the x-axis is no longer 45 degrees, as in Figure 4.4, but rather another value determined jointly by the STDR and correlation. This configuration of characteristic values repeats at design points 119, 294, 469, 644, and 819. For the sample plotted in Figure 4.5, CEP = 807 ft.

4.3 Experimental Process

Having established the major concepts and ground rules involved in the experimental process, we now specifically delineate each step in that process.

1. Convert a set of characteristics into parameters.
2. Calculate $CEP_{pop.}$ from those parameters.
3. Create a simulated population from those parameters such that:
   (a) The sample has 2000 pairs of crossrange and downrange miss distances.
   (b) The sample pairs are distributed bivariate normal.
4. Divide those simulated populations into groups according to sample size (SS).
   (a) When SS = 3, make $N_3 = 666$ samples, each of size three.
   (b) When SS = 5, make $N_5 = 400$ samples, each of size five.
   (c) When SS = 7, make $N_7 = 285$ samples, each of size seven.
   (d) When SS = 10, make $N_{10} = 200$ samples, each of size ten.
   (e) When SS = 15, make $N_{15} = 133$ samples, each of size fifteen.
5. Apply each CEP estimator N_{SS} times for each sample size.

6. Calculate the $\overline{RE}^i$, $VAR(RE)^i$, and $MSE(RE)^i$ associated with each estimation technique for this configuration of factors.

7. Return to step 1. Continue for all design points.

4.4 Problems Encountered and Their Resolution

Numerous problems with the experimental process occurred; however, only a handful qualify as important enough to be mentioned here, and only one potentially serious flaw became very evident late in the process. We will discuss these problems here.

4.4.1 Convergence Problems for CBN. As mentioned in Chapter II, even though the CBN technique had no problem calculating $CEP_{pop.}$ for each design point, it did have a problem with estimating CEP based on parameters estimated from extremely small samples. The third column in Appendix G lists the number of times the CBN method was not able to converge for a set of sample parameters. The worst point for this non-convergence was design point 175. At that point, all four factors assume their most extreme settings. The CBN method could not converge on 19 of the 666 samples of size three for design point 175 . The simulated population of 2000 RV strikes is illustrated in Figure 4.6

The parameters which result from the characteristic values at design point 175 are

$$\sigma_x = 849.33 ft.,$$

$$\sigma_y = (\sigma_x)(\mathbf{STDR}) = (\mathbf{849.33})(\mathbf{0.2}) = \mathbf{169.9ft.},$$

$$\sigma_{\text{pooled}} = \sqrt{\frac{\sigma_x^2 + \sigma_y^2}{2}} = \sqrt{\frac{849.33^2 + 169.9^2}{2}} = \mathbf{612.47ft.},$$

$$\mu_y = 0.0 ft.,$$

$$\mu_x = (\sigma_{\text{pooled}})(\mathbf{bias}) = (\mathbf{612.47})(\mathbf{2.0}) = \mathbf{1224.94ft.},$$

and

$$\rho = 0.99.$$

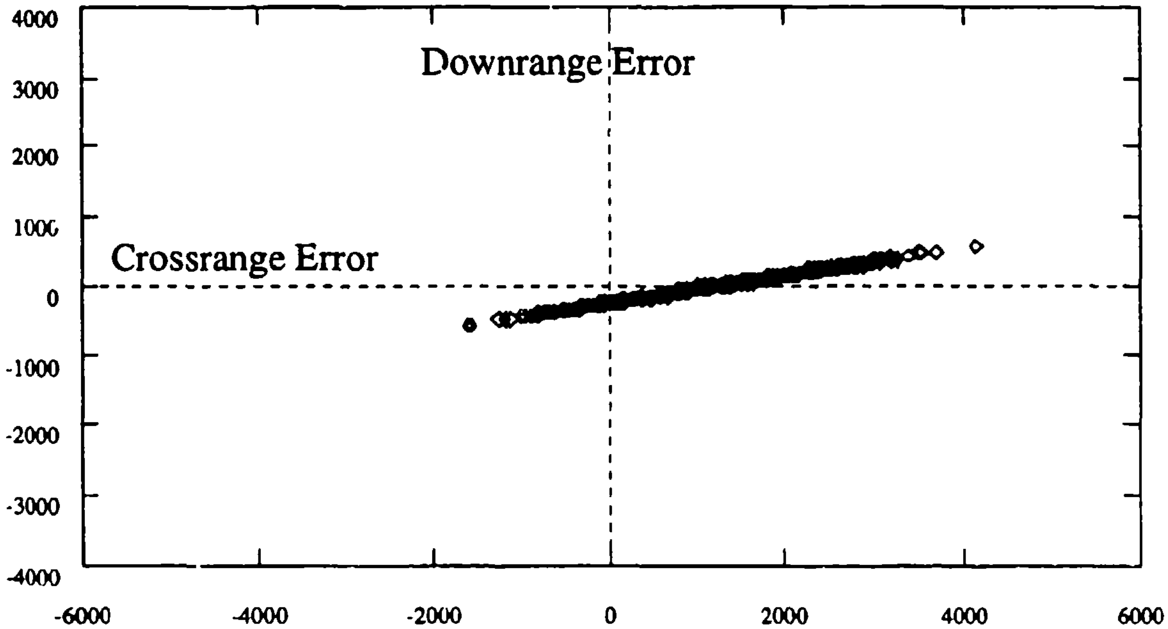


Figure 4.6. Design Point 175 Sample of 2000 RV Impacts from a population with $b = 2.0$, $\rho = 0.99$, $STDR = 0.2$

Those 19 samples for which the CBN method could not converge fell into two categories: Those whose sample parameters reflected a predominantly elliptical distribution and those whose sample parameters reflected a predominantly circular distribution. To graphically depict both categories, we selected one set of sample parameters from both categories, created 2000 pairs of miss coordinates for each set, and plotted both sets of 2000 miss coordinates. We display these in Figures 4.7 and 4.8. Even though these small samples came from a population that looks like Figure 4.6, their parameters describe quite different looking distributions.

Figure 4.7 shows an example from the first category of sample parameters for which the CBN would not converge. About two-thirds of the 19 problem sets fell

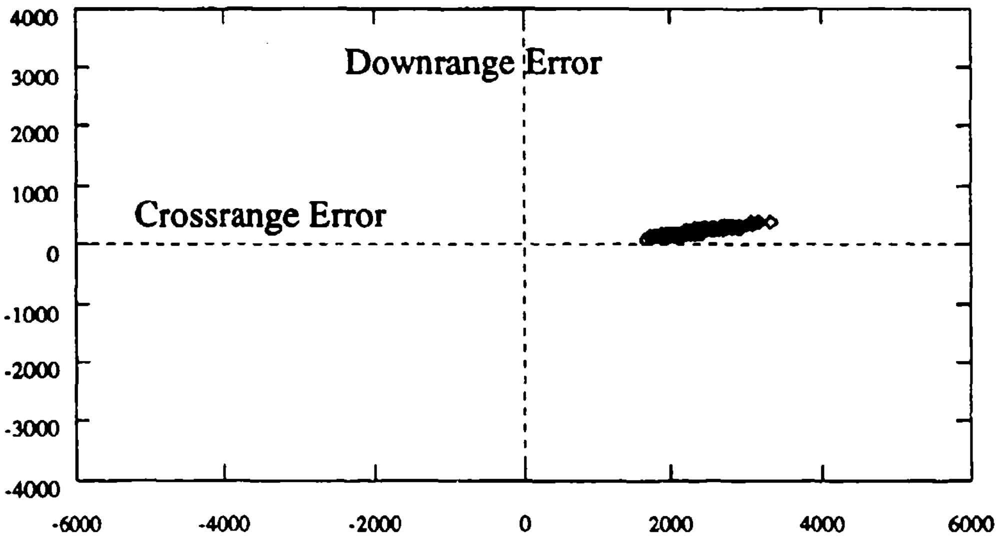


Figure 4.7. Elliptical Sample of 2000 RV Impacts: $\hat{\rho} = 0.988, \widehat{STDR} = 0.18, \hat{b} =$ **5.83**

into this category. The "tilt" looks about the same between this and Figure 4.6, but the bias is quite different. In fact, the sample size three parameters, from which this extrapolated sample of 2000 was generated, are

$$\hat{\mu}_x = 2177 ft., \;\; \hat{\mu}_y = 93 ft.,$$

$$\hat{\sigma}_x = 521 ft., \;\; \hat{\sigma}_y = 93 ft.,$$

$$\hat{\rho} = 0.988,$$

and

$$\hat{\sigma}_{pooled} = \sqrt{\frac{521^2 + 93^2}{2}} = 374 ft.$$

Converting these sample parameters to sample characteristics, we have

$$\hat{b} = \frac{\sqrt{\hat{\mu}_x^2 + \hat{\mu}_y^2}}{\hat{\sigma}_{pooled}} = \frac{\sqrt{2177^2 + 93^2}}{374} = \mathbf{5.83},$$

$$\widehat{STDR} = \frac{\hat{\mu}_y}{\hat{\mu}_x} = \frac{15}{166} = 0.18,$$

and

$$\hat{\rho} = 0.988.$$

The population characteristics were similar to these sample-derived characteristics, with the notable exception of bias. The remaining third of the problem sample sets reflected sample parameters which, when used to generate 2000 simulated RV strikes, looked like the distribution in Figure 4.8.

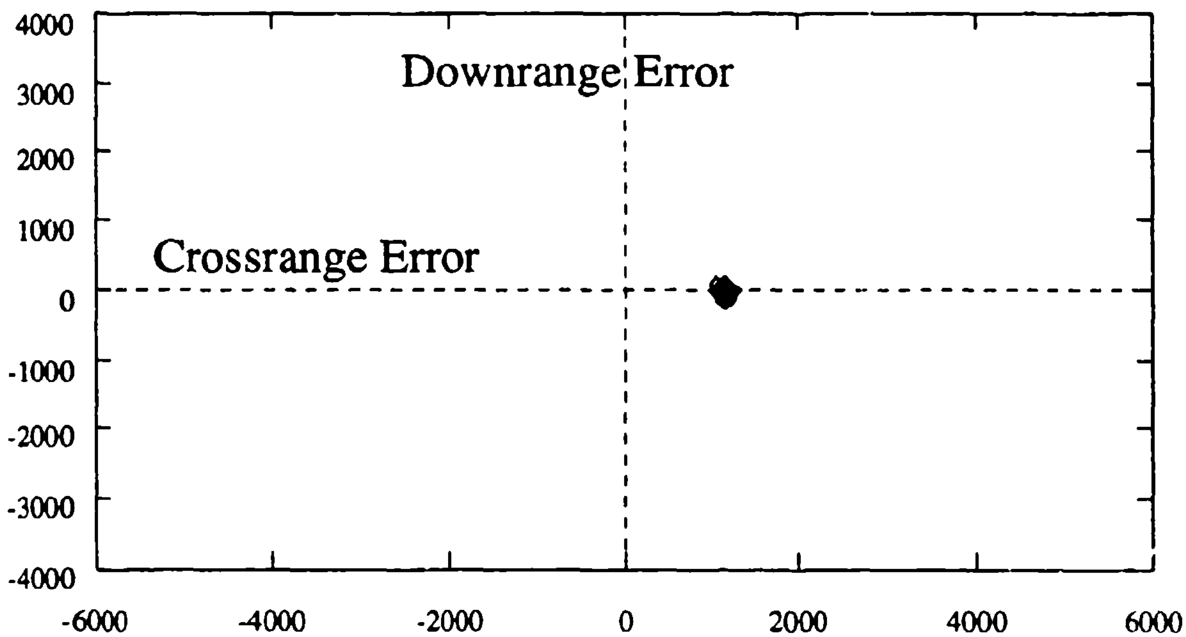


Figure 4.8. Circular Sample of 2000 RV Impacts: $\hat{\rho} = 0.424, \widehat{STDR} = 0.132, \hat{b} =$ **14.4**

The sample parameters derived from this set of three RV strikes were

$$\hat{\mu}_x = 1089 ft., \; \hat{\mu}_y = -52 ft.,$$

$$\hat{\sigma}_x = 106 ft., \; \hat{\sigma}_y = 14 ft.,$$

$$\hat{\rho} = 0.424,$$

and

$$\hat{\sigma}_{pooled} = \sqrt{\frac{106^2 + 14^2}{2}} = 76ft.$$

These translate into the characteristic values of

$$\hat{b} = \frac{\sqrt{\hat{\mu}_x^2 + \hat{\mu}_y^2}}{\hat{\sigma}_{pooled}} = \frac{\sqrt{1089^2 + (-52)^2}}{76} = 14.4,$$

$$\widehat{STDR} = \frac{\hat{\mu}_y}{\hat{\mu}_x} = \frac{14}{106} = .132,$$

and

$$\hat{\rho} = 0.424.$$

Analysis of the characteristics for all 19 sets showed, as in the above two cases, values of $\widehat{STDR}$ and $\hat{\rho}$, which, if not perfectly representative of the generating population, were reasonably within the bounds of the design space. Table 4.2 contains the characteristic values for all 19 sets, beginning with the input characteristics. In Table 4.2 we see that, for the most part, the estimations of the population $STDR$ and ρ are often close to the input values for design point (DP) 175. Furthermore, we have ample evidence that the CBN method, given nominal or near nominal values for *bias*, can converge for all these values of $STDR$ and ρ. However, all have scaled bias values greater than five, with thirteen out of the 19 in the double digit range. This is well beyond the limits of the design space. With evidence of the CBN method converging for scaled bias values of 4.0, it might be that it has difficulty dealing with scaled bias values greater than 5.0.

A number of attempts were made to achieve convergence for these points. We increased from 100 to 2000 the number of "slices" into which the integral plane was divided. This exponentially increased run time, and it did not work. An attempt

Table 4.2. Characteristic Values for Design Point (DP) 175 and for the 19 out of 666 size three samples (S) drawn at that point.

Point	*Bias*	*STDR*	ρ
DP 175	2.000	0.200	0.999
S1	17.361	0.314	0.893
S2	16.552	0.226	0.834
S3	10.794	0.032	0.903
S4	9.583	0.153	0.986
S5	7.658	0.112	0.890
S6	9.647	0.138	0.910
S7	27.558	0.300	0.497
S8	16.470	0.302	0.936
S9	37.146	0.230	0.837
S10	35.198	0.400	0.552
S11	30.662	0.297	0.319
S12	34.759	0.667	-0.229
S13	12.849	0.090	0.498
S14	13.604	0.173	0.944
S15	5.844	0.179	0.988
S16	14.420	0.132	0.424
S17	12.638	0.213	0.819
S18	5.310	0.162	0.983
S19	22.692	0.276	-0.320

to make the secant search method more sensitive, using smaller increments between candidate radii, also failed.

Future research efforts may investigate this shortcoming of the CBN technique further. We chose to delete these sample points from consideration for all estimation techniques, since forcing the others to submit a CEP estimate for these points, would place them at a disadvantage with respect to the CBN method. Furthermore, the rejection rate was never greater than the 2.8% observed at design point 175, and was usually zero, so we felt no great deal of information was lost by deleting those few samples from the experiment.

4.4.2 Problems With R234. Somewhat late in the experimental process we noted that certain of the design points violated the constraints placed on R234. Namely, for design points 155, 160, 165, 170, 173, 174, and 175, the input, or, population characteristics were outside the limit on "v", the ratio between bias and the CEP_{MPI}. That ratio must be no greater than 2.2, the limit to which the RAND tables extended, or the CEP^{R234} is invalid. Clearly, the use of R234 at these points is inappropriate.

Furthermore, after inserting code that rejected any *sample* parameters that also violated that limit on "v", we discovered an alarming rejection rate for all characteristic sets whose input bias was 2.0. Column four in Appendix G lists the number rejected out of the total number of samples taken, column two. The rejection rate was as high as 69% for these design points, and the rate averaged 45% for all sample sizes taken from design points with bias equal to 2.0. Figure 4.9 shows the average rejection rate for R234 for each combination of sample size and bias. We made the decision to

1. Not consider any of the data concerning the R234 from populations with bias = 2.0, and

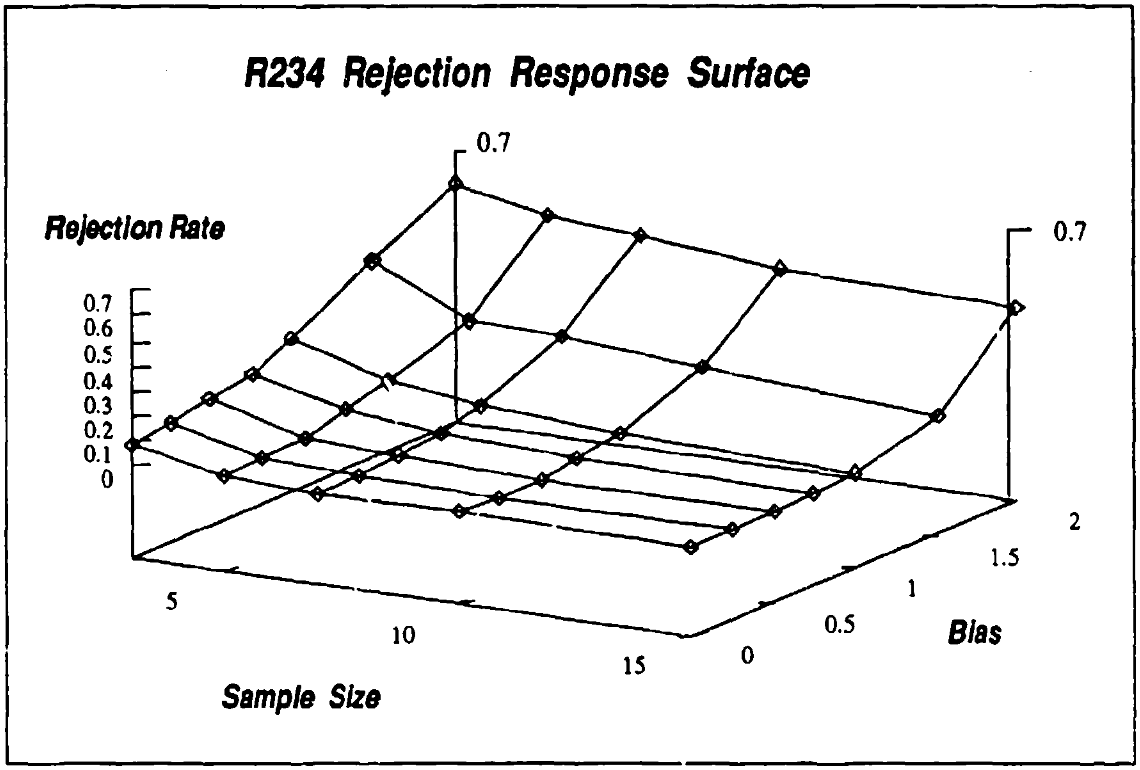


Figure 4.9. R234 Rejection Response surface

2. Reject all sample CEP estimates from R234 throughout the experiment when based on "v" greater than 2.2, while retaining the CEP^i from the other estimators for those samples.

After running the experiment, it became clear that R234 may have performed better with respect to the MOEs as a result of not operating on all the samples. We subsequently ran the experiment with none of the estimators providing CEP estimates for the samples which we had previously rejected for R234. Significant differences in performance occurred for all estimators at the 12% rejection rate and higher. We then made the decision to not accept any data for R234 when based on samples for which 12% or more were rejected. Table 4.3 shows the values for bias at each level of sample size beyond which we did not accept R234 data. This eliminated R234 from the competition at 325 design points.

Table 4.3. Limit of R234 Rejection Region

Sample Sizes	*Bias*
3	.25
5	.75
7	1.0
10	1.0
15	1.5

4.4.3 Experimental Run Time. The main experimental program, listed in Appendix D, is coded for operation 'n two ways. One can either create a simulated sample of 2000 RV strikes according to the characteristics, then cut that sample into successively larger and larger samples, from 3 to 15 in size. This is mode 1. Mode 2 entails setting the sample size constant, and running through all 175 combinations of characteristics for that one sample size. Using a network of SUN workstations, we ran the program in parallel on five workstations simultaneously. Mode 1 distributed the workload evenly among the workstations. However, mode 2 offered economies of scale which dramatically reduced total run time. Table 4.4 shows the total run times for both modes.

Table 4.4. Run Tim s

MODE	Run Time (hr)
1	30
2	16

4.4.4 Problems With The Design Space. In using Puhek's factorial design and applying the characteristics in the same manner, we made the same assumptions used by Puhek, namely

1. The effect from c elations valued from -1.0 to 0.0 is symmetrical to that for the values considereu in this study, from 0.0 to 1.0,
2. The effect from applying bias along either axis is the same, and

3. The effect from applying STDR along either axis is the same.

Using the following figures, we can see how these assumptions might seem reasonable. Figures 4.10 through 4.12 show the manner in which we applied the characteristics effect with a solid line, while the symmetric effect is shown with a dotted line. Our st..dy did not consider the alternate effect, reasoning that it was always symmetric, thus not increasing our knowledge of CEP estimation techniques' response to ρ. Figure 4.10 shows how, *when centered on the origin*, negative correlation values ($-1.0 \leq \rho \leq 0.0$) do have a symmetric effect to positive values of correlation ($0.0 \leq \rho \leq 1.0$).

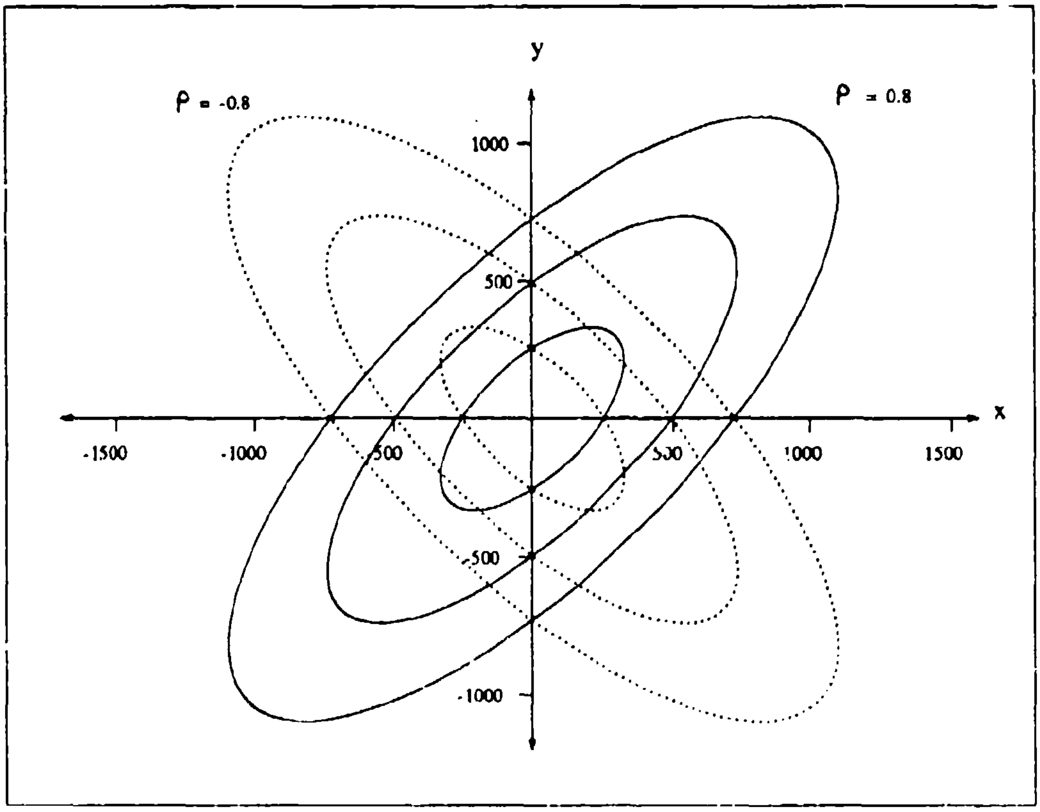


Figure 4.10. Negative values of correlation have symmetric effect about the origin with respect to positive values

Figure 4.11 shows the symmetric effect from applying STDR along both axes, *when centered on the origin.* Figure 4.12 shows how a perfectly circular distribution

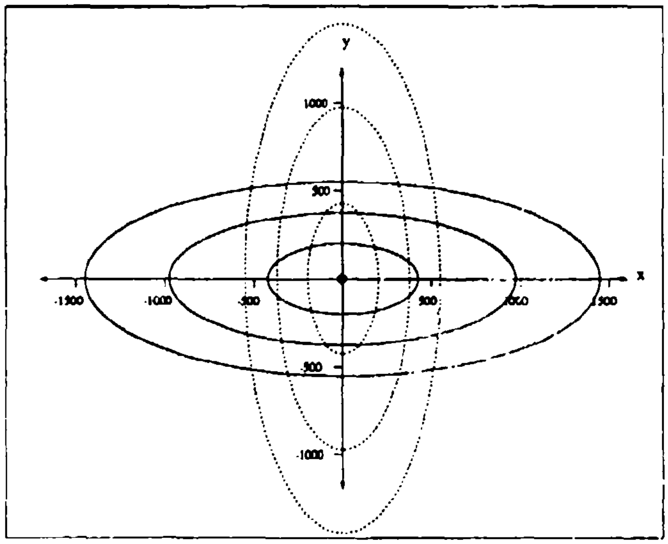


Figure 4.11. Axial Indifference With Respect to STDR

would measure the same effect from bias along either axis.

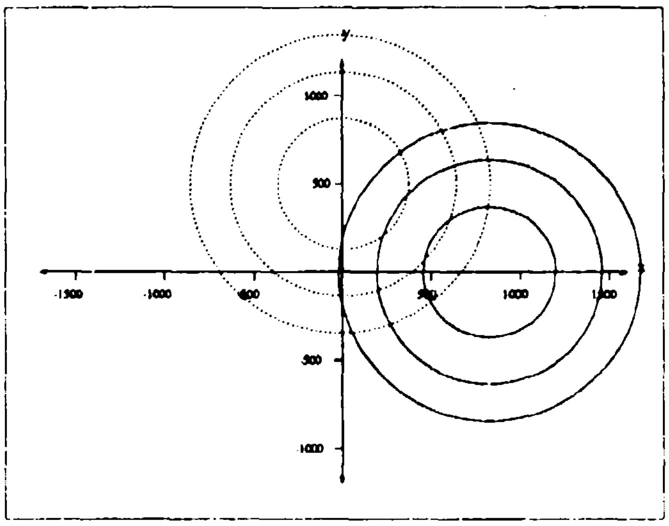


Figure 4.12. Axial Indifference With Respect to Bias

The problem arises when all three characteristics change simultaneously. In doing so, we found that our design space addressed only a fraction of the realm of possibilities. Specifically, using non-ideal bias and correlation, and allowing STDR to vary, our study tests the RE^i sensitivity to the changing ellipses depicted in Figure 4.13

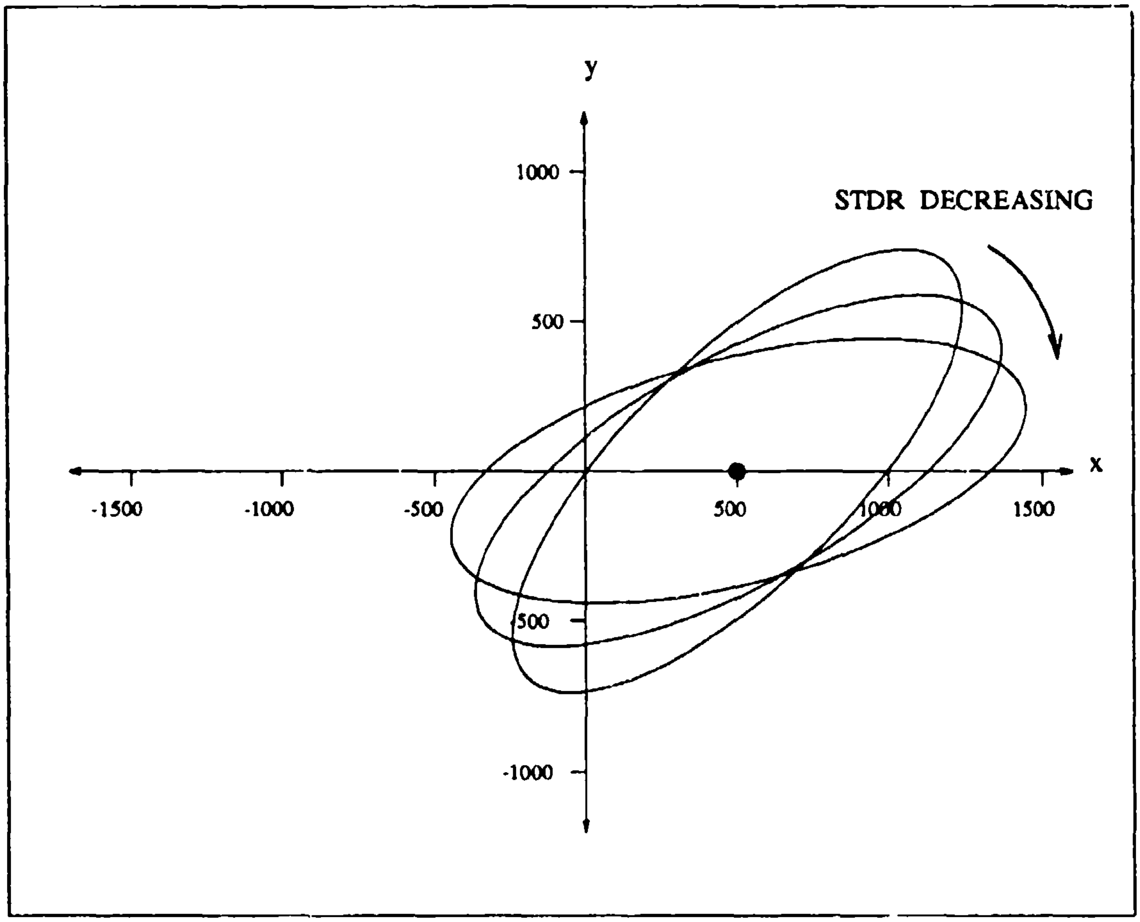


Figure 4.13. Range of Tilted Ellipse Possibilities Considered By Design Space

In Figure 4.14, we use a negative value for correlation with the same bias and STDR values, and we observe that the effect is not symmetrical to the ellipses generated in Figure 4.14. Thus, our design space failed to consider 50% of the realm of tilted ellipse configurations.

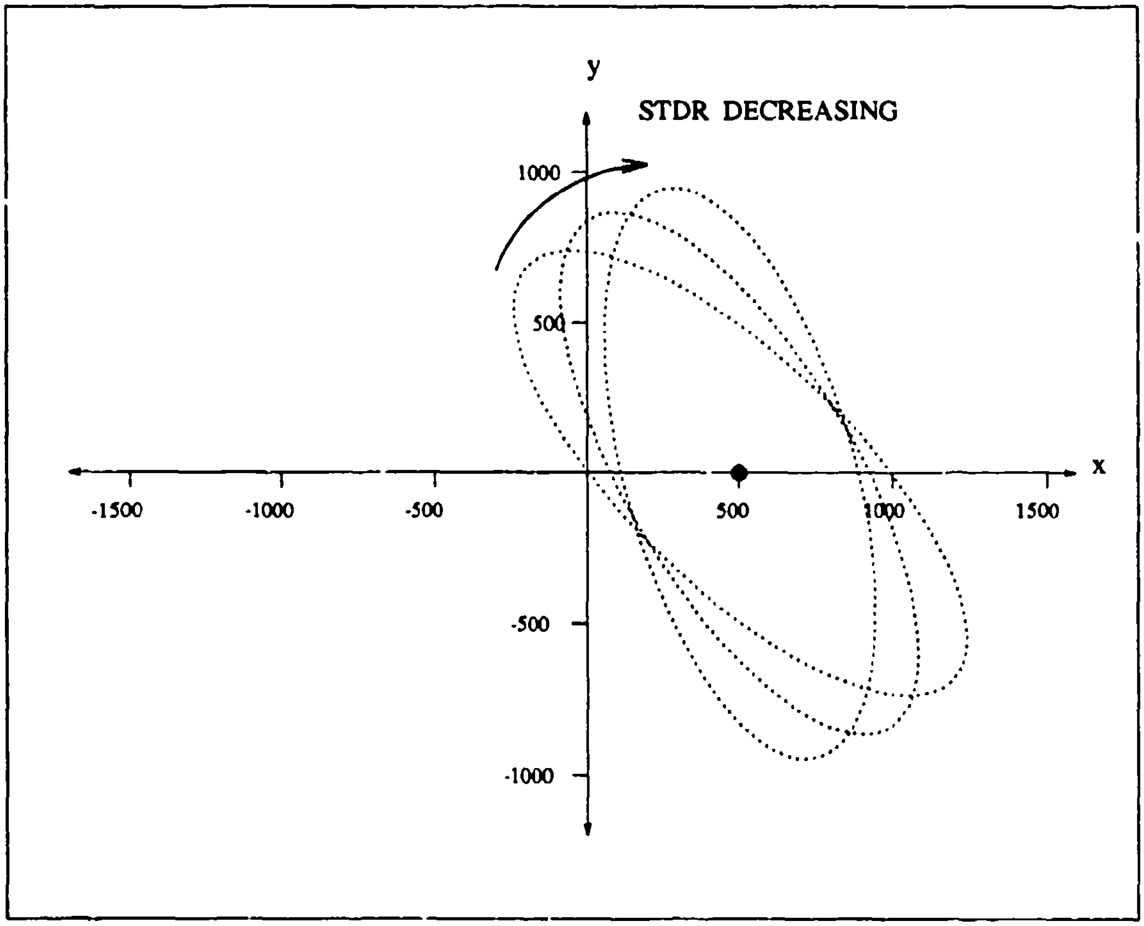


Figure 4.14. Range of Tilted Ellipse Possibilities Not Considered By Design Space

Furthermore, we can see that applying *bias* and *STDR* along the same axis, as in Figures 4.15 and 4.16, will have the same effect for both axes.

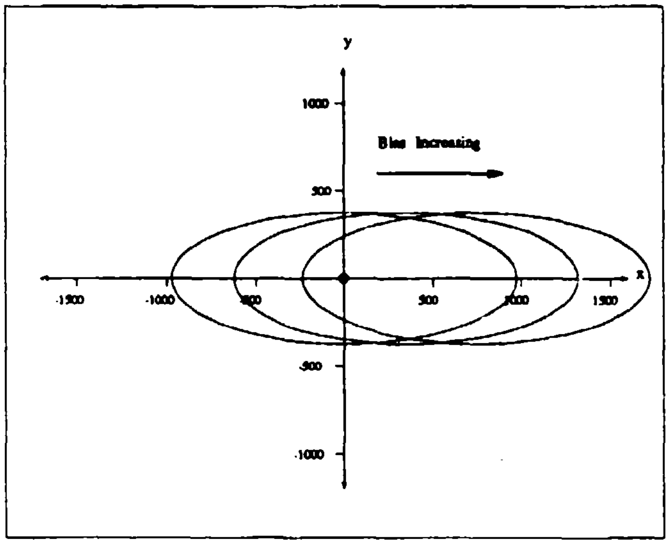


Figure 4.15. Range of STDR Possibilities Considered By Design Space

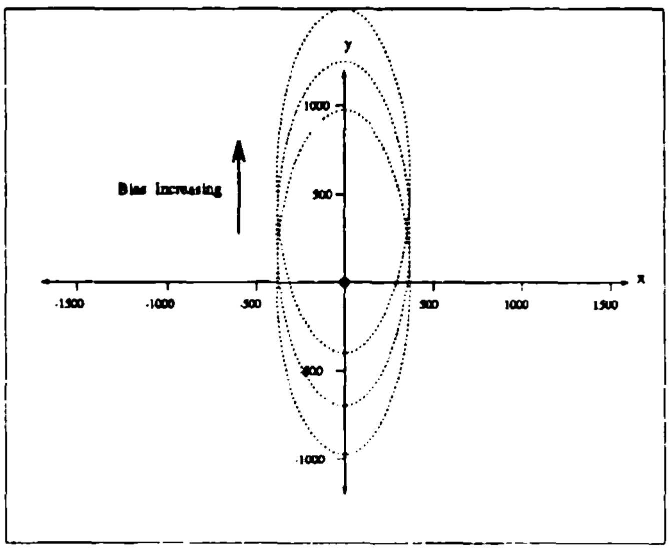


Figure 4.16. Symmetric Range of STDR Possibilities Not Considered By Design Space

However, when *bias* and *STDR* are applied to separate axes, as in Figure 4.17, we see a very different picture. In order to encircle 50% of the rightmost ellipse in Figure 4.17, CEP would be larger than that required for the rightmost ellipse in Figure 4.15. Thus our design space also failed to consider half of the possibili-

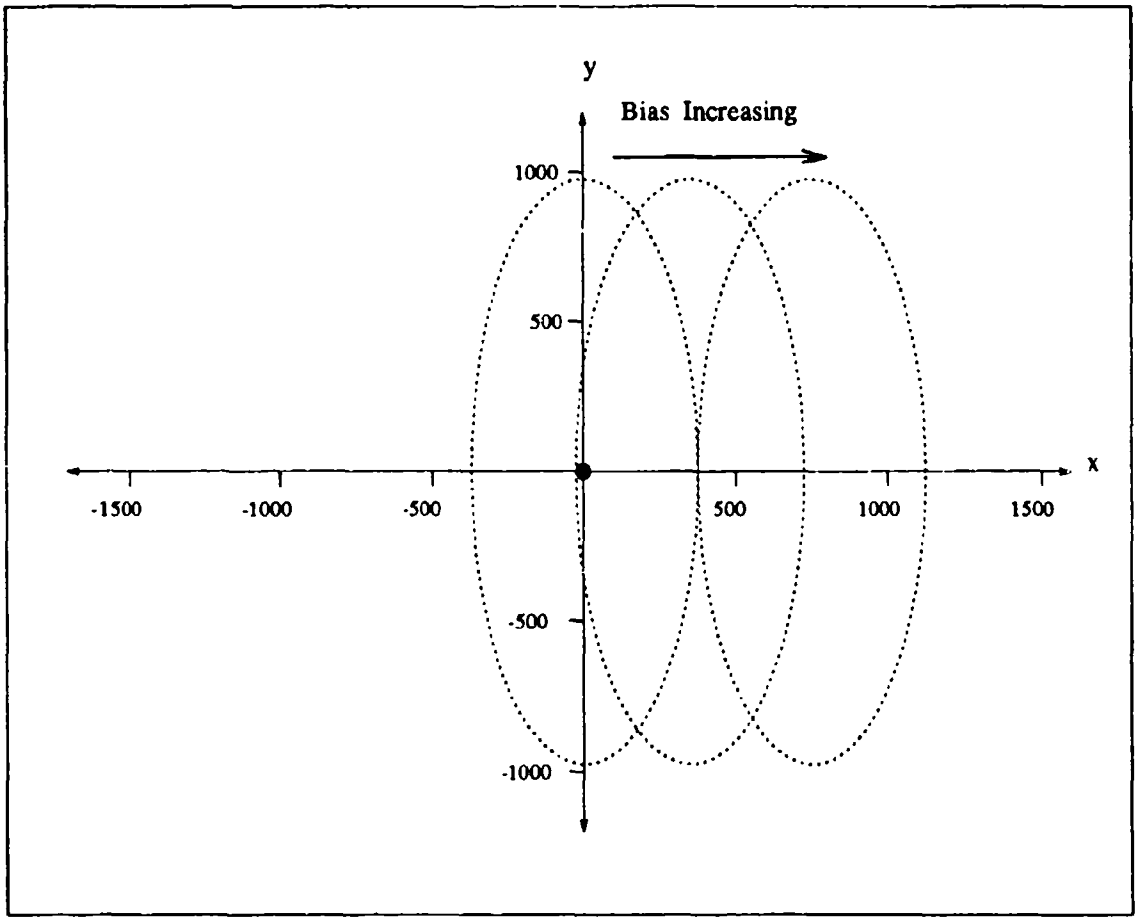


Figure 4.17. Range of STDR Possibilities Not Considered By Design Space

ties available when considering orthogonal ellipse configurations. However, we feel confident that subjecting the different estimators to a broad range of parameter configurations should provide a reasonable measure of their relative precision. Still, future research should more broadly cover the range of ellipticities.

V. Experimental Analysis

5.1 Overview

Having performed the experiment and generated output in terms of the three MOEs, we now face the task of analyzing the results. In an attempt to answer the questions posed in Chapter III, we use the following outline:

1. For each MOE, we conducted the following tests and analyses:
   (a) Factor reduction tests, to determine the number of significant factors.
   (b) Factor analysis, to identify the significant factors.
   (c) Analysis of rank-ordered MOE results, to possibly identify the best estimator.
2. We also conducted a histogram analysis of RE^i, to gauge the significance of the different MOEs.

5.2 Mean Relative Error ($\overline{RE}$)

By addressing $\overline{RE}$ first, we approach the question of estimator comparison from a very traditional view. The vast majority of studies which empirically compared estimator performance have used either RE, in the case of infinite sample size, or $\overline{RE}$, where sample size was considered. Furthermore, in arriving at some conclusions based on $\overline{RE}$, we will introduce metrics used for the other two MOEs. The understanding gained in applying these metrics with $\overline{RE}$ will provide economies when we interpret them for the other MOEs.

5.2.1 Factor Reduction Tests. Upon completing the experiment, we attempted to determine which of the design space variables (sample size, bias, STDR, and correlation) have a statistically significant impact on CEP estimation. Two tests which identify the number of significant factors are the Kaiser's test and the scree test. Some authors suggest these tests are more art than science, thus we chose to use two factor reduction tests to provide added confirmation. These use the eigenvalues of the variance/covariance matrix in numeric or graphical form to identify the number of significant factors [4:48-50].

5.2.1.1 Kaiser's Test. Appendix H lists the routines used in the statistical programming language SAS to generate and list the eigenvalues for this test [21:335]. The input variables and output MOE responses were treated as one group for purposes of computing the covariance matrix. The reasoning was that if there was some underlying relation between one or more of these variables with any of the responses, then an initial test for significance would detect that relationship. Counting the number of eigenvalues greater than one reveals how many significant factors exist.

With four input variables and five estimators, we have nine potential significant factors. SAS rank orders the factors from largest positive effect to largest negative effect. Table 5.1 displays the rank-ordered eigenvalues for the four input factors and five RE's.

Table 5.1. Rank-Ordered Eigenvalues for $\overline{RE}$

	1	2	3	4	5
Eigenvalue	3.7898	1.6073	0.9101	0.8027	0.1971
Difference	2.1825	0.6972	0.1074	0.6056	0.1252
Proportion	0.5302	0.2249	0.1273	0.1123	0.0276
Cumulative	0.5302	0.7551	0.8824	0.9948	1.0223
	6	7	8	9	
Eigenvalue	0.0719	-0.0125	-0.0943	-0.1247	
Difference	0.0844	0.0818	0.0304		
Proportion	0.0101	-0.0018	-0.0132	-0.0174	
Cumulative	1.0324	1.0306	1.0174	1.0000	

Only two factors have eigenvalues greater than one, although the next two factors have eigenvalues that are quite high. Based on the criterion for this test, we may tentatively conclude that only two factors are significant with respect to relative error.

5.2.1.2 Scree Test. The scree test also uses rank-ordered sets of eigenvalues. However, the test depends on plotting the values to observe a "scree" pattern. That is, if we plot from largest to smallest eigenvalue, the first few significant eigenvalues should have a steep, "cliff-like" appearance, while the insignificant factors should trail off at a shallow slope, like the rubble or "scree" at the bottom of the cliff [4:49]. The number of significant factors is that number of eigenvalues making up the cliff and the topmost eigenvalue of the "scree". The scree test for $\overline{RE}^i$ is in Figure 5.1 on the following page.

In Figure 5.1 two eigenvalues form the "cliff", with two potential "screes". Since we already have the first factor reduction test pointing to only two significant factors, we can interpret this plot as pointing to three significant factors.

While these tests do not identify which factors are significant, they do suggest a possible limit to the total number of significant factors. As they do not agree exactly on the number of significant factors with respect to RE, we will select two as the number of significant factors for $\overline{RE}^i$.

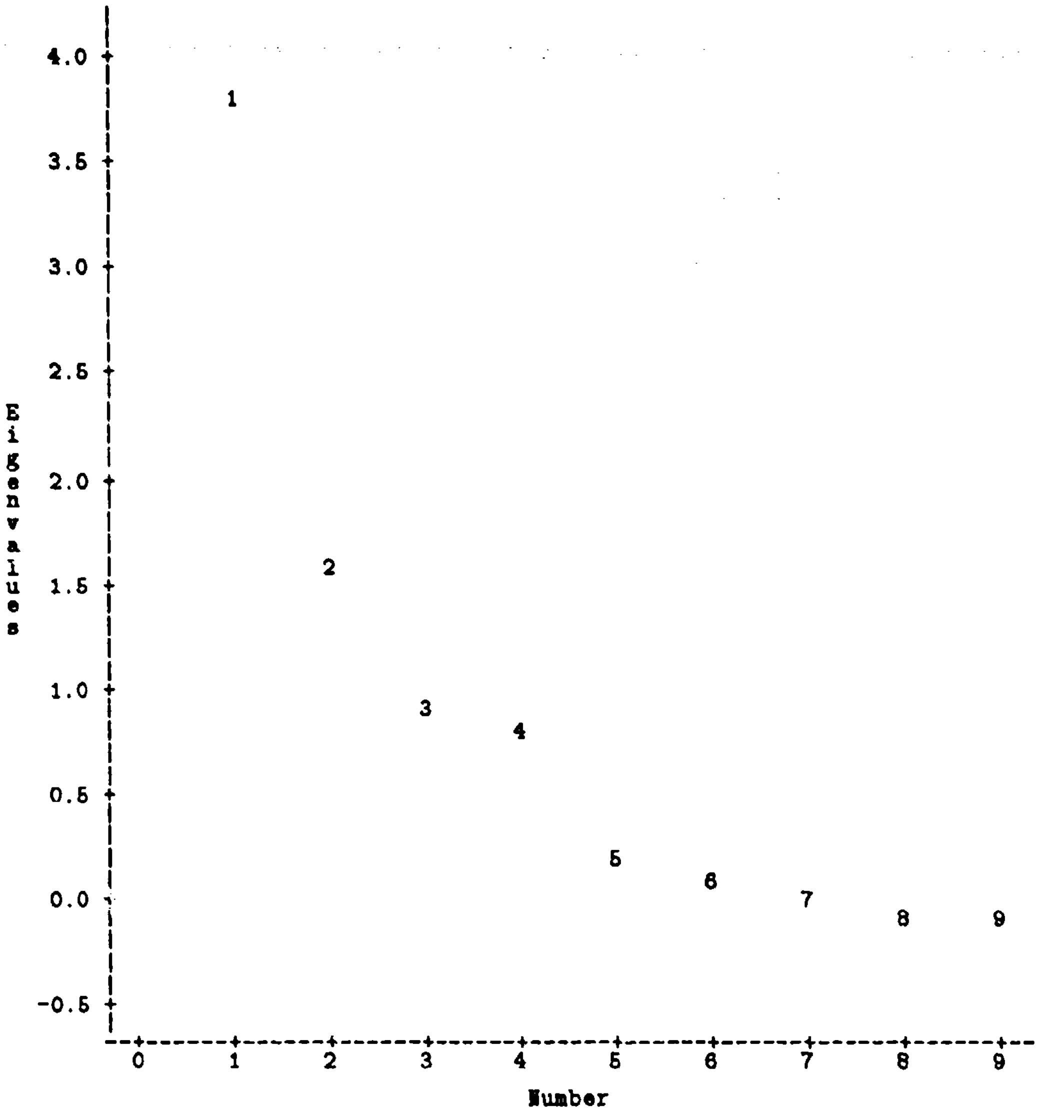


Figure 5.1. Scree Plot of Eigenvalues For $\overline{RE}$

5.2.2 Factor Analysis. According to William R. Dillon, factor analysis began as an analytic model for the social sciences, where the input variables are usually hidden and the relationship between the output variables is often poorly understood. Factor analysis operates by looking for correlations between groups of data [4:53-54]. Grouping highly correlated factors is often a helpful first step in understanding the underlying and possibly unseen relationship in the data. Dillon expresses the basic common factor analytic model as

$$X = \Lambda f + e \tag{5.1}$$

where

X is a vector of observed responses
(in our case, X is a matrix of input variables (b, $STDR$, ρ, and SS) and the associated $\overline{RE}^i$ for each estimator),

f is a vector of unobservable variables called common factors
(we think we have two of these),

e is a vector of unique factors associated with each row of X (in our case, e is a matrix with the same dimensions as the X matrix), and

Λ is a matrix of unknown constants called factor loadings.

If we assume that the unique part of each variable is uncorrelated to that of any other variable or its associated common part, we may represent the covariance of e $(E(ee') = \Psi)$ as a diagonal matrix with zero off-diagonals and Ψ_i on the diagonal elements. Then we can represent the covariance matrix of the observed responses as

$$\Sigma_{XX} = \Lambda\Phi\Lambda + \Psi \tag{5.2}$$

where the square matrix Φ gives the covariances between the common factors. If we assume that a correlation matrix rather than a covariance matrix is used (leaving "1s" on the diagonals), and that the factors themselves are uncorrelated (leaving zeros on the off-diagonals), then $\Phi = I$, the identity matrix, and the covariance of the observed responses becomes simply a function of the loadings matrix and their uniqueness matrix, or

$$\Sigma_{XX} = \Lambda\Lambda + \Psi \tag{5.3}$$

It is these factor loadings which allow us to plot, in the case of two factors, the relative position of all the observed responses with respect to the factors. An observed variable with high loading in terms of one factor and no loading with respect to the other would plot very close to the origin with respect to the latter, and very far from the origin with respect to the former.

Normally input variables are not included in the response matrix (X) because they are unknown. However, we know our input variables. By including them in the response matrix, we see if any input variable correlates highly with one of the factors. Instead of having to guess at the identity of two significant factors, we may use the input variables as the identifying entities. The factor plot does not discriminate between the estimators. It makes no determination as to which is better. It also does not measure the magnitude of the covariance. It simply depicts the level of correlation the variables have with the factors.

With this somewhat cursory introduction to factor analysis behind us, let us now view the factor analysis plots for $\overline{RE}$, provided by SAS, shown in Figure 5.2. Having settled on two significant factors from our previous analysis, we can instruct SAS to conduct the factor analysis in terms of two factors. The input variables and $\overline{RE}$'s are identified by letters, the legend of which is at the bottom of Figure 5.2.

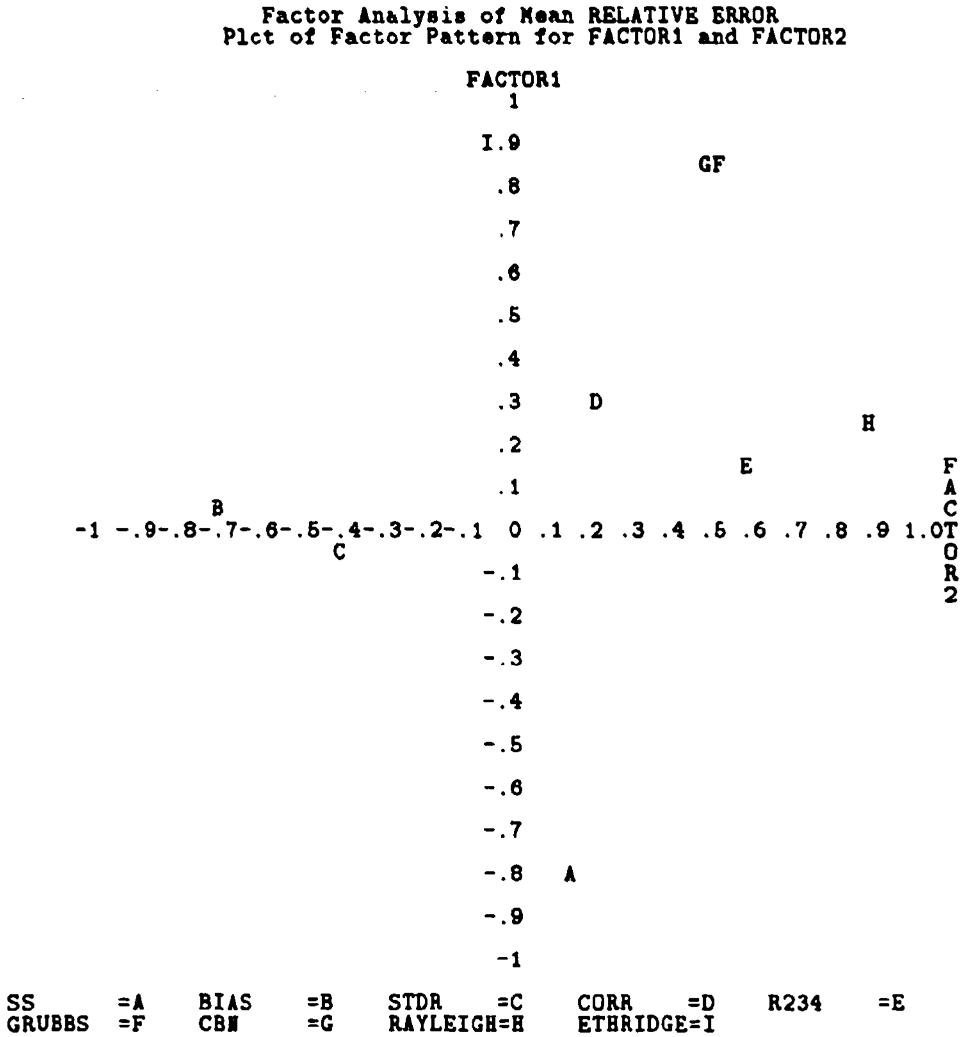


Figure 5.2. Plot of Factor Pattern For $\overline{RE}'$

While our factor reduction tests shed no light on the identity of the significant factors, the factor plot does. Sample size (A) appears very negatively correlated to factor 1, while bias (B) and STDR (C) negatively correlate with factor 2. Correlation (D) is about equally loaded with respect to both factors, although the loadings are relatively small. Thus, for $\overline{RE}'$, the significant factors are sample size (Factor 1), and bias/STDR (Factor 2). With respect to the estimators, we may conclude that

- Ethridge's $\overline{RE}$ varies inversely to sample size, with little or no reaction to the other input variables. As sample size increases, Ethridge's $\overline{RE}$ decreases.
- The $\overline{RE}$ for R234 and Rayleigh are more sensitive to changes in bias and STDR than they are to sample size. We expect their RE to decrease as bias and STDR increase.
- Grubbs and CBN have almost identical factor loadings, suggesting that they have similar reactions to changes in the two factors. Both are more heavily loaded with respect to sample size.

5.2.3 Comparative Response Surfaces. In this section we graphically portray the relationship between input variables and $\overline{RE}^i$ for selected estimation techniques in order to more fully grasp the predictive power of the factor plot, and to get a better feel for their interpretation. Since Rayleigh and Ethridge are the two estimators most correlated with Factors 1 & 2, respectively, we will use them to help graphically interpret the factor plot in Figure 5.2.

The factor plot suggested that $\overline{RE}^{RAYL}$ is most sensitive to changes in Factor 1, bias/STDR. Figure 5.3 shows the effect on $\overline{RE}^{RAYL}$ of varying STDR and bias at a fixed level of correlation and sample size. As one can see, CEP^{RAYL} exhibits

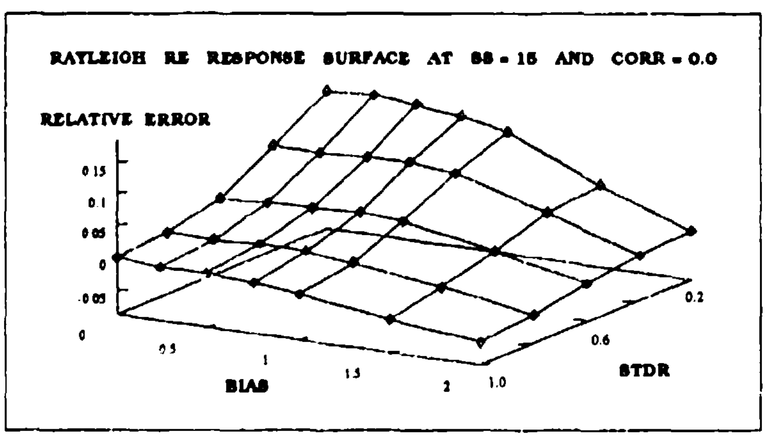


Figure 5.3. $\overline{RE}^{RAYL}$ with varying bias and STDR

a fairly large $\overline{RE}$ for small values of bias and STDR. Figure 5.3 varied bias and STDR at the high level of sample size. Figure 5.4, presents the same comparisons at a low level of sample size. As indicated in the factor plot, we see that $\overline{RE}^{RAYL}$ is insensitive to changes in sample size. In Figure 5.5 we see further evidence of the

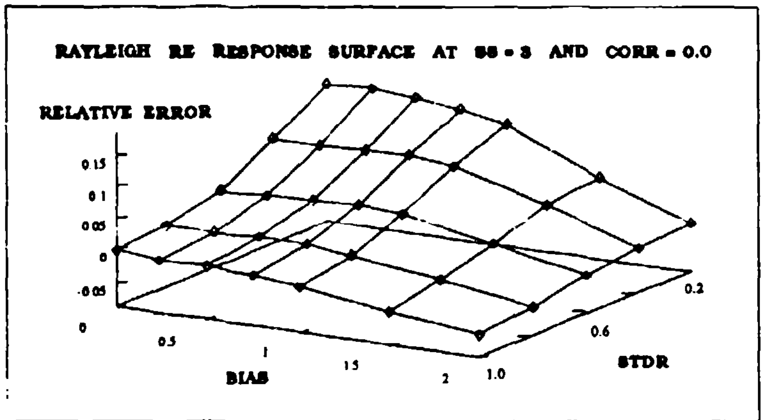


Figure 5.4. $\overline{RE}^{RAYL}$ with varying bias and STDR, SS = 3

insensitivity of $\overline{RE}^{RAYL}$ to sample size. Here, sample size varies with bias, keeping the two characteristic values that affect ellipticity at their nominal values. Note the parallel lines with respect to the sample size axis. This suggests little or no effect from changes in sample size. $\overline{RE}^{RAYL}$ shows parallel lines with respect to sample size no matter what it covaries with. Thus, this plot serves mainly to demonstrate the effect from bias alone.

Ideally, we would like an estimator to be insensitive to all the factors. Such an estimator would have parallel lines drawn to all the axes in these plots. Fortunately, we need not draw all the plots in search of such an estimator since the factor plot has already eliminated that possibility.

Ethridge proposed an insensitive, or robust estimator in his study, and from the factor plot it would appear that he succeeded, at least with respect to bias and STDR. $\overline{RE}^{ETH}$ is clearly sensitive to sample size, as Figure 5.6 shows. It also

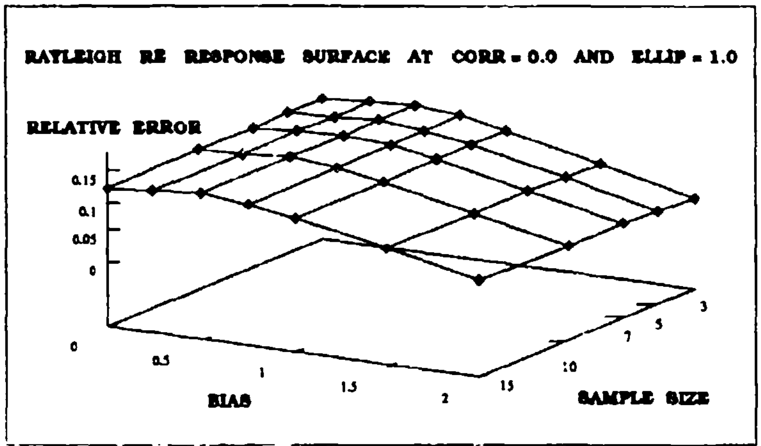


Figure 5.5. $\overline{RE}^{RAYL}$ with varying bias and sample size

demonstrates $\overline{RE}^{ETH}$'s insensitivity to STDR. Note the almost parallel lines with respect to the STDR axis.

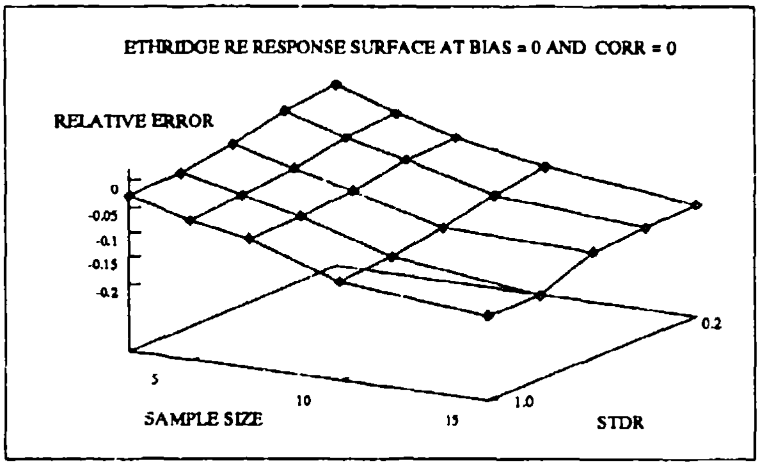


Figure 5.6. $\overline{RE}^{ETH}$ with varying STDR and sample size

However, there is more than one way to show insensitivity. A bumpy, or "noisy" surface also indicates robustness with respect to a factor. Since the factor plot indicated that $\overline{RE}^{ETH}$ was insensitive to both bias and STDR, we might expect a perfectly flat response surface with respect to them. We would be wrong. Consider Figure 5.7.

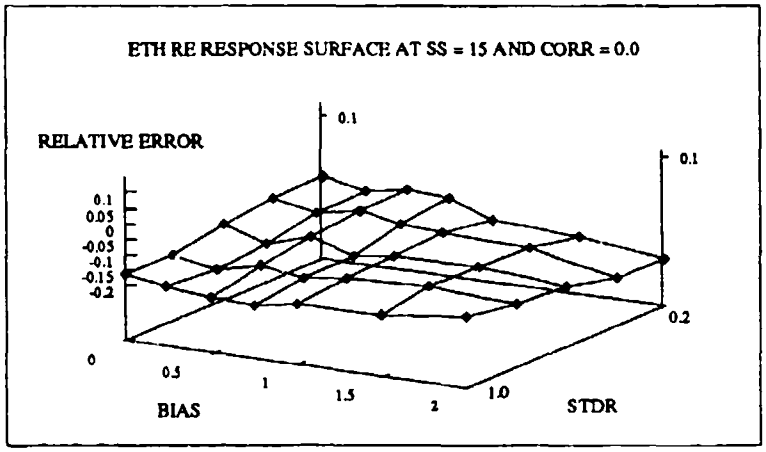


Figure 5.7. $\overline{RE}^{ETH}$ with varying STDR and bias

Figure 5.7 reveals a quite responsive surface with respect to these two factors, yet it is never a consistent response. Only surface plots with sample size as one of the variants have a smoothly increasing or decreasing $\overline{RE}^{ETH}$ surface.

5.2.4 Analysis of Rank-Ordering $\overline{RE}^i$ by Design Point. In this section we analyze the $\overline{RE}^i$ data in Appendix I, to see if one estimator has the best overall $\overline{RE}^i$, or if the best estimator varies from region to region of the design space. This analysis was performed by using the SORT routine in the IMSL subroutine library on the $\overline{RE}^i$ values in Appendix I. At each point, the SORT routine assigned a value of 1.0 to the smallest absolute value of $\overline{RE}^i$, and a 5.0 to the largest absolute value of $\overline{RE}^i$. The rank-ordered results are listed in Appendix J. If one estimation technique dominates the other estimators, then it should have the most first and second place finishes regardless of design point or region.

Figure 5.8 shows the number of times each technique finished first, second, and so on. To roughly determine the number of second place finishes and higher, simply subtract the point at which the technique began finishing in that place from the point at which it incremented to the next level.

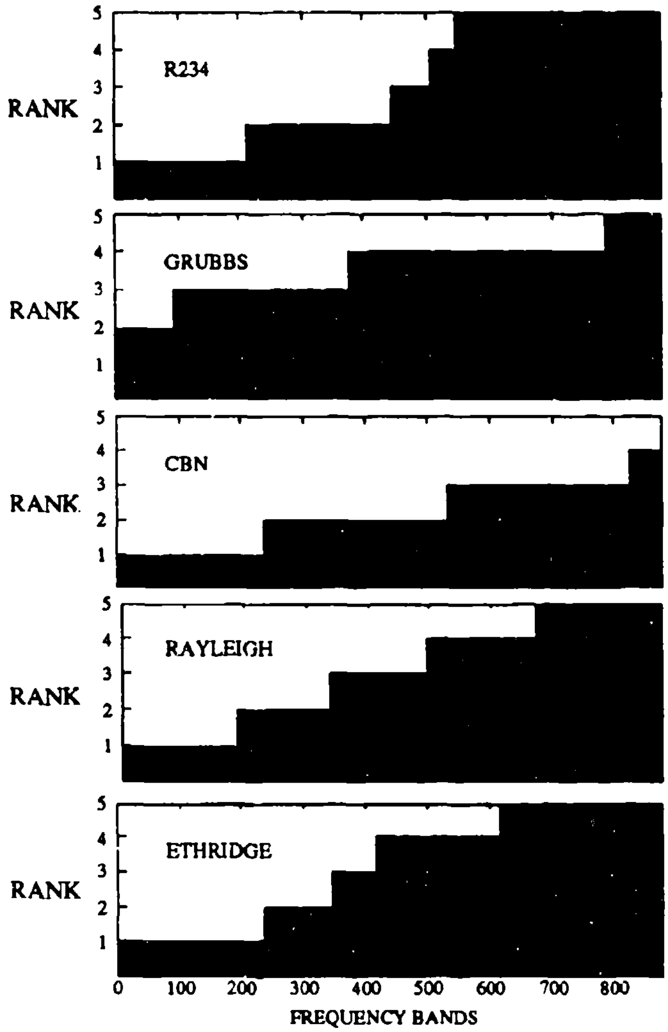


Figure 5.8. Frequency Bands for place finished with respect to $\overline{RE}^{i}$

To illustrate how to interpret Figure 5.8, consider the chart for CBN. It indicates that the CBN method finished first or second over 500 times, third place about 300 times, fourth place about 50 times, and no fifth place finishes. At the other end of the spectrum lies the Grubbs estimator. It had zero first, 100 second, 300 third, 400 fourth, and about 75 fifth place finishes. A good rule of thumb for Figure 5.8

is simply this: The better estimator has less shaded area in its chart. Note that we assigned R234 last place for those points at which it could not compete. The predominance of last place finishes for R234 results from the number of design points from which it was excluded (325), not the number of times it finished last.

While simplifying comparisons between estimators, ordinal comparisons such as those in Figure 5.8 can overstate the distinctions between techniques. For instance, by how much is a first place finish better than a second place finish, or, for that matter, a last place finish? A quick check of the data ion Appendix I reveals that for most design points there is quite a spread in $\overline{RE}^{i}$. As many as 20 percentage points often separate first and last place, and five percentage points usually separate first and second. Table 5.2 displays the frequency with which each technique's $\overline{RE}^{i}$ has a value within a certain range. R234 has only 550 entrants in Table 5.2 since it could not compete at all design points. From Table 5.2 we can draw the following

Table 5.2. Range of $\overline{RE}^{i}$ by Technique

$\overline{RE}^{i}$ Range	R234	Grubbs	CBN	RAYL	ETH
0% → 2.5%	222	133	260	221	190
2.5% → 5%	166	205	297	171	153
5% → 7.5%	132	221	156	93	149
7.5% → 10%	30	155	85	125	124
10% → 15%	0	109	77	265	165
15% → 20%	0	52	0	0	84
20% → 40%	0	0	0	0	10

observations:

- The CBN method is the least biased of the five estimation techniques over the entire design space. Furthermore, some of its second and third place finishes recorded in Figure 5.8 occur at points where the best or second best estimator is better by less than 5%.

- The Grubbs estimator has the smallest proportion of $\overline{RE}^i$ values less than 5%. However, it does not have the most frequent occurrences in the higher ranges, where Rayleigh and Ethridge are the "winners". As concluded from Figure 5.8, it appears that, over the entire design space, Grubbs is neither the worst nor the best.

- Most estimators have their maximum frequency of appearances in the lower ranges, and then taper off in the higher ranges. This is not the case with Rayleigh. It begins high, quickly tapering in the medium ranges of $\overline{RE}^i$, then increases to a maximum in the 10% $\rightarrow$ 15% range, a maximum not altogether explained by the increased width of that range. Thus Rayleigh, in contrast to Grubbs, is one of the most *and* one of the least biased techniques.

- R234 has a desirable low level of bias in most cases, but there are 325 cases in which it could not compete. The operational limitations of R2324 preclude it from consideration as the "best" estimation technique.

- Ethridge appears almost uniformly distributed between the first four ranges of $\overline{RE}^i$, although it does slightly taper as the ranges increase. The slight jump in frequency in the 10% $\rightarrow$ 15% range occurs because that range is wider than the previous four. With over 259 instances of $\overline{RE}^i$ greater than 10%, and with the fewest in the first two range categories (with the exception of Grubbs), Ethridge is clearly one of the more biased estimators.

Using only this analysis we would most probably select the CBN method to estimate CEP. However, what if the first place finishes are grouped according to specific regions of the design space? What if the first place finishes for a particular technique "clump" together rather than being randomly spread throughout the design space? Thus far, our analysis suggests the design space is primarily defined by sample size and bias. Analyzing Appendix J for changes in first place at points where bias and sample size change yields the following decision grid, depicted in Figure 5.9.

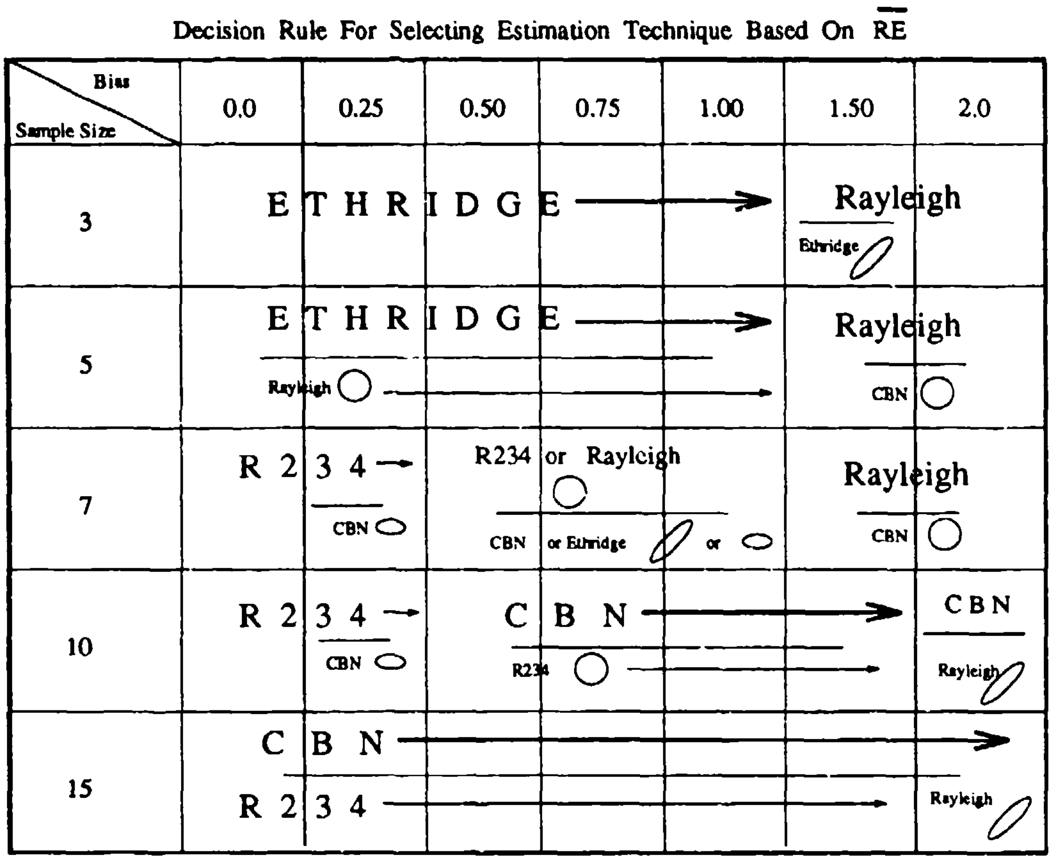


Figure 5.9. $\overline{RE}'$ Decision Grid

Figure 5.10 displays the meanings of the rounded and elliptical shapes in Figure 5.9. As a general rule, the larger the type, the more dominant that estimator appears at that combination of sample size and bias. A thin line separating two estimators signifies a second technique below the line which closely challenges the dominant estimator, or performs best with respect to the distributional shapes, explained in Figure 5.10.

To illustrate how to interpret Figure 5.9, consider the case where sample size is three and bias is 1.5. For this combination of factor values, the Rayleigh estimator dominates all others, with the exception of CEP^{ETH}. For highly correlated distributions at that point, CEP^{ETH} actually outperforms CEP^{RAYL}. As another example,

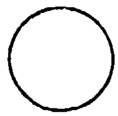
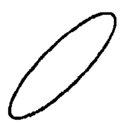
Symbol	*Interpretation*
	Associated estimator performs best on circular or near-circular distribution.
	Associated estimator performs best on elliptical distributions whose ellipticities are primarily the result of STDR.
	Associated estimator performs best on distributions with correlation of .85 or higher.

Figure 5.10. Legend For Decision Grid

consider the first five levels of bias at sample size five. Here, CEP^{ETH} continues to dominate, as it did for sample size three, except for primarily circular-shaped distributions. In those cases, CEP^{RAYL} is the estimator of choice. Finally, we see that at sample size 15, the CBN method dominates throughout. However, for all types of distributions at sample size 15, CEP^{R234} offers a competitive estimate up to a bias of 2.0, where CEP^{CBN} dominates except for highly correlated distributions.

The results in Figure 5.9 are based on the assumption that we know the population distribution for which we are estimating CEP. The distribution shapes in Figure 5.10 are inferred from the design point characteristics associated with an estimator's performance. The known population parameters at each design point are used to generate sample populations in a simulation context, but the population parameters are never known in practice. Thus, to infer an appropriate estimator from Figure 5.9 based on parameters drawn from sampling may be inappropriate.

Recall in Chapter I that we chose our parameter estimators (equations 1.4 through 1.9) because of their desirable qualities (unbiased, minimum variance, etc.). However, these qualities do not guarantee that the estimated parameter perfectly reflects the population parameter. Puhek showed that for small samples, the sample correlation could assume the entire spectrum of values $(-1.0 \leq \hat{\rho} \leq 1.0)$. In

Table 5.3. Correlation Analysis

	Sample Size						
Range	5	10	20	50	100	500	1000
(.9,1)	2	0	0	0	0	0	0
(.8,.9)	6	0	0	0	0	0	0
(.7,.8)	10	2	0	0	0	0	0
(.6,.7)	10	3	0	0	0	0	0
(.5,.6)	12	4	1	0	0	0	0
(.4,.5)	7	5	2	0	0	0	0
(.3,.4)	15	11	4	1	0	0	0
(.2,.3)	14	9	7	3	1	0	0
(.1,.2)	7	11	5	4	2	0	0
(0,.1)	17	6	6	2	3	1	1
(-.1,0)	10	8	5	3	1	1	0
(-.2,-.1)	15	4	7	2	2	0	0
(-.3,-.2)	12	8	6	4	1	0	0
(-.4,-.3)	9	14	4	1	0	0	0
(-.5,-.4)	12	9	3	0	0	0	0
(-.6,-.5)	14	4	0	0	0	0	0
(-.7,-.6)	6	2	0	0	0	0	0
(-.8,-.7)	10	0	0	0	0	0	0
(-.9,-.8)	7	0	0	0	0	0	0
(-1,-.9)	5	0	0	0	0	0	0
Mean	-.02	.00	.00	.01	.01	.01	.00

Table 5.3 we see the results of splitting a sample of 1000 miss distance coordinates from an uncorrelated population into successively smaller samples. The left-hand column displays the range of correlation, and the table entries show the frequency

with which those ranges occurred. Table 5.3 shows that as sample size decreases, $\hat{\rho}$ assumes an increasingly wider range of values. We might have guessed this effect since a sample of two observations will have a correlation of either 1.0 or -1.0, no matter what the population parameters are.

To illustrate the effect of small sample size on the sample characteristics used in this study, we generated a sample of 2000 miss distance coordinates from a population with *no* correlation($\rho = 0$), *no* bias ($b = 0$), and equal down and crossrange variances ($STDR = 1.0$). We then split them up into 666 samples of size three and estimated the population characteristics for each sample. The histogram of all 666 correlation estimates is found in Figure 5.11.

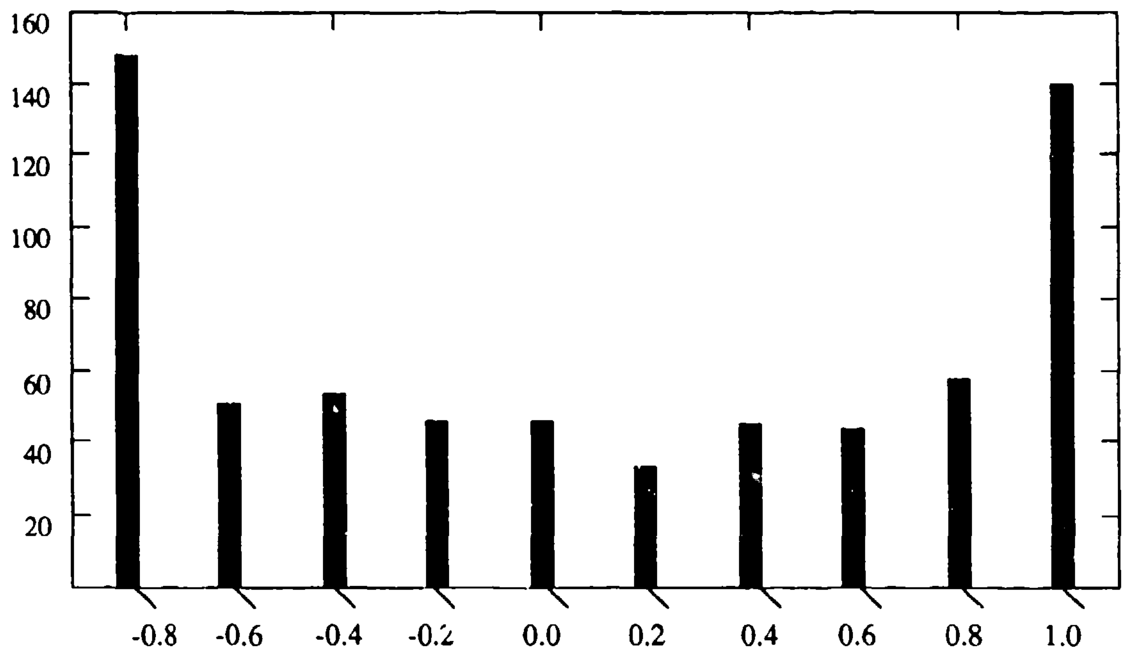


Figure 5.11. Histogram of 666 sample size three estimates of ρ from a population with $\rho = 0.0$.

Figure 5.11 reveals that we are much more likely to estimate a large (in absolute terms) value for correlation rather than the true population correlation of zero. Figure 5.12 displays the distribution of STDR values from the same samples used above. Recall that the population STDR was 1.0, but the sample estimates appear

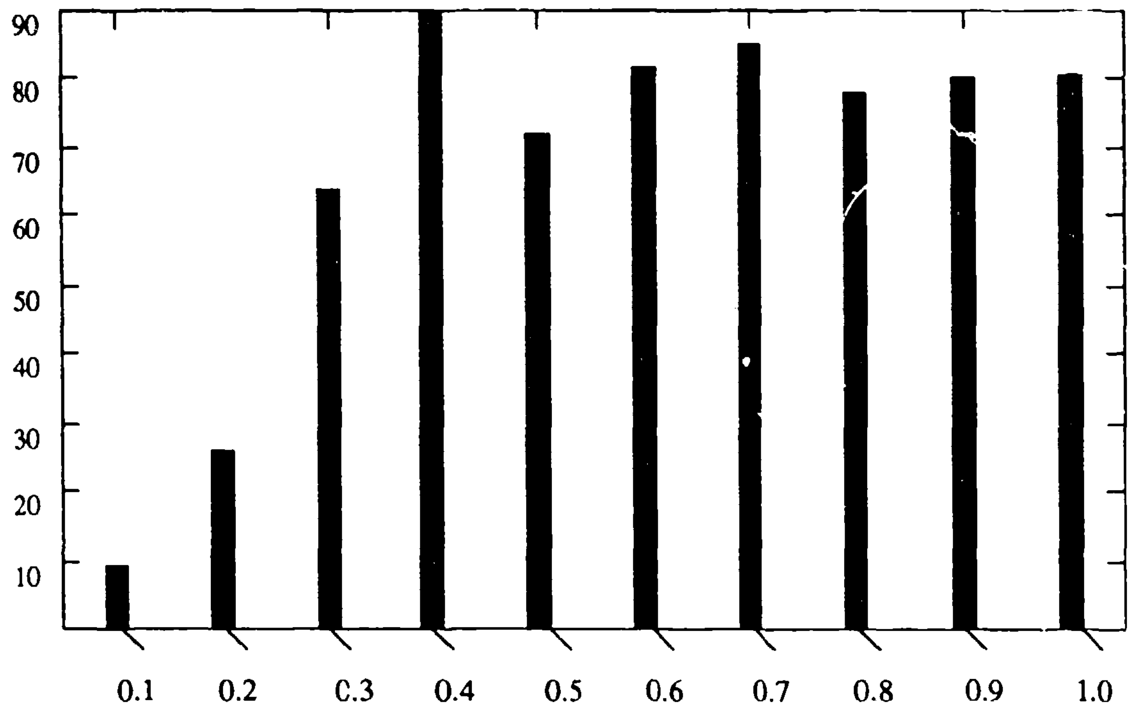


Figure 5.12. Histogram of 666 sample size three estimates of STDR from a population with STDR = 1.0.

uniformly distributed down to an STDR of 0.3. We can conclude that sample size three estimates of STDR have almost the same likelihood for being correct as they do for an estimate that is 70% in error.

Figure 5.13 shows the distribution of estimates of bias from the 666 samples of miss distribution coordinates described above. The population bias was zero, but we see that the estimators were much more likely to estimate the bias as 0.75. Indeed, some of our randomly drawn samples of three had a scaled bias as high as 5.0.

The point to be drawn from these three figures is that for sample size three we cannot possibly conclude the shape of the population distribution based on estimated characteristics. Without the ability to adequately characterize the population distribution, we really have no business estimating CEP from a sample of size three.

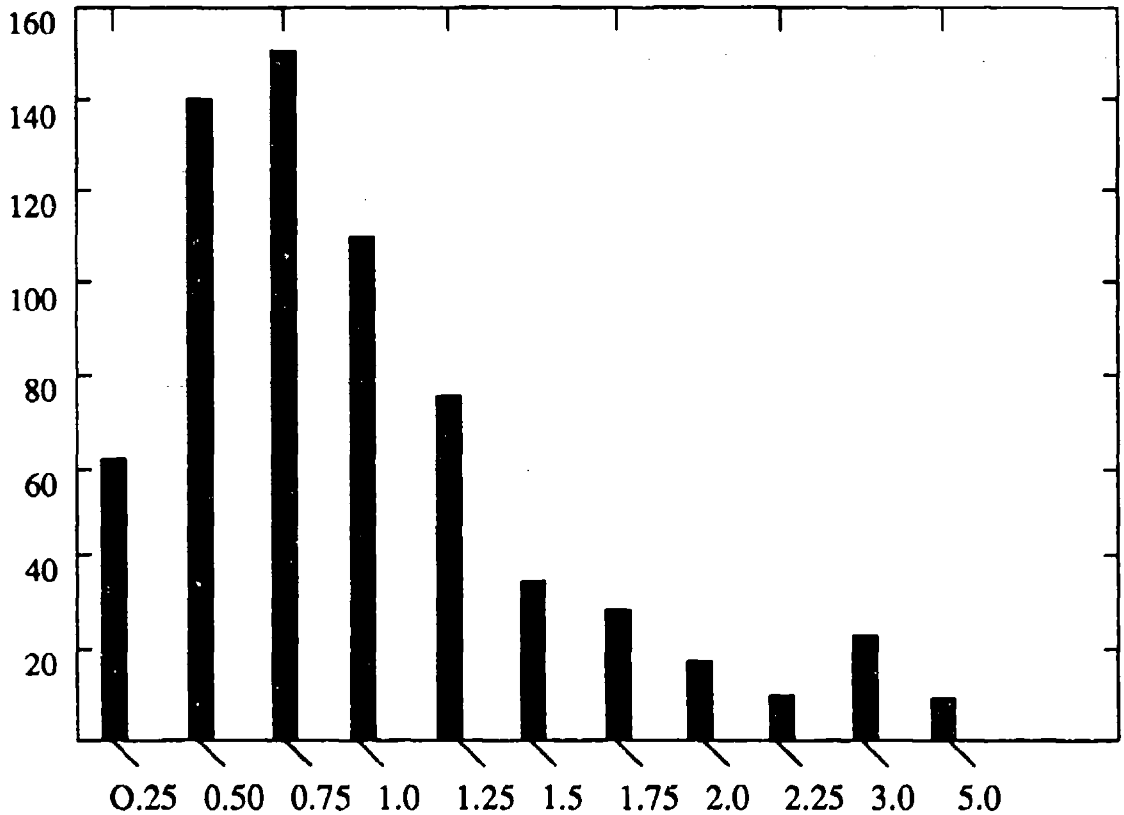


Figure 5.13. Histogram of 666 sample size three estimates of the bias of a population with bias = 0.0.

However, if we must do so, as a result of fiscal or political constraints, we should select our estimation technique based on its performance with respect to sample size, the one factor over which we have complete control. Therefore, we redisplay Figure 5.14 below, without the distributional caveats, except for bias.

Of the three characteristics, only bias has a non-uniform, almost gamma-like distribution, as displayed in Figure 5.13. Thus, we may assume that lower values of sample-estimated bias are more likely when the population bias is low, and higher values of sample-estimated bias are more likely when the population bias is high.

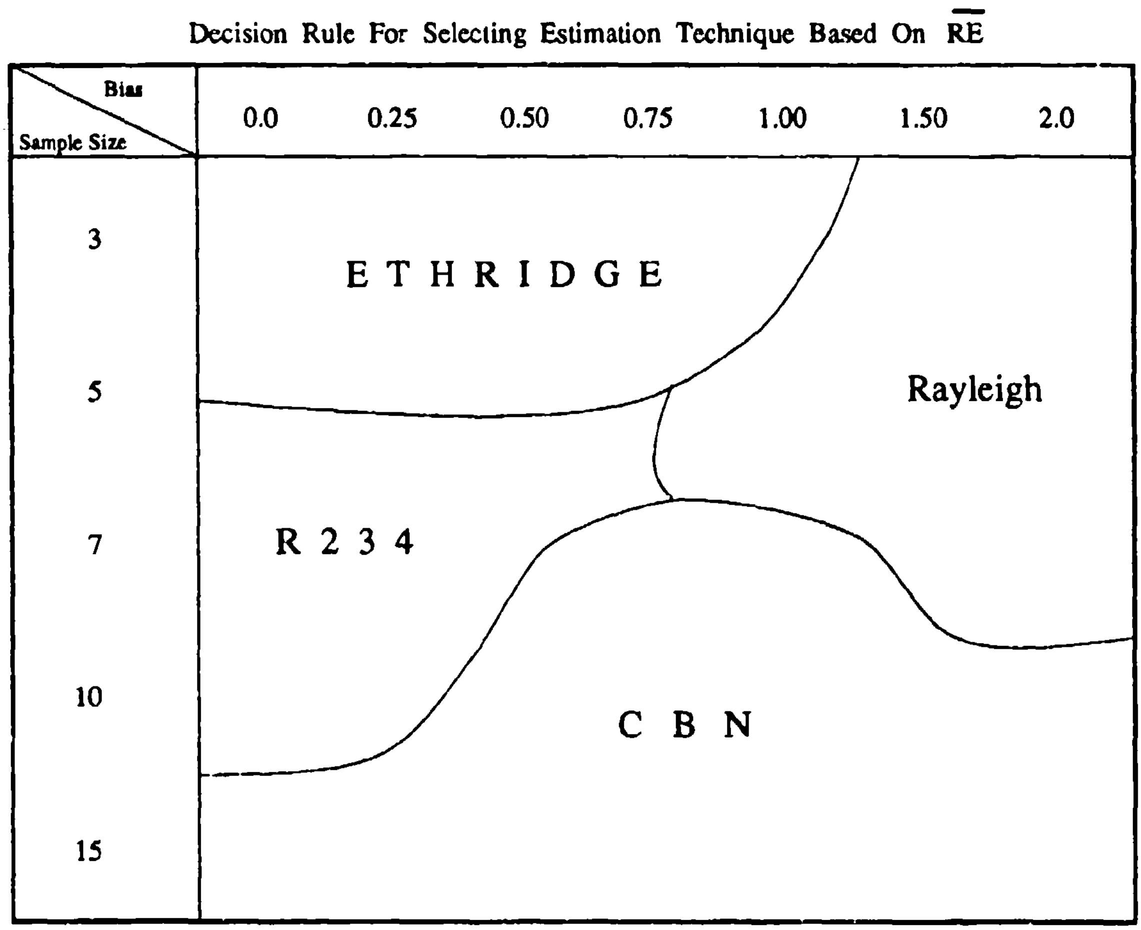


Figure 5.14. Simplified $\overline{RE}'$ Decision Grid

5.3 Variance of Relative Error ($VAR(RE)$)

We now turn our attention to the variance of RE^i about its mean, $\overline{RE}$. Using this MOE, we would select a CEP estimator with a smaller variance about its mean over one with a larger variance, even though the latter may be more accurate on average.

5.3.1 Factor Reduction Tests. Table 5.4 displays the rank-ordered eigenvalues for the four input factors and five estimator responses from our $VAR(RE^i)$ results in Appendix K. Only one eigenvalue is greater than one, suggesting only one factor is significant.

Table 5.4. Rank-Ordered Eigenvalues for $VAR(RE^i)$

	1	2	3	4	5
Eigenvalue	5.5203	0.7953	0.4718	0.4294	0.0542
Difference	4.7250	0.3235	0.0424	0.375	0.0506
Proportion	0.7663	0.1104	0.0655	0.0596	0.0075
Cumulative	0.7663	0.8767	0.9422	1.0018	1.0093
	6	7	8	9	
Eigenvalue	0.0036	-0.0007	-0.0067	-0.0633	
Difference	0.0043	0.0060	0.0566		
Proportion	0.0005	-0.0001	-0.0009	-0.0088	
Cumulative	1.0098	1.0097	1.0088	1.0000	

The scree test for $VAR(RE^i)$ has only one eigenvalue comprising the "cliff", as displayed in Figure 5.15. That one eigenvalue, plus the topmost eigenvalue of the scree, suggest that two significant factors exist. Thus, between our two factor reduction tests, we can conclude that no more than two significant factors exist with respect to $VAR(RE^i)$.

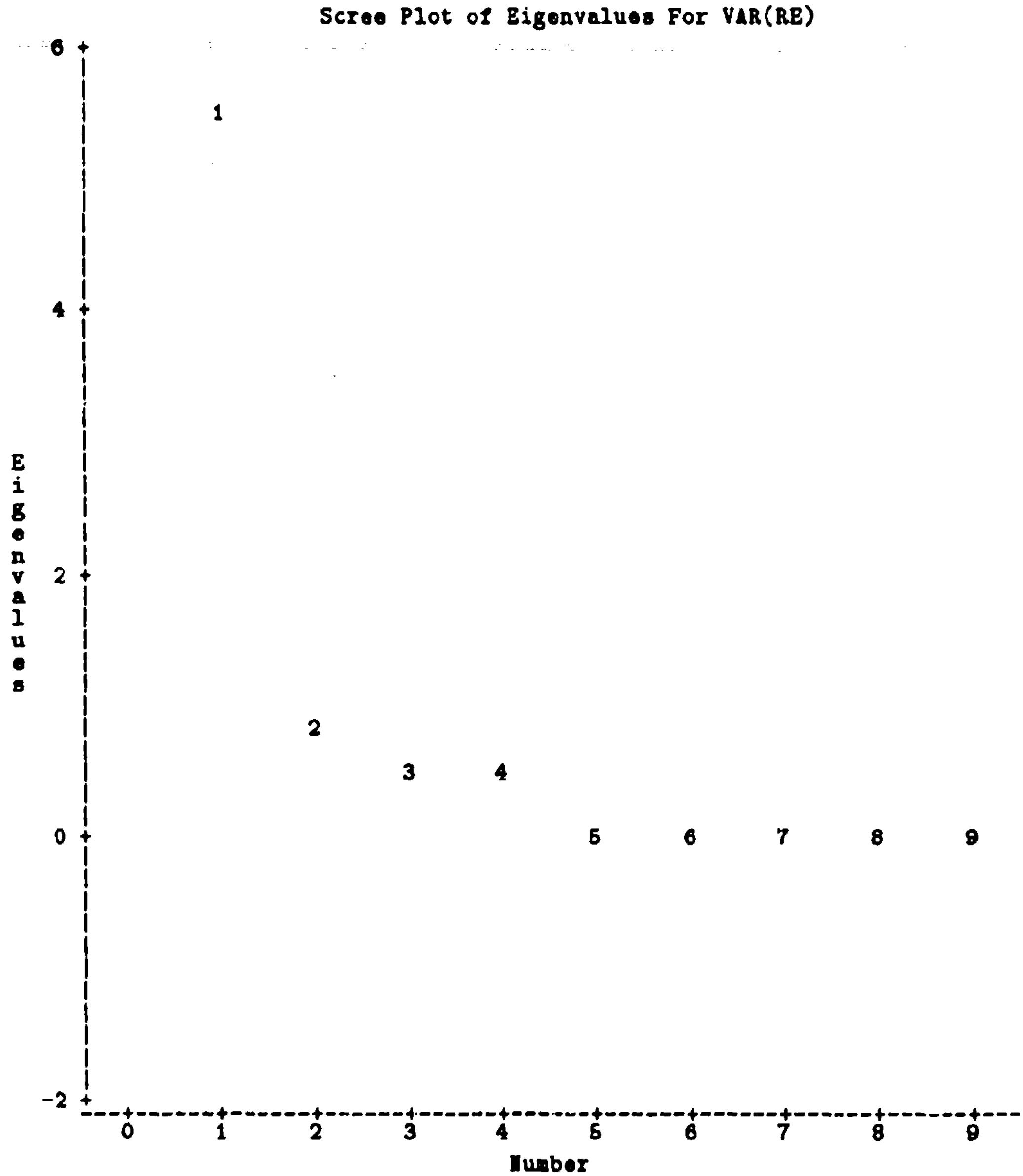


Figure 5.15. Scree Plot of Eigenvalues For $VAR(RE^i)$

5.3.2 Factor Analysis. Having narrowed the number of significant factors to no more than two, we can instruct SAS to conduct the factor plot with two factors. Displayed in Figure 5.16, a dramatic pattern emerges.

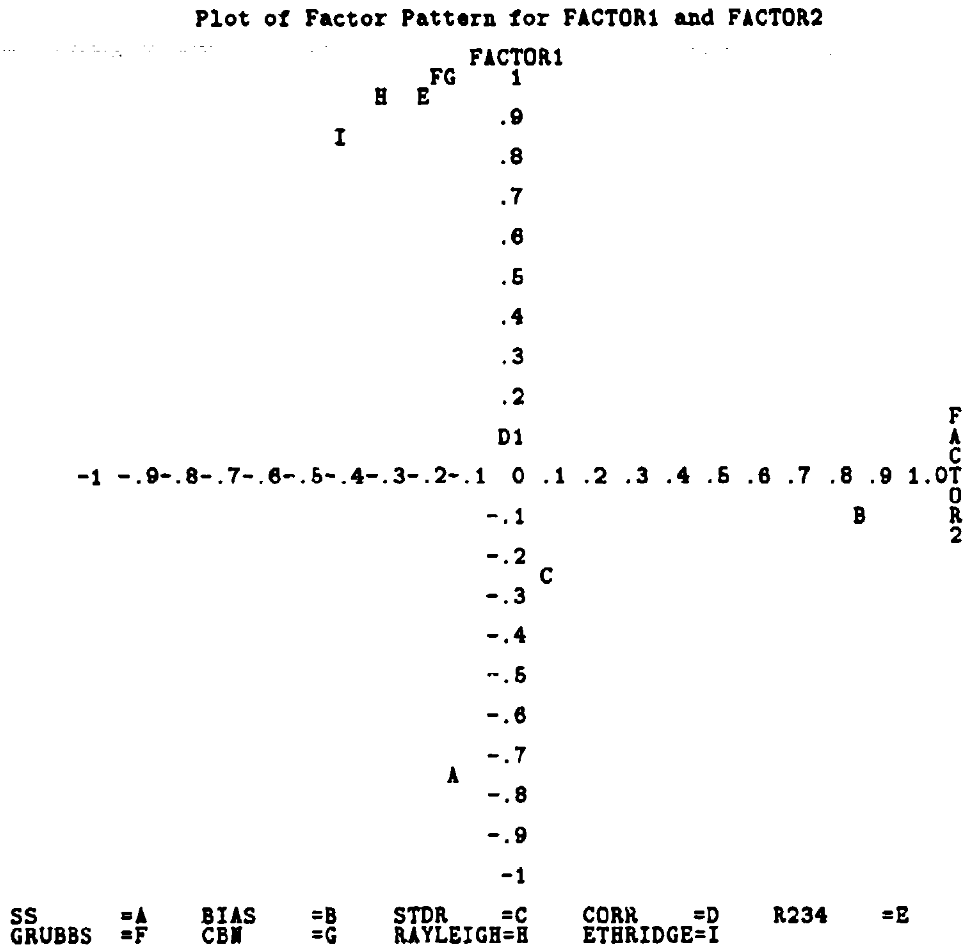


Figure 5.16. Plot of Factor Pattern For $VAR(RE^i)$

The remarkable grouping of all the estimators suggests they all correlate in very similar fashions to the two factors. Once again, bias and sample size highly correlate with Factor 1 and 2, respectively. The difference here is that the two ellipticity-inducing factors (STDR and CORR) have extremely small loadings on either factor. Thus we conclude that Factor 1 is sample size, while Factor 2 is bias. Furthermore,

- Variance decreases in all the estimators with increasing sample size.

- Ethridge's variance is more sensitive to changes in bias than any of the other estimators, showing increasing values as bias decreases.

- The significant factors for $\overline{RE}^i$ are roughly the same as they are for $VAR(RE^i)$.

- The manner in which the $VAR(RE^i)$ react to the significant factors is quite different from the case of $\overline{RE}^i$.

Had we chosen to graphically depict the $VAR(RE^i)$ response surfaces, we would have found many perfectly flat surfaces, with one exception: the case in which we allowed sample size to vary. Those surfaces show a dramatic upward slope in the direction of decreasing sample size.

5.3.3 Analysis of Rank-Ordering $VAR(RE^i)$ by Design Point. Figure 5.17 shows the frequency of places finished for all five techniques, but this time in terms of $VAR(RE^i)$. The clear "loser" in Figure 5.17 is Ethridge. With over 400 last place finishes, Ethridge is clearly the most variable estimator. Ethridge even has more fifth place finishes than R234, which had most of its fifth place finishes forced upon it. Although Grubbs' $\overline{RE}^i$ is inferior to the others, its variability rankings look quite good. While Grubbs has no first place finishes, it also has no last place finishes. With respect to variability, Rayleigh and the CBN method have the most first place finishes, with R234 placing first over 100 times.

We conclude that no matter what the MOE, Grubbs is never the "best". Furthermore, we appear to have a discrepancy between the two MOEs analyzed thus far: Ethridge is a top performer with respect to $\overline{RE'}$. That combined with its relatively large variance answers one of our research questions: Indeed, different MOEs can lead us to select different estimators as the "best". We further investigate when to use which MOE for selecting a CEP estimation technique.

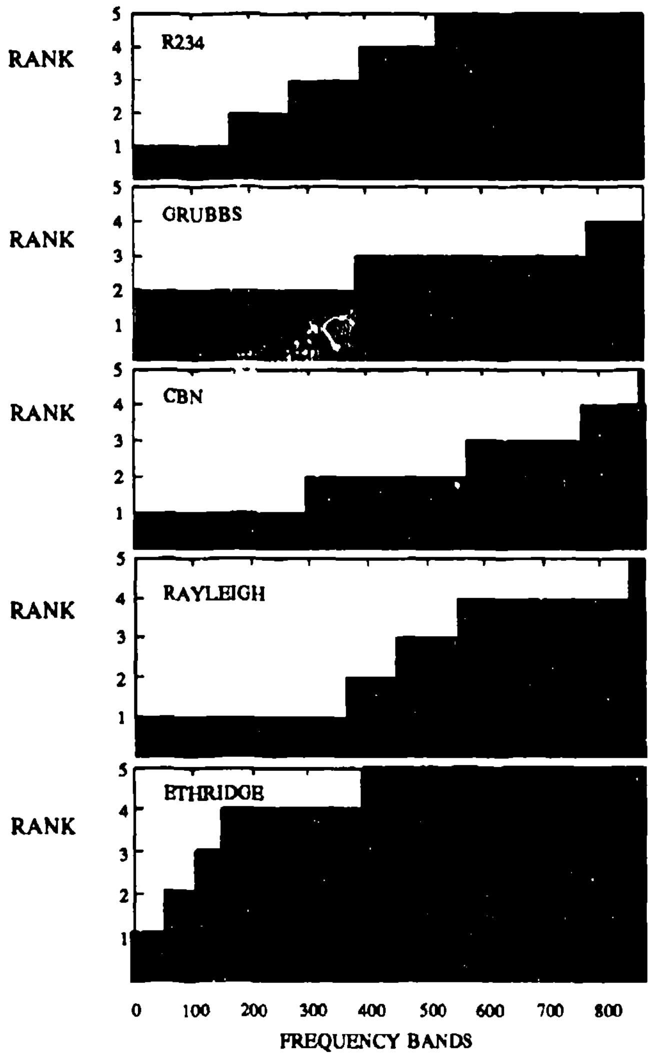


Figure 5.17. Frequency Bands for place finished with respect to $VAR(RE')$

As was the case with Figure 5.8, we temper our somewhat simplistic analysis in Figure 5.17 with Table 5.5. From Table 5.5 we can draw the following observations:

Table 5.5. Range of $VAR(RE^i)$ by Technique

$VAR(RE^i)$ Range	R234	Grubbs	CBN	RAYL	ETH
0.00 → 0.025	57	118	117	110	17
0.025 → 0.05	226	301	307	297	108
0.05 → 0.075	139	180	182	186	332
0.075 → 0.10	53	92	81	105	203
0.10 → 0.15	48	106	112	111	135
0.15 → 0.20	27	45	42	40	46
0.20 → 0.40	0	33	34	26	34

- All five techniques begin with low frequencies, build to a maximum, and decrease from that maximum. Furthermore, with the exception of Ethridge, the highest frequency for all estimators occurs in the 0.025 → 0.05 range.
- Grubbs has the most instances of $VAR(RE^i)$ in the 0 → 0.025 range, yet it has practically no first place finishes in Figure 5.17. This must mean that its large number of second-place finishes were second-best by a margin barely worth mentioning.
- Ethridge is c[illegible] the most variable technique, but only in terms of where its maximum frequency occurs with respect to the other estimators. And that difference is only about 0.05 points different from the other techniques.
- The number of entries for the Grubbs, CBN, and Rayleigh techniques are strikingly similar. To have numbers this similar suggests that the differences in $VAR(RE^i)$ may be statistically insignificant. A quick reading of Appendix K reveals that at each design point the range of values between the high and low $VAR(RE^i)$ for all five estimators is often quite small, and rarely as large as 0.05. Furthermore, the spread between first and second place finishes is extremely small, unlike the spread observed for $\overline{RE^i}$. Thus, at least for CBN,

Grubbs, and Rayleigh, we may have preferences based on $VAR(RE^i)$, but they would not be strong preferences.

- Rather than assisting in selecting the best estimator, the $VAR(RE^i)$ MOE greatest strength might be in eliminating the worst technique. In this case, we would eliminate the Ethridge estimator, then distinguish between the remaining techniques based on their $\overline{RE}^i$.

Decision Rule For Selecting Estimation Technique Based On VAR (RE)

Bias / Sample Size	0.0	0.25	0.50	0.75	1.00	1.50	2.0
3	R 2	3 4 / CBN ○	Rayle	gh →	→	→	→
5	R 2 / CBN	3 4 → / CBN	C B	N →	Rayl	eigh →	→
7	C / R23	B N → / 4 ○	C B	N →	Rayl / CBN ○	eigh → / BTH ∅	→
10	R 2 / CB	3 4 → / N	C B	N →	CBN / Rayleigh	Rayle	gh →
15	R 2 / CB	3 4 / N	C B	N →	CBN / Rayleigh	Rayle	gh →

Figure 5.18. $VAR(RE^i)$ Decision Grid

In constructing the decision grid for $VAR(RE^i)$, we should remember that for each first place finish there is probably a second and/or third place finish which is only insignificantly worse than it. However, should a pattern appear wherein one estimator is consistently the best within a certain region, then we should place emphasis on that pattern rather than the magnitude of its $VAR(RE^i)$. Figure 5.18 displays the grid for $VAR(RE^i)$.

Using $\overline{RE^i}$ as the criterion in selecting an estimation technique, we would have almost always selected Ethridge's estimator for sample sizes three to five. Ethridge barely merits an honorable mention when $VAR(RE^i)$ is considered. Indeed, at those settings, Ethridge is quite often the most variable. Aware that the difference between first and last place is minimal in most cases, we should be nonetheless concerned with Ethridge's consistently most variable status in the region where its average RE performed so well.

The real "winners", at every level of sample size, are CBN and Rayleigh. For highly biased distributions, regardless of sample size, CEP^{RAYL} is the estimator of choice. However, for most cases in which bias is less than or equal to one, CBN is first or a strong second, showing it to be a robust estimator across a range of values.

The reader will also notice fewer caveats exist for Figure 5.18 with respect to distribution shape, than were evident for Figure 5.9. The factor plot for $VAR(RE^i)$ prepared us for this since none of the estimators showed a great correlation to the characteristic factors of STDR or correlation.

As we did with the decision grid for $\overline{RE^i}$, we reproduce Figure 5.18 without the distributional caveats. Furthermore, since the difference between R234 and CBN are minimal at the higher sample sizes and low bias values, we recommend the CBN method for those regions of the design space. Again, no clear winner emerges for all regions of the factor space, but regional winners do exist, and they are sometimes different than those identified by $\overline{RE^i}$ alone.

- While Ethridge's estimator is on average the least biased of all estimators for sample size three through five, it has greater variance than R234, CBN, and Rayleigh for those same settings.
- R234 is the best performer for low settings for bias and sample size.
- Rayleigh is the best performer for high settings of bias, regardless of sample size.

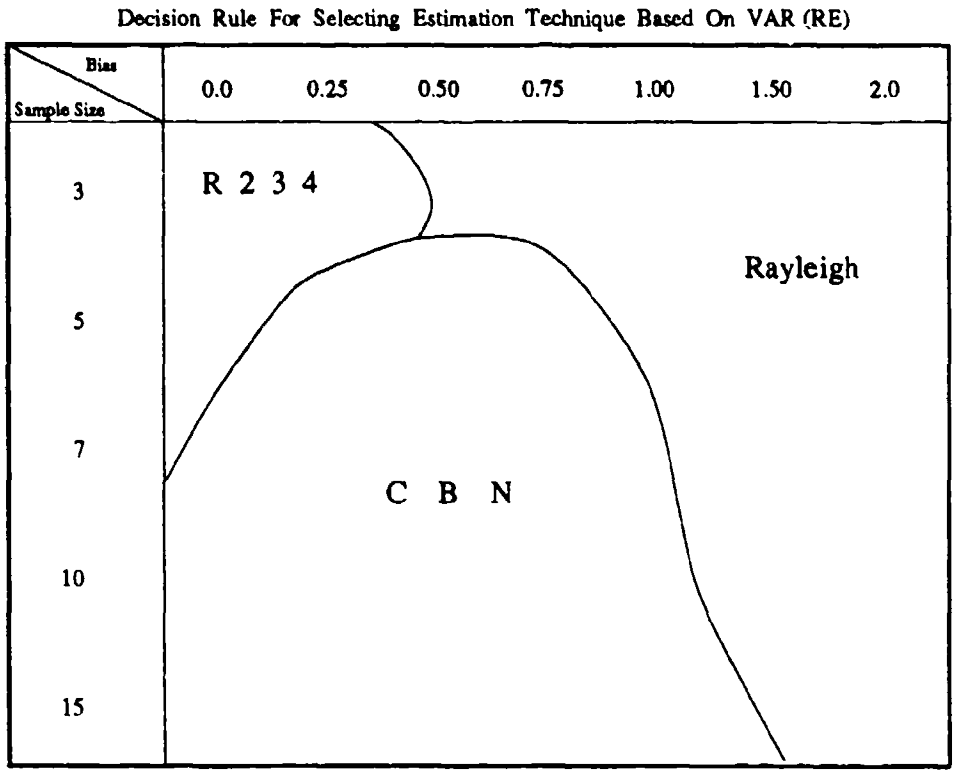


Figure 5.19. Simplified $VAR(RE^i)$ Decision Grid

- With the exception of sample size three, the CBN method performs best for mid-range settings of bias.

We have seen that $VAR(RE^i)$ provides us with a "weak" distinction between estimators, and that $\overline{RE}^i$ provides a "strong" distinction between estimators. Furthermore, we have gotten mixed signals from the two measures we have analyzed thus far. Especially for sample size three and five, $\overline{RE}^i$ and $VAR(RE^i)$ lead to very different conclusions. Quite possibly the analysis of mean squared error will provide insight into this conundrum.

5.4 *Mean Squared Error of Relative Error ($MSE(RE)$)*

We now turn to the MOE which measures both estimator bias and variance. As such, this measure confounds both of the previous measures in its measure of total displacement from the target ($RE = 0$).

5.4.1 Factor Reduction Tests. Table 5.6 displays the rank-ordered eigenvalues for the four input factors and five estimator responses from our $MSE(RE^i)$ results in Appendix M. As in the case of $VAR(RE^i)$, only one eigenvalue crests the requirement for significance. Indeed, the magnitude of that eigenvalue, and the others, is extremely similar to that for $VAR(RE^i)$, indicating that $VAR(RE^i)$ is possibly the major component of $MSE(RE^i)$.

Table 5.6. Rank-Ordered Eigenvalues for $MSE(RE^i)$

	1	2	3	4	5
Eigenvalue	5.3370	0.8224	0.5490	0.4780	0.1077
Difference	4.5145	0.2735	0.0710	0.3703	0.1072
Proportion	0.7420	0.1143	0.0763	0.0665	0.0150
Cumulative	0.7420	0.8563	0.9327	0.9991	1.0141
	6	7	8	9	
Eigenvalue	0.0004	-0.0031	-0.0164	-0.0821	
Difference	0.0036	0.0133	0.0657		
Proportion	0.0001	-0.0004	-0.0023	-0.0114	
Cumulative	1.0141	1.0137	1.0114	1.0000	

The scree test results on the following page also appear identical to those for $VAR(RE^i)$. Clearly, no more than three significant factors exist for all three MOEs. Since their identity for the previous two have been roughly similar, and both $\overline{RE}^i$ and $VAR(RE^i)$ combine to make $MSE(RE^i)$, we should have no surprises from the factor plot.

5.4.2 Factor Analysis. Figure 5.21 contains the results of the factor analysis. The pattern is almost identical to that found for $VAR(RE^i)$, with only a slight leftward and downward change for the tightly clumped group of estimators. Bias and sample size remain the defining factors, with STDR exerting a slightly greater effect than in the case of $VAR(RE^i)$. For MSE, Ethridge appears equally sensitive to sample size and bias. Still, the striking resemblance between Figure 5.21 and Figure 5.16 almost forces us to accept that, when measuring the displacement of RE^i, the largest component of that displacement is $VAR(RE^i)$. Had $\overline{RE}^i$ been the major component, we should have seen $MSE(RE^i)$ behaving more like $\overline{RE}^i$ in terms of its factor loadings for the different techniques.

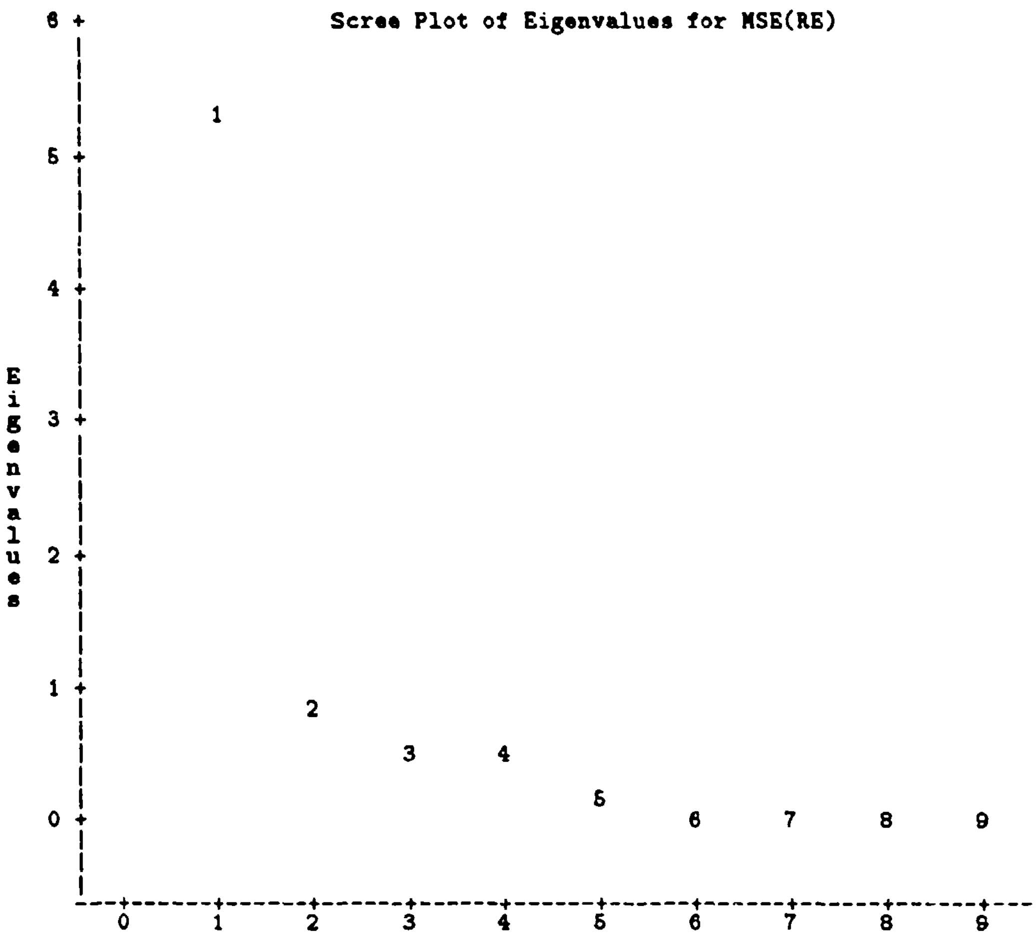


Figure 5.20. Scree Plot of Eigenvalues For $MSE(RE^i)$

The similarity between $MSE(RE^i)$ and $VAR(RE^i)$ is also apparent when plotting the surface responses of $MSE(RE^i)$ to changes in the factors. They are all primarily flat unless sample size and, to a lesser extent, bias are one of the variables. Ethridge's surfaces do show about equal sensitivity to sample size and bias.

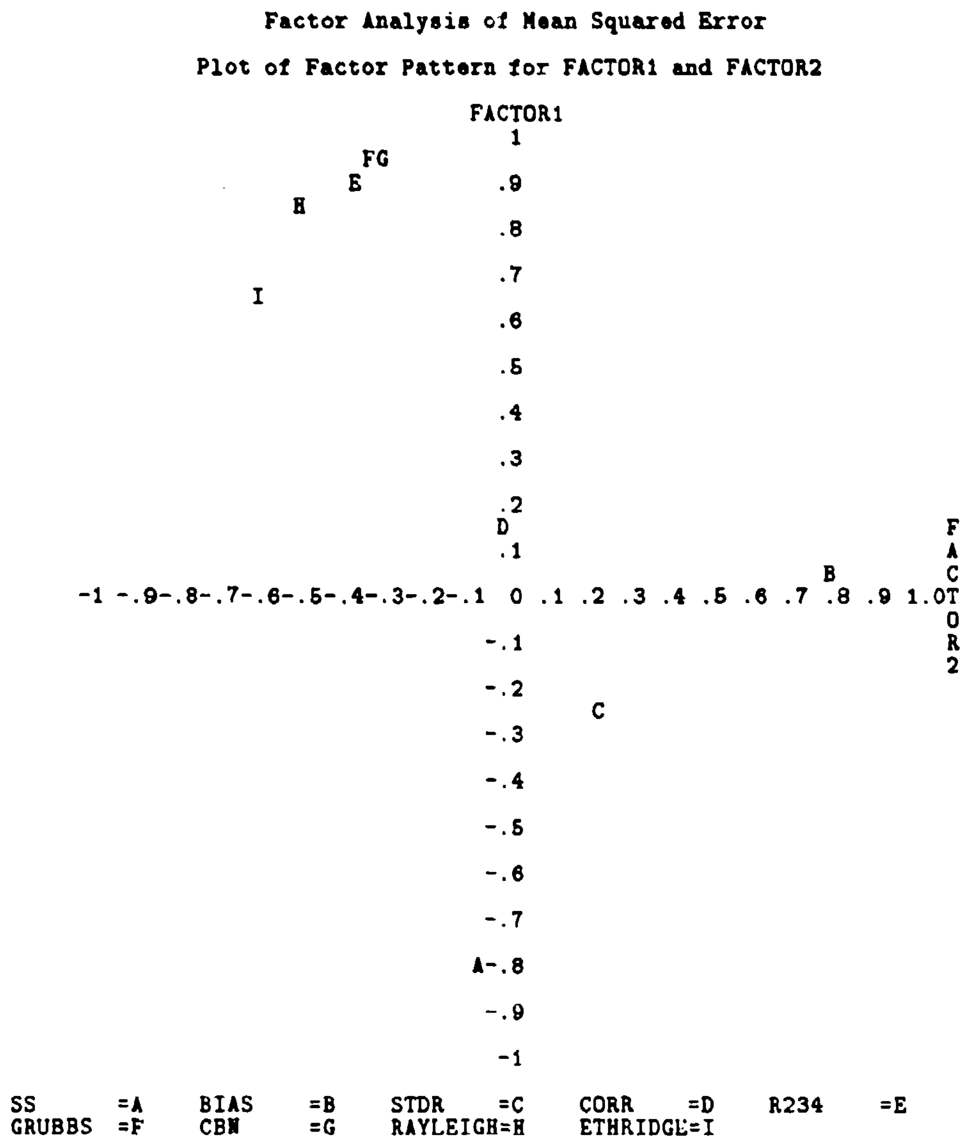


Figure 5.21. Plot of Factor Pattern For $MSE(RE^i)$

5.4.3 Analysis of Rank-Ordering $MSE(RE^i)$ by Design Point. Figure 5.22 displays the number of times each technique finished in each position. Once again, the results of this analysis appear extremely similar to those for $VAR(RE^i)$.

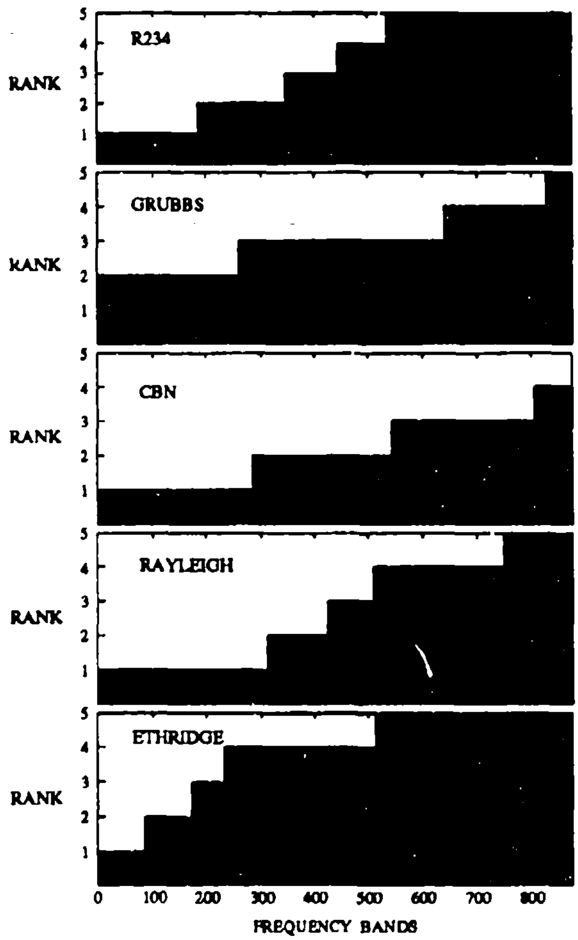


Figure 5.22. Frequency Bands for place finished with respect to $MSE(RE^i)$

Table 5.7 confirms our suspicions concerning the similarity between $MSE(RE^i)$ and $VAR(RE^i)$. It has an almost identical distribution of frequencies in the same ranges as Table 5.5. In Table 5.7 we see the same similar distribution of scores for the CBN, Rayleigh, and Grubbs estimators as observed in Table 5.5. In fact, the numbers themselves are practically the same. Checking Appendix M in the same way we did Appendices I and K, we see the same minimal spread at each design point. That

Table 5.7. Range of $MSE(RE^i)$ by Technique

$MSE(RE^i)$ Range	R234	Grubbs	CBN	RAYL	ETH
0.00 → 0.025	53	95	112	97	14
0.025 → 0.05	214	293	300	242	83
0.05 → 0.075	149	183	174	207	205
0.075 → 0.10	53	96	90	119	286
0.10 → 0.15	53	120	117	127	201
0.15 → 0.20	28	40	40	49	52
0.20 → 0.40	0	48	42	34	34

is, when we distinguish between first and second place $MSE(RE^i)$ we make almost no distinction at all. Thus, like $VAR(RE^i)$, $MSE(RE^i)$ provides a "weak" distinction between estimators. Furthermore, it completely masks the distinction between estimators based on $\overline{RE}^i$. For these reasons, we recommend using the $VAR(RE^i)$ as a means for screening out the most variable estimators and using $\overline{RE}^i$ to select the "best" technique from among estimators with like distributions. We do not recommend using $MSE(RE^i)$ to either select a "best" estimation technique or for future studies of potential MOEs for CEP estimation techniques.

We include Figure 5.23 simply to further demonstrate its extreme similarity to the decision grid for $VAR(RE^i)$. Ethridge's estimator appears somewhat more often, suggesting that its low bias might offset its high variability in a few isolated cases. Furthermore, more distributional caveats appear in Figure 5.23 than did in Figure 5.18. Again, the factor plot predicted this, since, for MSE, the estimation techniques display increased sensitivity to bias and STDR. Nevertheless, this chart adds almost nothing beyond that inferred by Figure 5.18.

Figure 5.23, like those before it, is based on our foreknowledge of the underlying population. Since the underlying population is never completely known in practice, we display Figure 5.24 without the distributional caveats found in Figure 5.23. The similarity between Figure 5.24 and Figure 5.19 should not be ignored. We may

Decision Rule For Selecting Estimation Technique Based On MSE (RE)

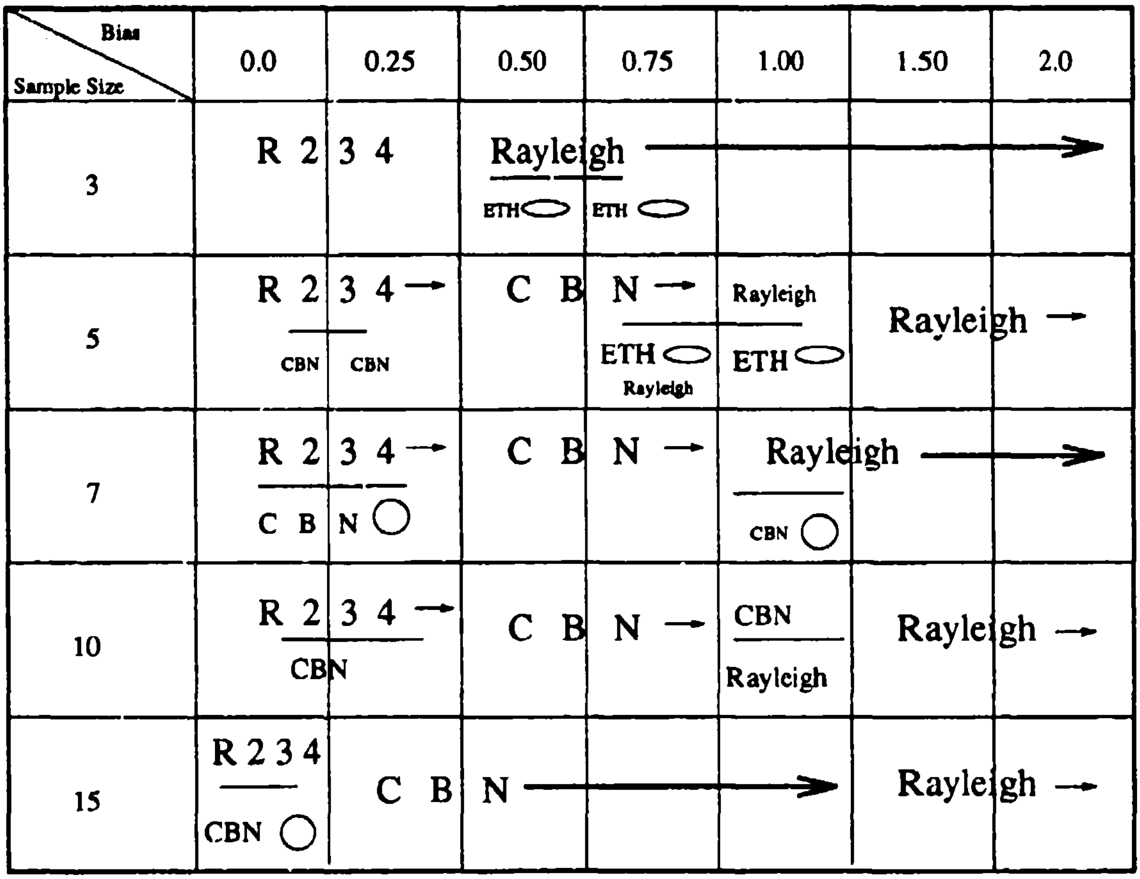


Figure 5.23. $MSE(RE)^i$ Decision Grid

now safely conclude that most of a CEP estimation technique's dispersion about the target RE of zero, as measured by $MSE(RE)^i$, is due to its variance.

5.5 Histogram Analysis

In an effort to assist the reader in better visualizing the relationship between an estimator's $\overline{RE}^i$ and its $VAR(RE^i)$, we replicated the experiment at four design points to record and display in histogram format the RE^i of each estimator at that point. We selected the four design points using two criteria:

Decision Rule For Selecting Estimation Technique Based On MSE (RE)

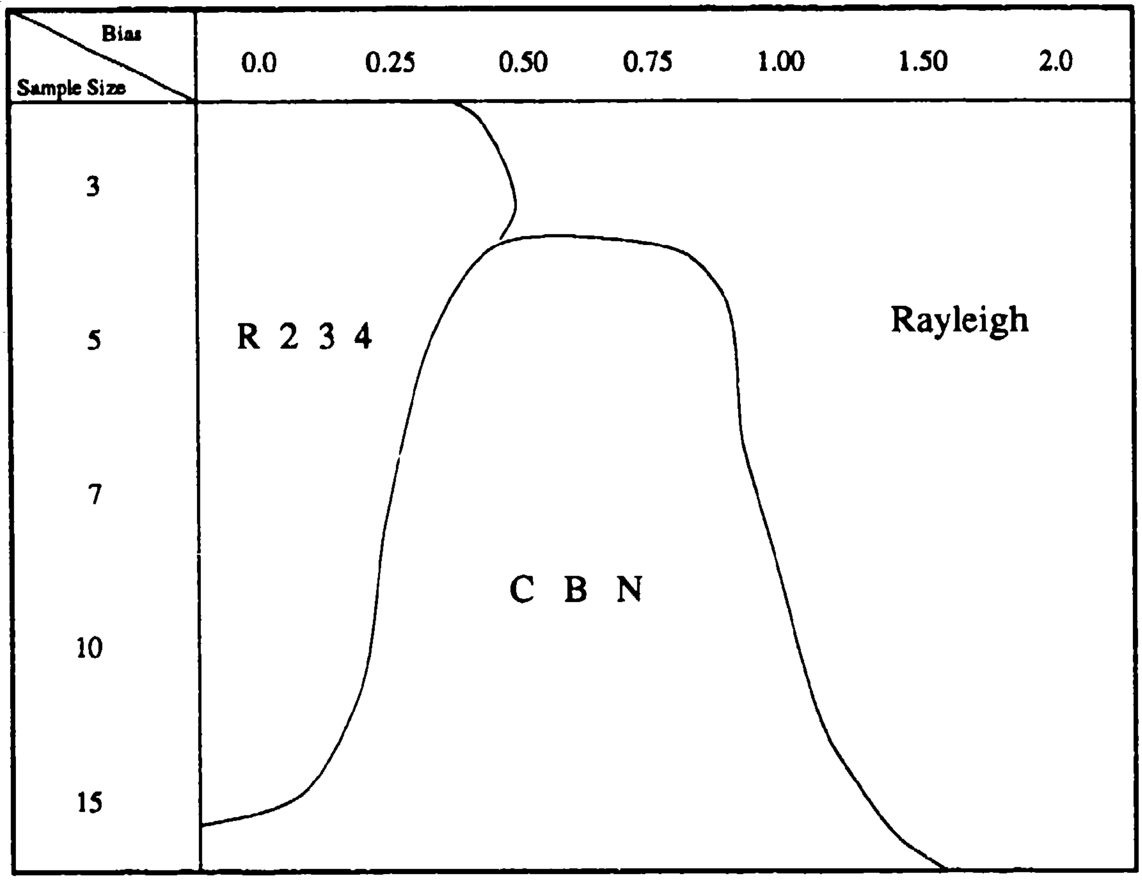


Figure 5.24. Simplified $MSE(RE)^i$ Decision Grid

1. We sought points which represent a clear spread between the low and high levels of the significant factors, sample size and bias. As a result of the restrictions placed on R234, the highest level of bias we could use at SS = 3 was 0.25. Thus, to strike a balance between low and high values of bias and SS, we selected SS = 5, and 15, bias = 0.0 and 0.75

2. Having concluded that STDR and correlation are not significant factors, we held them to their nominal values.

Table 5.8 shows the design points and their associated factor levels.

Table 5.8. Four Design points for Histogram Comparison

Design Point	*Sample Sizes*	*Bias*	*STDR*	ρ
176	5	0.0	1.0	0.0
251	5	0.75	1.0	0.0
701	15	0.0	1.0	0.0
776	15	0.75	1.0	0.0

Since RE^i can assume values between -1.0 and $+\infty$, we scaled our histograms to the dimensions needed by the most varied set of RE^i. This occurred at design point 126. The width of each bar represents an increment of 0.05 change in RE^i. Also plotted as vertical lines are the target (zero RE), and the $\overline{RE}^i$ for each estimator. When the $\overline{RE}^i$ for an estimator is within 0.05 of the target, only the target is plotted. The identity of the estimator being plotted is to the left of the plot.

The most striking feature in Figure 5.25 is how similarly distributed all five estimators appear. Indeed, only the Ethridge estimator has a bias large enough to merit a line separate from the target of zero. Ethridge's higher variability is barely perceptible in its somewhat heavier loading on its left hand tail.

In Figure 5.25 we used samples of size five. In Figure 5.26 we estimate the same distribution, but with samples of size 15. The variability of most of the estimators has decreases markedly with the increase in sample size, but the Ethridge estimator remains the most variable. Even though Ethridge's $VAR(RE^i)$ is less than it was in Figure 5.25, the range between its high and low RE^i actually increased.

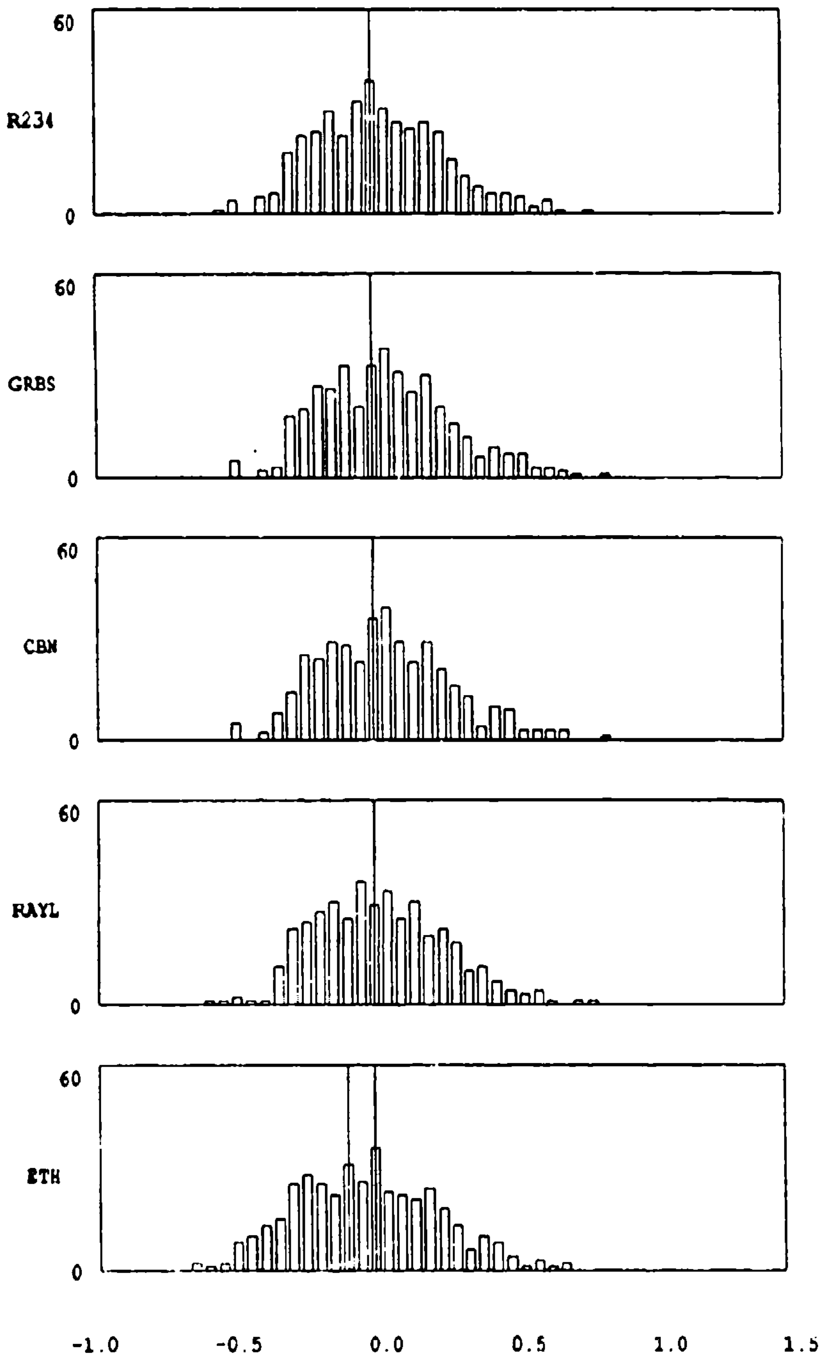


Figure 5.25. RE for Sample Size = 5, bias = 0.0

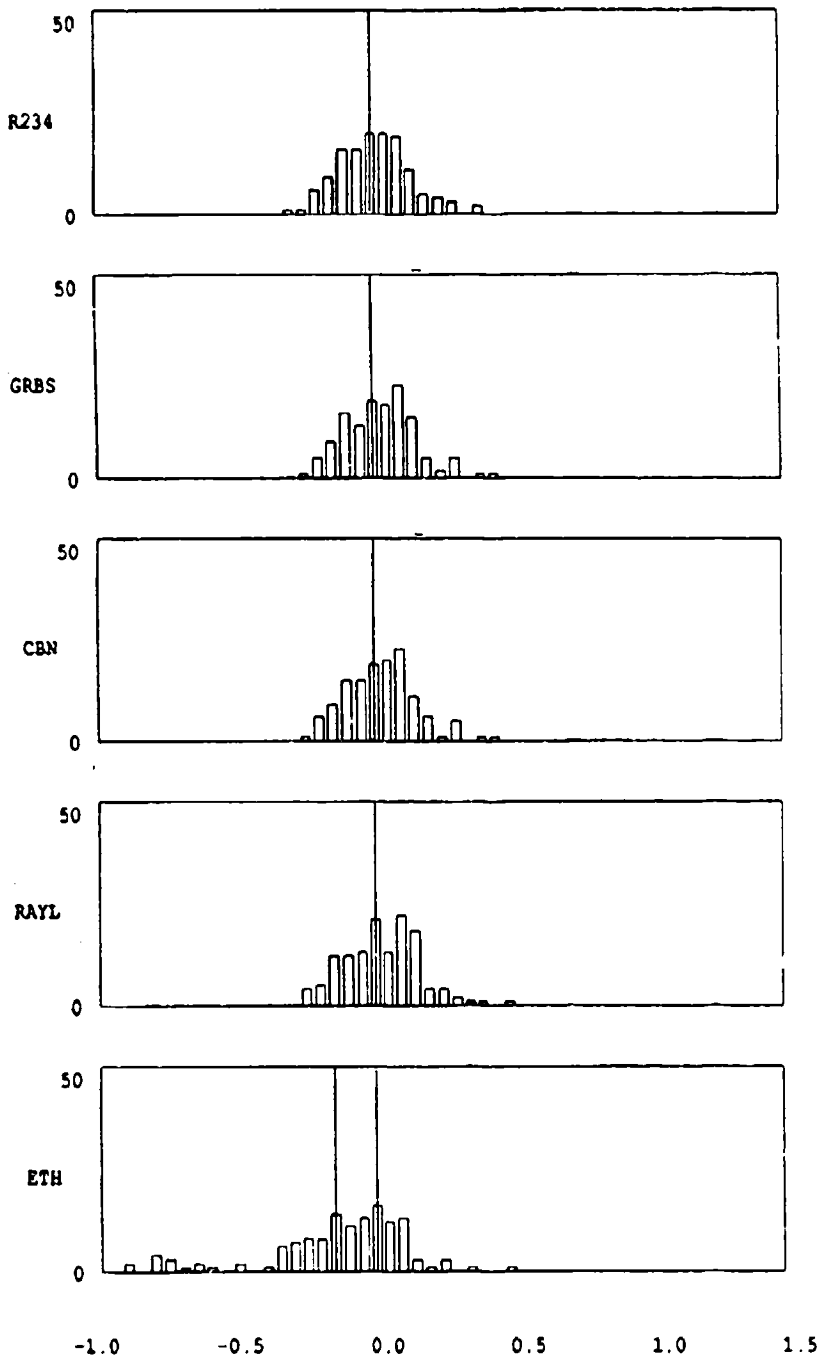


Figure 5.26. RE^3 for Sample Size = 15, bias = 0.0

Another unexpected result is that $\overline{RE}^{ETH}$ *increased* with increasing sample size. All the other estimators at sample size of 15 had $\overline{RE}^i$ values less than 5%. We know of no reason for the Ethridge estimator's behavior, but only note that it almost consistently returns a negative of $\overline{RE}^i$. Clearly, we must reject Ethridge as an estimator when techniques with smaller $VAR(RE^i)$ and $\overline{RE}^i$ are available.

Since the distributions of the remaining four estimators are quite similar regardless of the change in sample size or distributional characteristics, comparisons based on $\overline{RE}^i$ are appropriate.

Figure 5.27 shows a design point at which the Rayleigh technique is the best in terms of both $\overline{RE}^i$ and $VAR(RE^i)$. Its $\overline{RE}^i$ is about 5% better than the first three techniques, and 10% better than the Ethridge, but its slightly smaller variance is imperceptible. This shows why $VAR(RE^i)$ provides a "weak" distinction between techniques, while $\overline{RE}^i$ provides a stronger distinction. Once again, Ethridge is the most biased and most variable estimator - the former is much more noticeable than the latter.

Figure 5.28 shows that with increased sample size, only Ethridge has a mean CEP estimate differing from $CEP_{pop.}$ by more than 5%. Indeed, Ethridge's $\overline{RE}^i$ increased over that observed at sample size five. We ranked the remaining techniques at this design point in terms of $\overline{RE}^i$ as follows: R231 first, CBN second, Rayleigh third, Grubbs fourth.

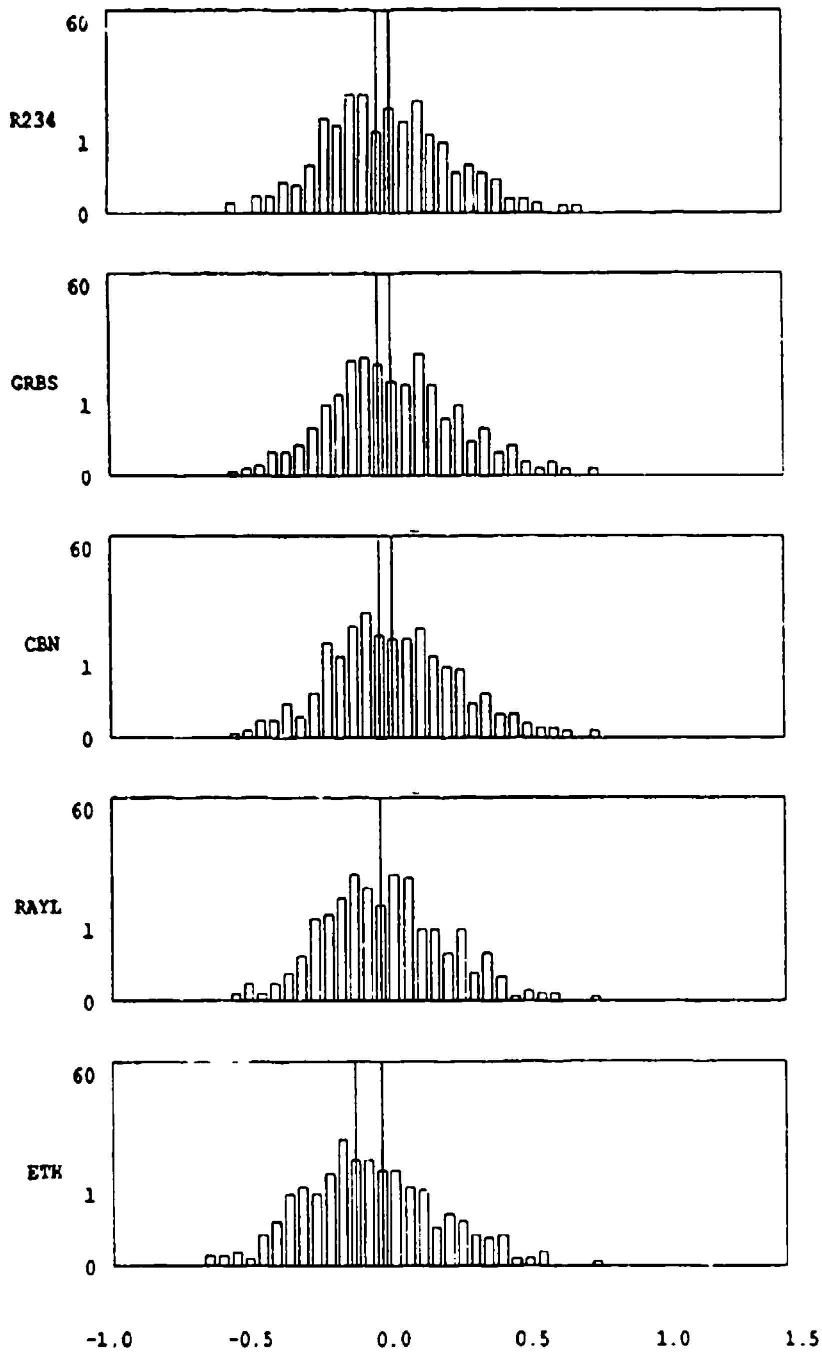


Figure 5.27. RE^5 for Sample Size = 5, bias = 0.75

Clearly these ordinal rankings overstate the distinction between these estimators at this point. We would probably be equally served by any of these four at this design point.

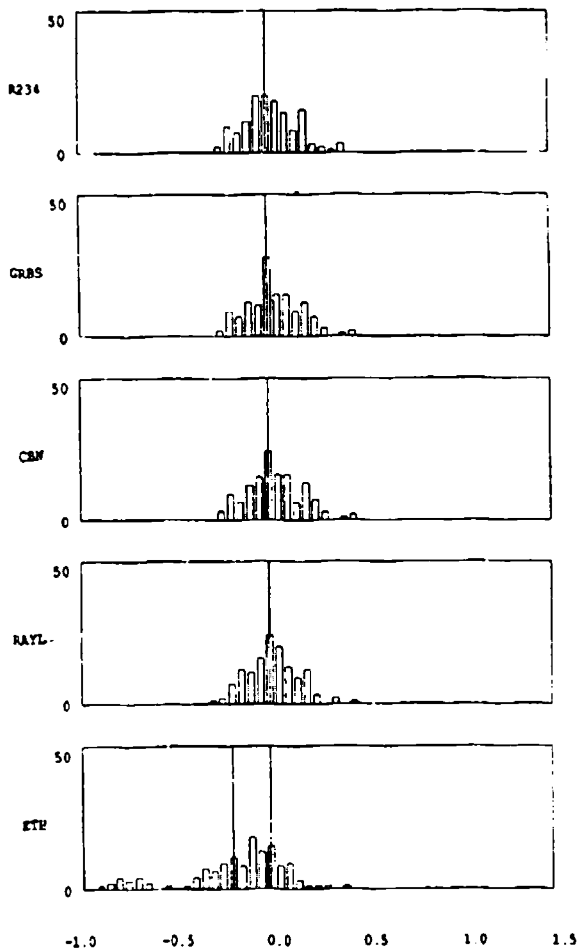


Figure 5.28. RE' for Sample Size = 15, bias = 0.75

Ethridge's estimator still poses a troubling question for sample sizes of five or less: At those levels of SS, Ethridge's variability, while consistently the worst, is not significantly worse than the other techniques. Should we then select Ethridge as the estimator of choice, owing to its strong showing with respect to $\overline{RE}$?

To answer this, we selected a fifth and final design point at which to demonstrate the total RE^i histogram for all five estimators. At design point 46, the Ethridge estimator is the best in terms of $\overline{RE^i}$, but the worst in terms of $VAR(RE^i)$. Displayed in Figure 5.29, we see why Ethridge's estimator did so well in terms of $\overline{RE^i}$. As noted earlier, Ethridge appears to have an inherent negative bias which,

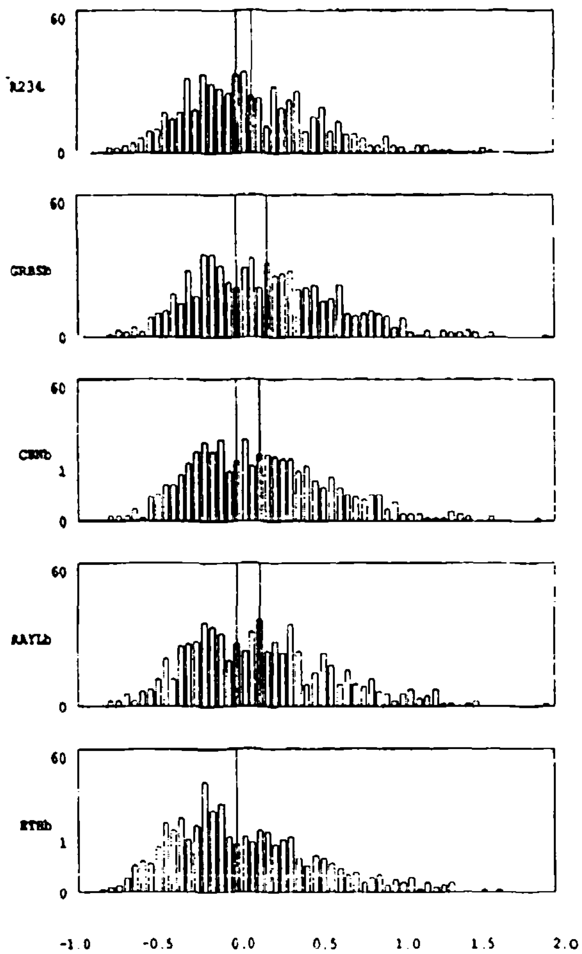


Figure 5.29. RE^i for Sample Size = 3, bias = 0.25, STDR = 0.2, ρ = 0.0

in the case where the other techniques tend towards a larger positive bias, works in Ethridge's favor. Furthermore, the histogram underlines the left-tailed skewness of Ethridge's RE^i distribution. With its mode 20% removed from the target, this demonstrates that Ethridge's superior $\overline{RE}^i$ does not imply greater precision. Future research efforts may wish to explore this phenomena. It may be that larger samples better reflect the bivariate normal quality of the underlying distribution, placing Ethridge at the disadvantage observed in Figures 5.26 and 5.28. It may be that for highly unbiased samples, the natural log function returns large negative values, skewing the results from the estimator. Without investigating these issues, we cannot recommend the Ethridge technique for operational analysis or further comparative studies such as this.

5.6 Summary

Using the questions at the beginning of Chapter IV as an outline for this section, we conclude that

1. There is no one "best" estimation technique for the entire design space. For sample sizes larger than those considered, we expect the CBN method to easily dominate. However, as ICBM accuracy improves, $\hat{\sigma}_{pooled}$ may decrease more rapidly than unscaled bias, possibly to the point where a scaled bias greater than 4.0 is not unlikely. The issue of the CBN's ability to converge at high levels of scaled bias should be addressed.

2. There are clearly regions of the factor space in which one technique dominates. That is, instead of having their first place finishes scattered randomly throughout the design space, first place finishes appear confined to specific regions of the design space defined primarily by sample size and bias. STDR and ρ play a smaller role in identifying when an estimator is the "best".

3. We should not select our technique based on the shape of the miss distance distribution. We can only infer that shape from sampling, and we showed how disparate the sample estimations of a population's distribution can be from the

actual population for small sample sizes. We may place some limited confidence in the estimated characteristic of bias. The one factor in the design space over which we have complete control operationally is also the most significant factor in the design space: sample size. We feel most confident when identifying our selected technique based on sample size.

4. The dimensions of sample size and bias are the most significant factors for all three MOEs.

5. Considering the findings of this study, future analysts may wish to ignore or reduce the number of levels for STDR and correlation. Correlation levels of .99 are extreme and not expected in operational settings. An STDR level of 0.2 might also be extreme. However, as noted at the end of Chapter IV, our design space did not visit all elliptically-shaped distributions. Before closing the book on elliptical-inducing factors, one further study should test them in a comprehensive manner.

6. $VAR(RE^i)$ and $MSE(RE^i)$ differ with $\overline{RE}^i$ over which estimators are the best, especially at the sample size three and five levels. However, from the histogram analysis above, we saw that $VAR(RE^i)$ was the best means of filtering out the more variable estimators like Ethridge. Then, once we have a set of estimators with approximately the same degree of variability, $\overline{RE}^i$ provides a "stronger" means of distinguishing between estimators. In any case, $MSE(RE)^i$ provides essentially the same measure as $VAR(RE^i)$, and confounds the distinction made by $\overline{RE}^i$. For these reasons, $MSE(RE)^i$ should not be used exclusively to select an estimation technique. We recommend the decision grid displayed in Figure 5.30. In its construction, we returned to the $\overline{RE}^i$ data, selecting the second best estimator in the region where Ethridge had formerly prevailed. The wide line reflects our relative lack of confidence in the bias characteristic. If an operationally derived scaled bias value places the analyst in one of these

shaded regions, we would not have a strong preference for one estimator over another.

Decision Rule For Selecting Estimation Technique

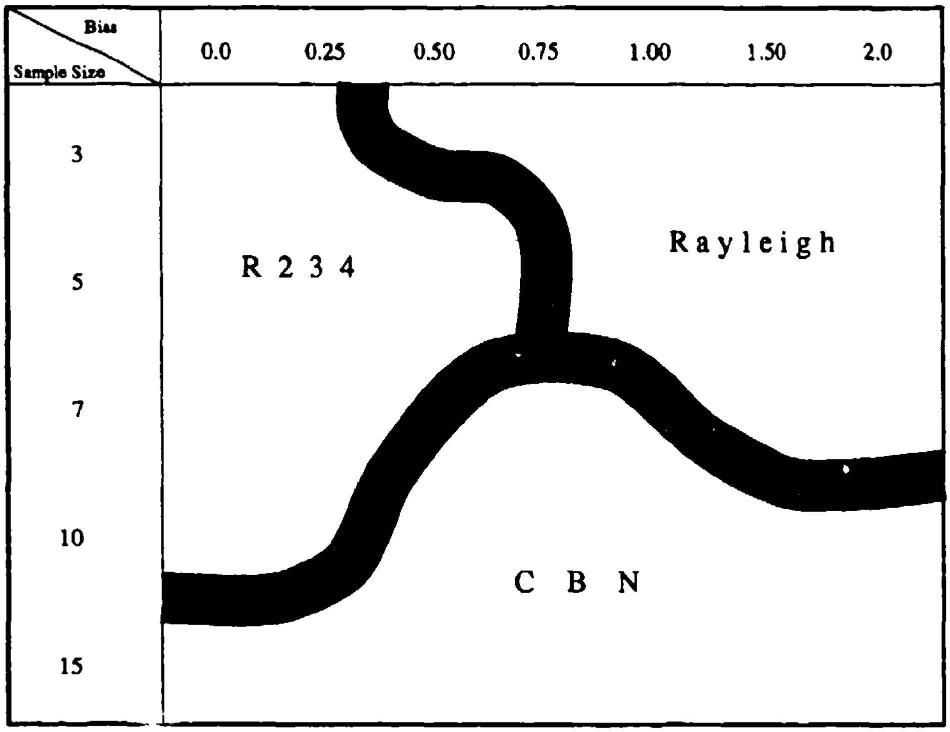


Figure 5.30. Estimator Decision Grid

7. As mentioned above, our analysis does not suggest that either $\overline{RE^i}$ or $VAR(RE^i)$ is more or less important than the other. Both should be considered in future comparisons of CEP estimation techniques. In fact, given the skewed appearance of Ethridge's RE^i distribution, future studies may wish to include two other moments as means of distinguishing between estimation techniques: Skewness and Kurtosis. The former would provide a measure of distributional skewness, most evident in Ethridge, and the latter measures how much of the distribution lies in the tails. As two more measures of dispersion, these may not provide strong preferences between estimators, but we may develop a strong

preference against an estimator with consistently high scores in either of these measures.

8. Additionally, we expect that our ability to characterize a miss-distance distribution from a sample of sizes three to five to be dismal. In these cases, one may use R234 or Rayleigh techniques for an initial guess, and then use hypothesis testing to define the confidence intervals within which that guess falls. Thus, one could state the results from Rayleigh at SS=3 and bias = 0.75, but only when couched in terms of the level of confidence derived from the hypothesis test.

VI. *Estimator Improvement Technique*

6.1 Overview

Having found no superior estimation technique for the entire design space, we attempt to answer the final question posed at the end of Chapter I: Is there some feasible means for improving one of the better estimation techniques such that it can dominate the design space? In this chapter, we outline the reasoning behind this investigation, the choice of estimator for improvement, and the results of the analysis. The recommendations section outlines extensions to this research that could form the basis for future study efforts.

6.2 Objective

In the last chapter we recommended using one of three methods (R234, CBN, or Rayleigh) based on the combination of sample size and bias. In this chapter, we hope to improve on an estimator and obviate the need for any decision grid. If

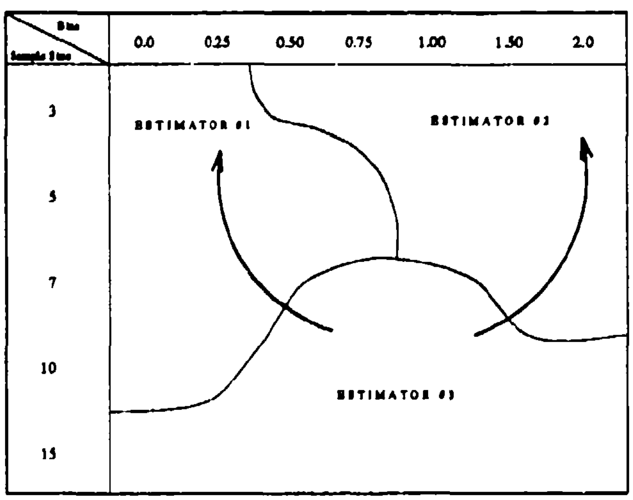


Figure 6.1. Improved Estimator #4

this were possible, we could select an estimator like #3 in Figure 6.1 and extend its acceptability into the regions of the design space formerly dominated by other techniques.

Figures 5.25 through 5.28 provided the impetus for this additional effort. From these we see that the techniques often agree with each other to within 5% or 10%, discounting the Ethridge estimator. If the mean relative error ($\overline{RE}^i$) behaved in a predictable fashion, then it might be feasible to model the $\overline{RE}^i$ for a particular estimator, and compensate for the predicted relative error to achieve a less biased, or possibly unbiased estimator. The next issue would be to select an estimator on which to improve.

6.3 Selecting An Estimation Technique For Improvement

Clearly the Ethridge estimator was too variable for consideration. The reader will observe in Figure 6.2 that Ethridge's $\overline{RE}^i$ often behaves unpredictably. Any attempt to model surfaces like this would prove fruitless. In Figure 6.3, we see the

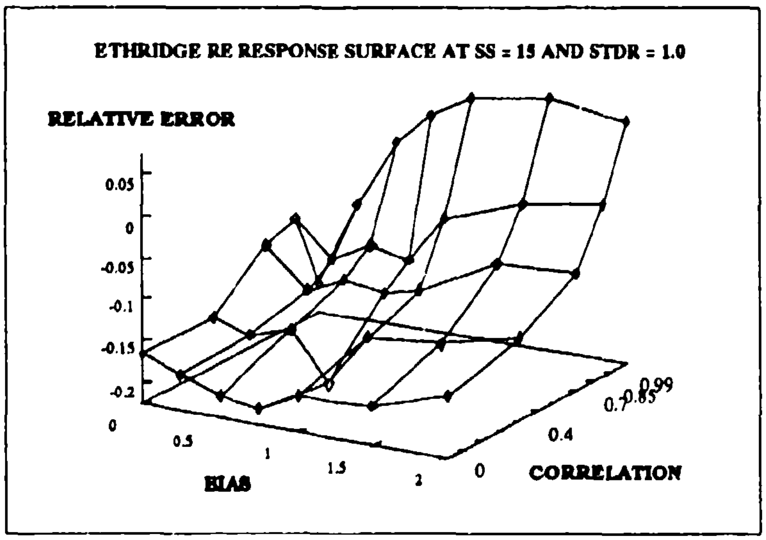


Figure 6.2. $\overline{RE}^{ETH}$ Response Surface

type of surface we desire. Here, we plot $\overline{RE}^{CBN}$ with respect to population bias and correlation. This flatness demonstrates that the CBN technique, at least at SS=15 and STDR = 1.0, is insensitive, or "robust", to changes in bias and correlation. If

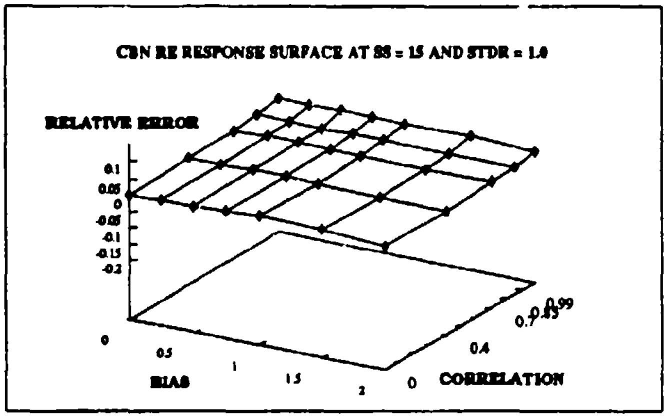


Figure 6.3. $\overline{RE}^{CBN}$ Response Surface

the $\overline{RE}^{CBN}$ was always so robust for all sets of factors, we could recommend the CBN method for all occasions. However, as Figure 6.4 shows, $\overline{RE}^{CBN}$ is sensitive to changes in sample size and SDTR. Still, the change in $\overline{RE}^{CBN}$ is quite smooth,

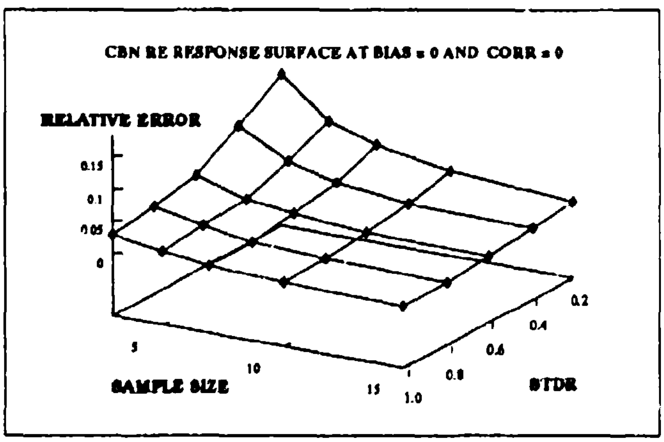


Figure 6.4. $\overline{RE}^{CBN}$ Varying Response Surface

suggesting a certain predictability. Indeed, all the different pairs of variables for $\overline{RE}^{CBN}$ exhibited either the desirable flat surface of Figure 6.3 or a smoothly varying surface like Figure 6.4. Thus, the CBN method meets the predictability criterion as a candidate for improvement.

We also expect the CBN method to dominate all settings of bias as sample size increases beyond that considered by the design space. Thus we select CBN for improvement, hoping to increase our preference for it in the regions where R234 and Rayleigh currently dominate.

6.4 Improvement Technique

The first step in improving the CBN technique was to see whether we could properly fit $\overline{RE}^{CBN}$ with a regression model using the method of least squares. The regression model is simply

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n, \tag{6.1}$$

where Y is the response vector we are interested in modeling (here $\overline{RE}^{CBN}$), the X_i are what we suspect are the significant variables affecting Y (here sample size, bias, STDR, and correlation), β_0 is the intercept (the average $\overline{RE}^{CBN}$), and the β_i are the coefficients relating the variables in such a way as to minimize the distance between the predicted response and the observed response. The reader may appreciate a more complete discussion of this technique, such as the one found in "Applied Linear Statistical Models" [16:38-52,207].

Here we simply note that we have generated the $\overline{RE}^{CBN}$ for all combinations of the variable settings listed in Table 4.1. Thus, we have all the information we need for equation (6.1) with the exception of the β_is. If we list the X_is in matrix form ($\mathbf{X}$), and the Ys and βs in vector form ($\vec{Y}$ and $\vec{\beta}$), then we can represent equation (6.1) as

$$\vec{Y} = \mathbf{X}\vec{\beta} + \vec{\varepsilon}, \tag{6.2}$$

where $\vec{\varepsilon}$ is the error left unexplained by the model. If we assume that the error has an average value of zero, multiply both sides of equation (6.2) by the transpose of $\mathbf{X}$ ($\mathbf{X}'$), and swap the left and right hand sides of equation (6.2), we can represent it as

$$(\mathbf{X'X})\vec{\beta} = \mathbf{X'}\vec{\mathbf{Y}} \tag{6.3}$$

To solve for the coefficients to equation (6.1), we simply multiply equation (6.4) through by $(\mathbf{X'X})^{-1}$, yielding

$$\vec{\beta} = (\mathbf{X'X})^{-1}\mathbf{X'}\vec{\mathbf{Y}}. \tag{6.4}$$

The SAS routine PROC REG [21:658] quickly calculates β coefficients, given the design matrix and the specific response we are interested in modeling. Our

Table 6.1. SAS Regression Analysis

Variable	DF	β Estimate	Standard Error	T for H_o: Parameter=0	Prob gt —T—
INTERCEP	1	0.171833	0.00687590	24.991	0.0001
SS	1	-0.009784	0.00067528	-14.489	0.0001
BIAS	1	-0.037707	0.00473730	-7.960	0.0001
STDR	1	-0.150628	0.00979828	-15.373	0.0001
CORR	1	-0.011324	0.00947517	-1.195	0.2324
SS1	1	0.002045	0.00032724	6.246	0.0001
SS2	1	0.007488	0.00092605	8.086	0.0001
SS3	1	0.000775	0.00089551	0.866	0.3869
BIAS1	1	0.019014	0.00595216	3.195	0.0015
BIAS2	1	0.001049	0.00575588	0.182	0.8554
STDR1	1	0.116385	0.01511173	7.702	0.0001
BIAS3	1	-0.014139	0.01041154	-1.358	0.1748
STDR2	1	-0.006714	0.00148412	-4.524	0.0001
BIAS4	1	-0.002353	0.00141338	-1.665	0.0964
BIAS5	1	0.000321	0.00136677	0.235	0.8146
STDR3	1	0.000418	0.00071920	0.581	0.5616

specific coding in SAS is contained in Appendix O, while the estimated β coefficients are given in the third column of Table 6.1. Since we constructed and tested a full-factorial designed experiment (i.e. every possible combination of all four factors), we tested the significance of the two, three, and four way interactions. Figure 6.4 depicts a two-way interaction in between STDR and sample size. $\widehat{\overline{RE}}^{CBN}$ increases from the combined effect of both STDR and sample size. Three and four way interactions are not as amenable to graphical depiction. However, by applying the least squares technique, we can gauge the interactive effect from the magnitude of its β coefficient, but more importantly by the t-statistic associated with the null-hypothesis that the coefficient = 0.0. A large t-statistic in absolute terms suggests that we cannot accept the null- hypothesis, meaning that the variable itself is significant. SAS also provides that statistic.

The variables in Table 6.1 that have a trailing number (all variables after CORR) represent interactive terms of two or more of the main four factors. Using the criteria summarized above for selecting significant terms, we developed the following model, where the interaction terms are completely spelled out. For example, the interaction between sample size and STDR is $SS \times STDR$, a simple multiplication of the two terms.

$$
\begin{aligned}
\widehat{\overline{RE}}^{CBN} = {} & 0.171833 - 0.009784 \times SS - 0.037707 \times BIAS \\
& - 0.150628 \times STDR + 0.002045 \times SS \times BIAS + 0.007488 \times SS \times STDR \\
& + 0.019014 \times BIAS \times STDR + 0.116385 \times STDR \times CORR \\
& - 0.006714 \times STDR \times CORR \times SS
\end{aligned}
$$

To estimate the relative error for the CBN method from a particular set of data, one need only calculate the scaled population values of bias, STDR, and correlation, and, along with the sample size, substitute those numbers into $\widehat{\overline{RE}}^{CBN}$. The model provides an estimate of "how wrong" the CBN method is for that set of data.

6.5 Implementation and Testing

Armed with a model of $\overline{RE}^{CBN}$, we approach the problem of eliminating it from CBN in practice. After all, we built the model from the same input parameters with which we simulated the 875 different design points. How will it work when used on sample data? Using $\overline{\widehat{RE}}^{CBN}$, we performed the same experiment outlined in Chapter IV, except that this time we did not test Grubbs or Ethridge, having eliminated them from further consideration in Chapter V. We tested R234, CBN, Rayleigh and the modified CBN (MCBN), which estimated CEP by subtracting $\overline{\widehat{RE}}^{CBN}$ from CBN's CEP estimate, or

$$CEP^{MCBN} = CEP^{CBN}(1 - \overline{\widehat{RE}}^{CBN}). \tag{6.5}$$

In applying equation (6.5), we used the *sample* values for bias, STDR, and correlation rather than the population characteristics. Having observed how different the sample and population values can be for the smallest sample sizes, our expectations were muted with respect to this model's performance. We were to be pleasantly surprised.

6.6 Analysis of First Through Fourth-Place Finishes

This analysis was conducted under less sensitive conditions than those for Figure 5.8. In that case, we discriminated between ranks based on a difference as small as .000001. As a result there were only two ties in the rankings over the entire design space. Having seen that the original five estimators were statistically equal in many more cases than that, especially in terms of $VAR(RE^i)$, we chose to decrease the sensitivity of the ordinal rankings. In Figure 6.5 we discriminate only between whole percentage point differences. Thus, a $\overline{RE}^i$ of 0.045 would tie with a $\overline{RE}^i$ of 0.054, since both would round to 5% $\overline{RE}^i$. This results in more first-place finishes than we have design points at which to compete. We felt that differences in $\overline{RE}^i$ of $\frac{1}{10}$th of one percent or less were not significant enough to discriminate between estimation techniques. In the case of ties, the tied estimators are assigned the highest rank being considered. For example, if two estimators tie for second place, they would both be ranked second, and the next estimator would be ranked fourth. The raw $\overline{RE}^{'}$ data are found in Appendix P, and their ordinal rankings are in Appendix Q.

Given a better chance to rank in first place, the three top performers in Figure 5.8 actually fared worse in Figure 6.5. Originally, the R234, CBN, and Rayleigh techniques combined for just over 600 first place finishes. In Figure 6.5, they barely clear 400 first-place finishes, and the reason is obvious: MCBN alone has just shy of 500 first-place finishes.

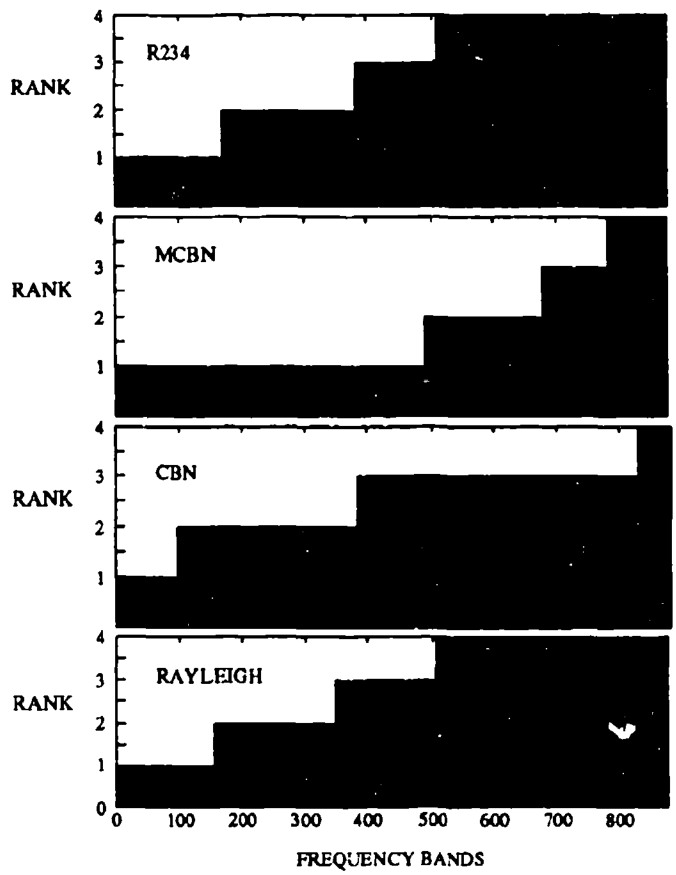


Figure 6.5. First through fourth place finishes with respect to $\overline{RE}^{'}$

The evidence from Figure 6.5 compels us to conclude that MCBN does provide at least a one percentage point improvement to $\overline{RE}^{CBN}$, at least in some instances. Furthermore, with almost 700 first and second place finishes out of a possible 875, there are a few points at which the MCBN improves on the CBN technique by 2 or more percentage points. MCBN does have more fourth place finishes than does CBN, so there are certainly some points at which MCBN does not improve on the CBN technique. Table 6.2 displays the frequencies with which the four techniques' $\overline{RE}^i$ appear for specified ranges.

Table 6.2. Range of $\overline{RE}^i$ by Technique

$\overline{RE}^i$ Range	R234	MCBN	CBN	RAYL
0% → 2.5%	222	463	260	221
2.5% → 5%	166	256	297	171
5% → 7.5%	132	106	156	93
7.5% → 10%	30	36	85	125
10% → 15%	0	14	77	265
15% → 20%	0	0	0	0
20% → 40%	0	0	0	0

From Table 6.2 we see that the MCBN technique has taken a great deal of the bias out of the CBN method. In over 700 instances, the MCBN method has less than 5% mean relative error. This is almost a 30% increase over the CBN method for the lowest ranges. Furthermore, MCBN's 463 occurrences within 2.5% represent a 78% increase over the previous record-holder in this category, the CBN method. Still, it may be that the "best" estimator can only be described by design space coordinates. A pattern analysis of the first place finishes should provide insight as to whether these places finished conform to some subset of the design space, or if they are randomly scattered about the design space.

Recalling that CEP^{ETH} also did well in terms of $\overline{RE}^i$, we now transition to analysing the $VAR(RE^{MCBN})$. Figure 6.6 shows that, apparently, the R234 and CBN methods transfered most of their first place finishes to MCBN, and this was not expected. Furthermore, this analysis was also conducted under less sensitive conditions than in Figure 5.8, giving all the estimators a better chance to at least tie for first place. Apparently, in modeling and subtracting out the $\widehat{\overline{RE}}^{CBN}$ from

CEP^{CBN}, we also significantly decreased its variance. Thus, we simultaneously decreased bias and variance in the CBN estimator by only modeling the bias. In retrospect this should not have been totally unexpected. After all, $VAR(RE^{CBN})$ depended on many of the same variables as $\overline{RE}^{CBN}$. Attempts to minimize one would almost certainly have a similar effect on the other.

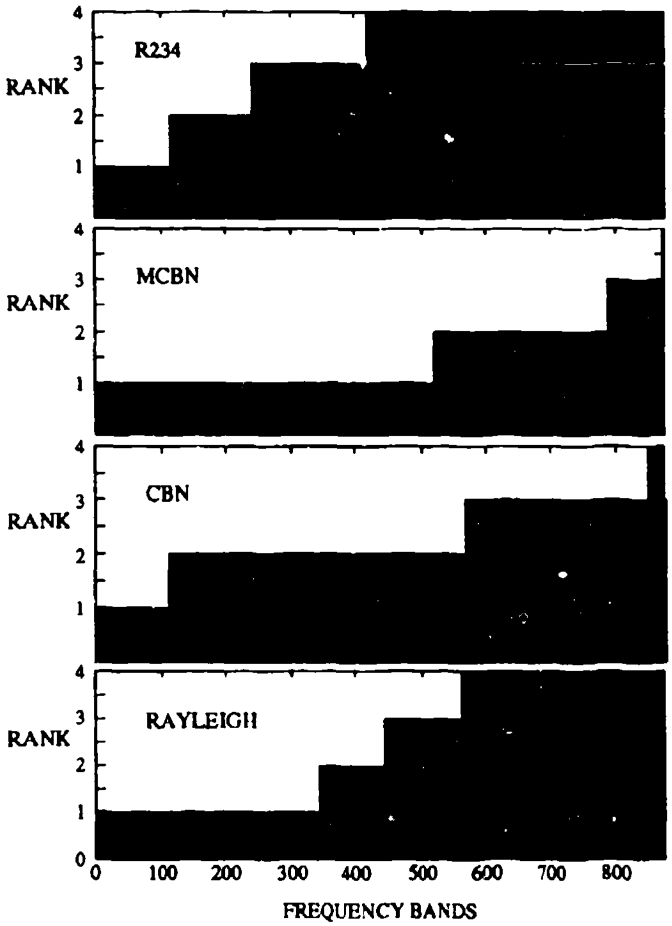


Figure 6.6. First through fourth place finishes with respect to $VAR(RE^i)$

The most important detail to glean from Figure 6.6 is that the MCBN method finished first or second almost 800 times, which pretty well covers the design space. Unless there is an estimator which consistently finishes first in regions in which

MCBN finishes second and third (note, MCBN had zero fourth place finishes), we may have achieved our goal of modifying a technique to dominate the design space.

From Table 6.3 we observe a slight improvement over the CBN technique, but not as significant improvement as observed in Table 6.2. Thus, our "weak" MOE ($VAR(RE^i)$) has identified MCBN as the least variable estimator, but by slim margins in almost every case. Still, one should note the increase of almost 10% in

Table 6.3. Range of $VAR(RE^i)$ by Technique

$VAR(RE^i)$ Range	R234	MCBN	CBN	RAYL
$0.00 \rightarrow 0.025$	57	136	117	110
$0.025 \rightarrow 0.05$	226	327	307	297
$0.05 \rightarrow 0.075$	139	166	182	186
$0.075 \rightarrow 0.10$	53	86	81	105
$0.10 \rightarrow 0.15$	48	94	112	111
$0.15 \rightarrow 0.20$	27	44	42	40
$0.20 \rightarrow 0.40$	0	22	34	26

the top two ranges in Table 6.3 for the MCBN method. This is a significant increase for many scientific endeavors, and especially so since we were not trying to decrease variability when constructing the MCBN technique, and this analysis allowed more opportunity for first place ties. Appendices R and S contain the raw and ranked data, respectively, for this analysis of $VAR(RE^i)$.

6.7 Analysis of First-Place Finishes

Performing the same analysis as in Figure 5.9, we arrive at Figure 6.7. The modified CBN performs extremely well at the smaller sample sizes (3 and 5), a region where $\overline{RE}^{ETH}$ had a remarkable performance but was discounted for the reasons stated in Chapter V. We then recommended either R234 or Rayleigh for sample sizes three and five, since they were second to Ethridge at those levels. Now we recommend a new small sample estimator of choice: MCBN. Furthermore, MCBN encroaches on territory formerly held by R234 and Rayleigh. For the reasons stated in Chapter V, Decision Rule For Selecting Estimation Technique Based On $\overline{RE}$

Bias / Sample Size	0.0	0.25	0.50	0.75	1.00	1.50	2.0
3	M R 2 3 4 ○	C B	N	→	→ Rayleigh	Rayle M C	igh B N
5	M Rayleigh ○	C B →	N → →	→ →	→	→	Rayleigh MCBN
7	R 2 3 4 M C B N ∅	R 2 3 4 MCBN	MCBN → R 2 3 4	→ R 2 3 4	→ R 2 3 4 ○	→ Rayleigh CBN	Rayleigh M C B N CBN
10	M R 2 3 4	C B R 2 3 4	N → R 2 3	→ 4 ○ →	→	→	CBN M C B N Rayleigh
15	M R 2 3	C B 4 CBN	N → R 2 3 4	→ R 2 3 4	→ R 2 3 4 ○	→ →	MCBN CBN Rayleigh

Figure 6.7. Second $\overline{RE}'$ Decision Grid

we discount the distributional caveats in Figure 6.7 to arrive at the simplified decision grid in Figure 6.8. We also selected MCBN when indifferent between techniques, as at sample size seven, for bias settings 0.25 through 0.75. Sample size seven remains a point of indifference, somewhat, when selecting an estimation technique. Future research should give that region of the design space more attention.

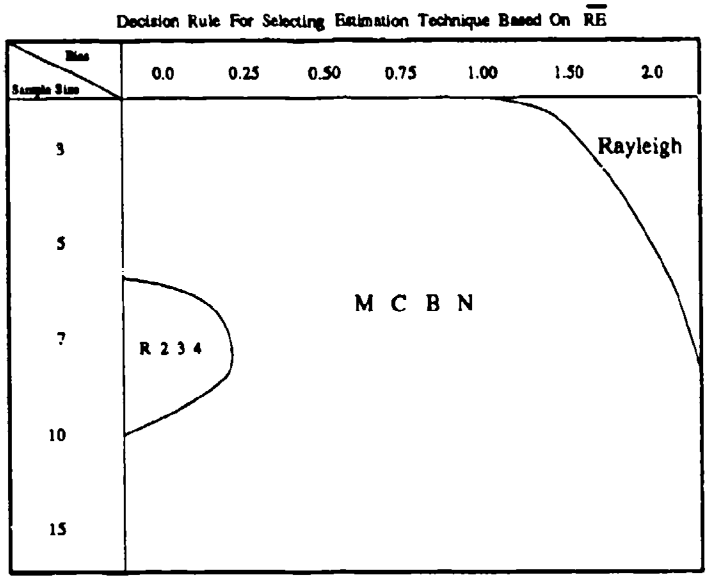


Figure 6.8. Second Simplified $\overline{RE}'$ Decision Grid

Figure 5.18 finds its analogue in Figure 6.9. Once again, we see that MCBN

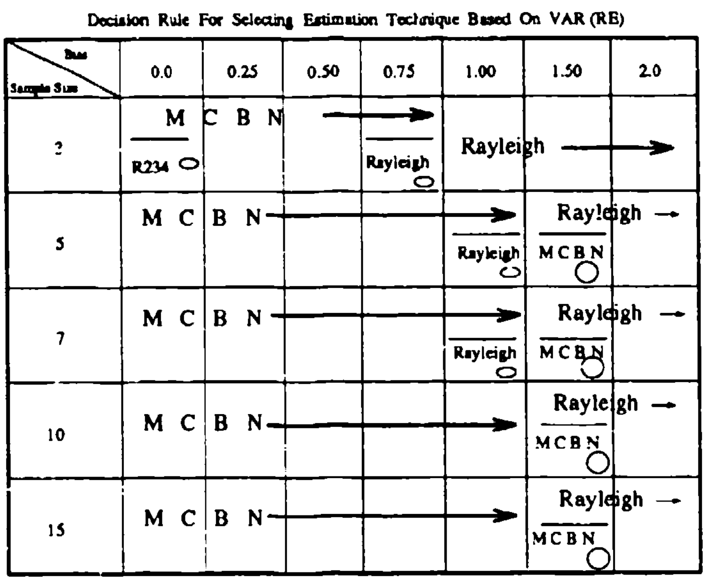


Figure 6.9. Second $VAR(RE')$ Decision Grid

has encroached on both R234 and Rayleigh, although with mixed results. R234 is effectively eliminated. Rayleigh, while losing half of its sphere of influence, still held tenaciously to the bias setting of 2.0, and basically split sample size three with MCBN. However, the remainder of the design space belongs to MCBN.

One reminder: the CBN technique was considered in this analysis. Approximately 90% of its few first place finishes were in three-way ties with the MCBN and Rayleigh methods at the sample size 15 setting. As one of the limits to the design space, we should not be surprised that the beneficial effects imparted from MCBN begin to "wear off" at sample size 15. This is also the case with a bias setting of 2.0.

Figure 6.9 barely needs the simplification shown in Figure 6.10, but we display it for consistency purposes. Expecting no surprises (and getting none) from similar

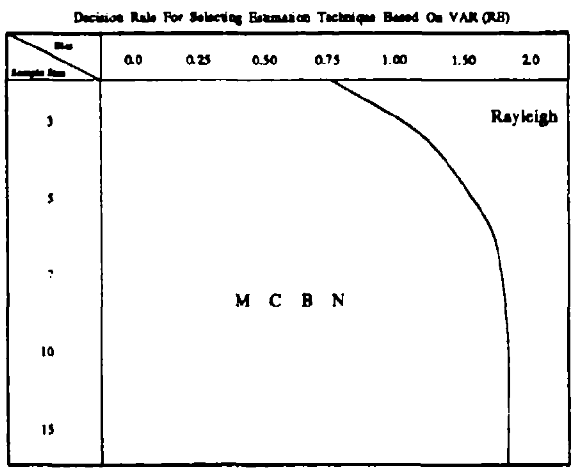


Figure 6.10. Second Simplified $VAR(RE^i)$ Decision Grid

plots for $MSE(RE^i)$, we chose not to display a decision grid for $MSE(RE^i)$. Doing so would show that $MSE(RE^i)$ primarily mirrors $VAR(RE^i)$, further substantiating our conclusion that $MSE(RE^i)$ confounds rather than clears up the separate distinctions made by $\overline{RE}^i$ and $VAR(RE^i)$.

6.8 Other Issues

One measure of the aptness of a model like $\widehat{\overline{RE}}^{CBN}$ is the model r-square. This is a measure of the correlation, or "fit" of the model to the data from which it was constructed. The model r-square for $\overline{\widehat{RE}}^{CBN}$ was 0.77. Since ±1.00 represents the ideal value for this statistic, we felt our $\overline{\widehat{RE}}^{CBN}$ could be improved upon. Thus, we added quadratic and cubic versions of all the main factors to the **X** matrix, computed the β coefficients, and found several of the higher order terms to be significant. Furthermore this model, with five more terms than equation (??), had a model r-square of 0.92. We subjected it to the same experiment performed above, and were terribly disappointed. Its $\overline{RE}^i$ occasionally finished first, but its variance was the worst by many orders of magnitude. Why does a much better fitting model perform so badly with respect to one less well-fitted? Our conjecture is that the imprecise value of the sample data is further exacerbated by the higher order terms.

6.9 Histogram Analysis of Selected Design Points

To determine if the difference between the MCBN method and the Rayleigh and R234 methods was significant in the two regions where MCBN was not the best (identified in Figure 6.8), we created the same type of histograms of selected points as we did in Chapter V. This time, we sought points in the three separate regions identified in Figure 6.8 as regions in which one technique seemed to dominate. Thus, we selected the following three points to display the RE^i distribution and mean:

Table 6.4. Three Design points for Histogram Comparison

Design Point	*Sample Sizes*	*Bias*	*STDR*	ρ
175	3	2.0	0.2	0.99
292	5	1.0	0.4	0.4
351	7	0.0	1.0	0.0

Since the CBN method was dominated at all design points, there was no region in which it dominated in terms of first place, thus we selected only three points for the remaining estimation techniques. Design point 175 was selected to show Rayleigh at its best advantage over the other estimators. In Figure 6.11 we see only the histograms for MCBN, CBN, and Rayleigh. We do not display R234's RE^i

distribution because it could not compete in that region. The reader will note the similarity in the distributions, as observed in Chapter V's histograms. In this region of 25 design points, Rayleigh finished first 11 times and second 12 times, and MCBN finished first and second 10 times each. $|\overline{RE}^{RAYL}|$ excedes 5% only once, while $|\overline{RE}^{MCBN}|$ excedes it twice. Combined with our inability at SS=3 to adequately predict sample bias, we see no significant loss in estimator . uracy should the analyst select the MCBN over the Rayleigh estimator in this region.

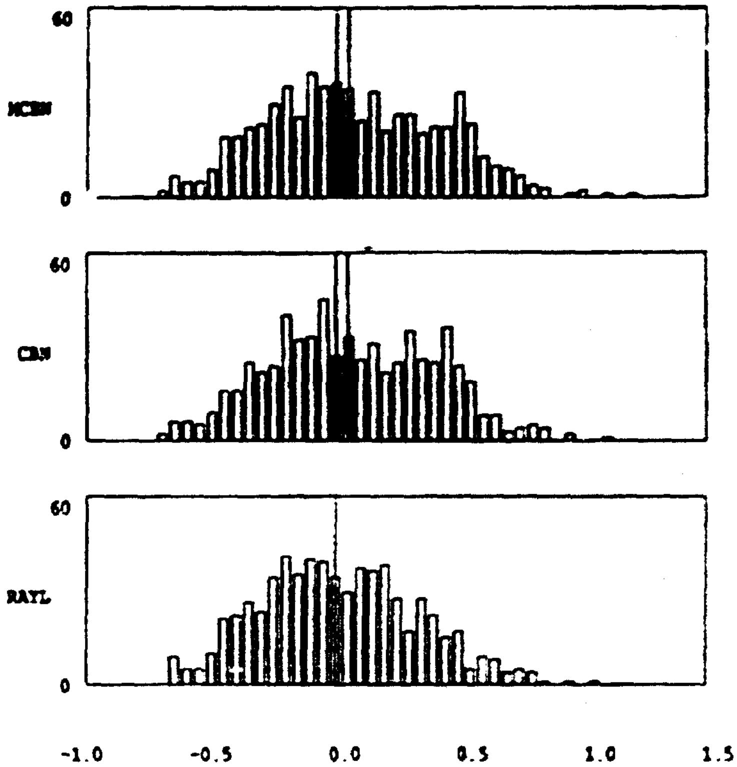


Figure 6.11. RE' for Design Point 175

Figure 6.12 shows the histograms at design point 351, taken from the region in which R234 does its best, low bias and SS=7. At this particular point, the only estimator which performs poorly is the MCBN, with -9% $\overline{RE}^t$. The other estimators all have less than 1% bias at this point, making us truly indifferent between them.

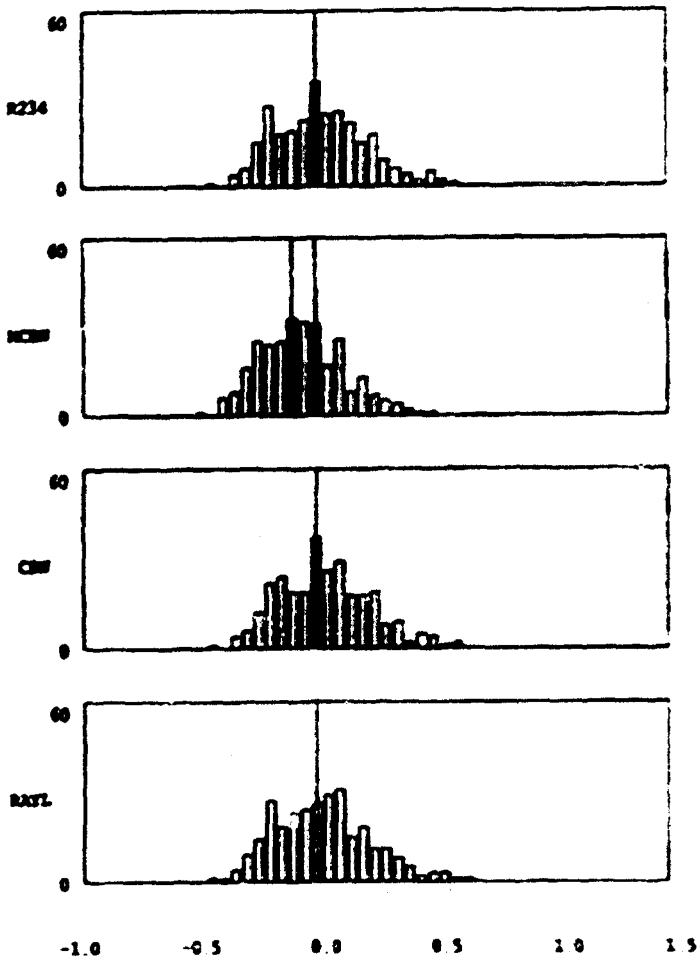


Figure 6.12. RE^t for Design Point 351

There are design points in this region at which MCBN is the best. From design point 351 to 375 (the entire collection of SS=7 and bias=0.0 design points), both R234 and MCBN have 11 first place finishes. However, R234 has only two third place finishes and no fourth place finishes, while MCBN has three third place finishes and six fourth place finishes. Furthermore, $\overline{RE}^{MCBN}$ ranges from -8% to 1%, while $\overline{RE}^{R234}$ ranges between -3% and 4% in this region. We conducted no study regarding our ability to predict sample bias from a sample of size seven, but we expect it to be better than for sample size three. Thus, for sample size seven, we still recommend using R234, with the caveat that MCBN can only be a few percentage points worse.

Finally, Figure 6.13 is taken from design point 292, a point at which MCBN does best. Once again, R234 was not able to compete at this point. We observe about a 10% separation between MCBN and the remaining estimators, Rayleigh and CBN. Over the entire region of sample size five and scaled bias of one (DPs

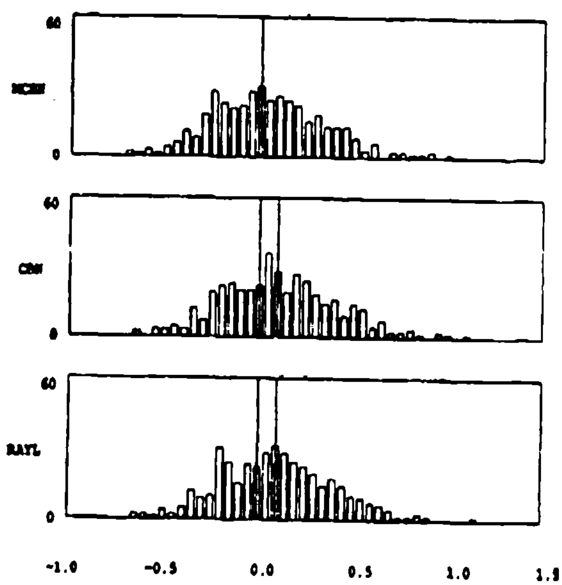


Figure 6.13. RE^i for Design Point 292

276 through 300), MCBN has 19 out of 25 first place finishes, clearly dominating the field. The MCBN method's performance makes it the logical choice over all the other estimation techniques except for the two design space regions previously noted.

6.10 Summary

Clearly, we have improved upon the CBN method with MCBN. Furthermore, our model bested other techniques in regions of the design space where they were previously dominant. Indeed, where Rayleigh continues to perform best, closer analysis suggests that the distinction between Rayleigh and MCBN is hardly worth making. Only R234 gets recommended over MCBN for a very constricted region of the design space, and the recommendation is not a strong one. Thus, as a rule-of-thumb, we recommend using the MCBN method over the entire design space, and comparing it to R234 for sample size seven with small scaled bias values.

A more important finding than an improved estimator may be that least-squares regression of $\overline{RE}^i$ provides a definite means for improving estimation techniques. This could extend to other fields of study where small sample analysis is required. With respect to CEP estimation techniques, analysts may wish to apply the regression analysis to the Rayleigh and Grubbs technique. Both techniques are much simpler to implement than the CBN technique, making modified versions of the Grubbs or Rayleigh techniques more appealing than the MCBN technique.

Elder constructed a linear combination of biased estimation techniques, using regression analysis. His estimator performed better than the most biased technique, but it performed worse than the best techniques across the design space. His design space was significantly different than ours, but we would expect the same results if we also constructed a model of biased estimators. Having constructed a reduced-biased estimator, and shown how others might be constructed, the question becomes: How would a linear combination of reduced-bias estimators perform with respect to other techniques in terms of $\overline{RE}^i$ and $VAR(RE^i)$?

VII. Conclusions and Recommendations

7.1 Scope

This study sought to evaluate five CEP estimation techniques under a number of combinations of four factors known to affect CEP estimation: sample size, bias, STDR, and correlation. Furthermore, three related yet distinct measures of effectiveness were considered in an attempt to identify the best means of comparing CEP estimation techniques. Once coarse grid response surfaces were generated for each MOE over the entire design space, analysis was undertaken to reduce the number of significant factors from four to a lower number. It was found that for all three measures of effectiveness, two factors held the most significance: sample size and bias. Analysis also revealed that for small samples, our ability to estimate the population STDR and correlation is extremely suspect. Thus we concluded our analysis by recommending existing techniques based on the settings of sample size and bias.

We then turned our attention to improving one of the existing techniques in order to decrease or eliminate the inherent bias in that estimator. Assuming that the estimator's $\overline{RE}^i$ was a function of our four main factors and their interactions, we created a model for the estimator's $\overline{RE}^i$. We then created a new estimator which took the original estimator's CEP estimate and corrected for its bias using the model. The resulting reduced-bias *and* reduced-variance estimator performed well enough over almost all regions of the design space for us to recommend it unequivocally.

7.2 Recommended Techniques

We found that the largest component of an estimator's displacement from the population CEP was its variance. However, neither $\overline{RE}^i$ nor $VAR(RE)$ alone proved a successful means of selecting an estimation technique. Both were employed in arriving at the decision grid for existing estimators displayed below in Figure 7.1. The analyst using this grid should be advised that for sample sizes of three and five,

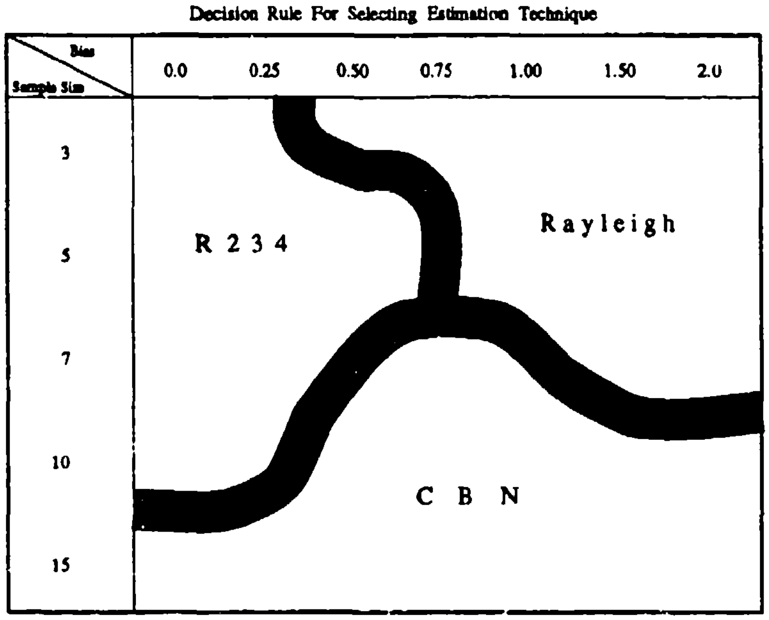


Figure 7.1. Decision Grid For Existing CEP Estimation Techniques

the confidence placed in the estimated bias should be fairly low. However, lower scaled bias values are more likely if the population bias is low, and higher scaled bias values are more likely if the population bias is high. Should sample size and bias intersect between two of the regions, the analyst should be indifferent with respect to the estimator used.

However, concern over sample size or bias can be dismissed when applying the modified CBN (MCBN) method. It outperforms all three of the better estimators shown in Figure 7.1 in all areas of the design space, except for two small regions of the design space. Even so, in those special regions we found the difference in performance between the "best" estimator and the MCBN method was small. Given that the regions themselves comprise such a small part of the entire design space, we recommend using the MCBN technique in lieu of any other technique considered in this study.

7.3 Measures of Effectiveness

Along with the estimation techniques, this study sought to weigh the advantages and disadvantages of three MOEs: $\overline{RE^i}$, $VAR(RE^i)$, and $MSE(RE^i)$. We found that, as a measure of an estimator's total displacement from the target, $MSE(RE^i)$ mostly consisted of an estimator's $VAR(RE^i)$. Thus, when measuring $MSE(RE^i)$, one is primarily measuring $VAR(RE^i)$. Furthermore, with one notable exception at higher sample sizes, the spread between estimators in terms of $VAR(RE^i)$ was not significant. Thus, by itself, $VAR(RE^i)$ provided a means to eliminate the worst technique, but provided only a weak endorsement for the "best" estimator in a region of the design space. We therefore recommend using $VAR(RE^i)$ as a "filter" to eliminate the most variable estimators (the third and fourth moments, skewness and kurtosis, might also prove to be valuable filters), and using $\overline{RE^i}$ as a means for selecting the "best" of the remaining estimators. This is because there was a significant difference in $\overline{RE^i}$ between techniques at different design points. We do not recommend using $MSE(RE^i)$ as a means for discriminating between CEP estimation techniques, because it confounds $\overline{RE^i}$, and offers no different conclusions than those offered by $VAR(RE^i)$.

7.4 Technique Performance

Of the five previously existing estimators, three performed best in specific regions of the design space depending on the sample size and population bias. These were the CBN, Rayleigh, and R234 techniques. Overall, the CBN and Rayleigh were the best techniques, but for lower levels of sample size and bias, they could not outperform R234.

The Ethridge technique had the best average relative error for sample sizes of three and five and moderate to low levels of bias, but analysis showed this resulted from a skewed distribution of RE^i rather than an overall tendency to be more accurate. This raised the possibility that including skewness and kurtosis as MOEs for future analysis on CEP estimators. Furthermore, some analysts may be interested in analyzing the Ethridge distribution's heavy left-tail behavior at higher sample sizes. Without that analysis, we recommend that Ethridge's estimator not be considered for future analysis.

The Grubbs technique analyzed in this study is an approximation to the Grubbs-Patnaik/Chi-Square method. Its performance was consistently the worst in terms of $\overline{RE}$, but its $VAR(RE)$ was rated from average to very good. Noting, however, that all but one estimator enjoyed essentially the same ratings in terms of $VAR(RE)$, we cannot recommend future analysis include this technique. However, future analysis should consider the Grubbs-Patnaik/Chi-Square method. It may have less bias than the Grubbs technique considered in this study.

The R234 method may not be appropriate for a study of this nature. The limits placed on its use frequently forced us to reject a small sample estimate from consideration. Studies which make comparisons apart from small sample sizes should include the R234 method. Furthermore, a special study on R234's accuracy beyond its stated limits of scaled bias equal to 2.2 would appear to be in order. For example, we found that for scaled bias approximately equal to 6.5, R234 returned a negative CEP estimate. How accurate is R234 in the scaled bias region between 2.2 and 6.5?

The Rayleigh technique, by far the easiest technique to use, had the smallest estimator bias at levels of low sample size and high scaled bias, and minimum variance for high levels of bias, regardless of the setting for sample size. As nothing more than a scalar multiple of the mean radial miss (MRM) distance, these findings might be surprising. However, one should consider that at high levels of bias, regardless of the shape of the distribution, approximately half of the distribution will lie beyond the MPI, and half will land before the MPI. This makes the distance to the MPI a very good estimate for CEP. Rayleigh's small variance may be due to the sparcity of parameters used in its estimation of CEP. As the only previously existing technique to finish among the top three and have no limit on its use in terms of scaled bias, we highly recommend future research continue to consider this technique.

This study compared, for the first time, a numerical integration technique with algebraic approximations under the constraints of small sample size. The CBN method performed extremely well, however it enjoyed no unfair advantage over the other techniques. In fact, a possible limit was discovered in terms of the level of scaled bias this technique can be expected to accept. Apparently, at scaled bias levels between 4.0 and 6.0, the CBN technique could not converge on an estimate for CEP. This may be a function of the level of precision used in the program, the number of slices used in the integral plane, or the sensitivity of the modified secant search method. As ICBMs become more accurate, scaled bias values of four or greater may become commonplace, owing to a greatly reduced σ_{pooled}. Along with including numerical integration techniques like the CBN method, future research efforts should investigate the limits of these techniques with an eye towards increasing their applicability.

Finally, we developed a model for $\overline{RE}^{CBN}$ to adjust the CBN method's CEP estimate. This modified CBN method (MCBN) proved to be a significant improvement over all estimators over most of the design space. In those limited regions where is was not the best, or equal to the best estimator, MCBN was very nearly as good. Since those regions require either a foreknowledge of the population bias, or a high confidence in the estimated bias (neither of which are available), we feel comfortable recommending the MCBN method over all the existing estimators over the entire design space.

As significant, or maybe more so, we demonstrated a simple technique for adjusting an estimator's known bias towards zero, a technique that could be applied to any estimator. It also appears to reduce an estimator's variability. Furthermore, we did this with a model that fit imperfectly, as measured by the model r-square. What happens with better fitting models (we suspect overmodeling), or linear combinations of several modified estimators, must be addressed by what could be fruitful and exciting research.

7.5 Design Space Considerations

Future research should expand the levels of STDR and correlation considered, as well as the axes on which they are applied. Clearly, negative values for correlation, and biased, orthogonal ellipses should be addressed. However, we anticipate that such a study would support our finding that both factors are insignificant when compared to sample size and bias. Still, we cannot conclude they are insignificant until the analysis has been completed.

Nevertheless, even if STDR and correlation prove significant, our ability to estimate them for small samples is extremely suspect. We would under no circumstances recommend their usage as operational criteria, as we did with sample size and bias, for selecting an estimation technique when constrained to small samples.

7.6 Future Research

Our primary recommendations for future research include:

1. **Develop Other Modified Estimators.** Testing and developing a modified version of one or many of the algebraic estimation techniques could provide a more accurate and certainly easier technique than that offered by the MCBN. We recommend modified versions of the Grubbs-Patnaik/Chi-Square, the R234, and the Rayleigh methods. If these modified estimators provide reduced biased estimates over the original versions, then a linear combination of them might reduce the bias even further.

2. **Examine the Effect of Higher Order Terms in Modified Estimators.** The model r-square for the $\widehat{\overline{RE}}^{CBN}$ was .77. The r-square for another, much more variable, $MCBN'$ with quadratic and cubic terms, was .92. Future re-

search might find a model with a smaller number of higher order terms, and thus a model r-square between .77 and .92, but with less bias and variance than the MCBN method proposed by this study.

3. **Expand the Number of Estimation Techniques Analyzed.** Ethridge compared 10 estimation techniques in his study. Now that we know that the best estimation techniques have roughly the same type of distribution, we can use $VAR(RE^i)$ to screen out the worst and $\overline{RE^i}$ to select the best.

4. **Include Skewness and Kurtosis as Measures of Effectiveness.** We noticed that Ethridge's distribution of RE^i appeared skewed, suggesting that other statistics than mean and variance might prove helpful in distinguishing between estimation techniques.

5. **Expand and Contract Certain Factors of the Design Space.**

   (a) **Sample Size.** Beyond sample size 10, we expect that either the MCBN or CBN technique to return the least biased CEP estimate. Below sample size 5 we have little confidence in our ability to estimate CEP. At sample size 7 a number of competing estimators vie for the honor of least biased. Future research should constrain themselves to the sample size levels 5, 6, 7, 8, 9, to gauge more finely the effect from this most significant factor.

   (b) **Bias.** A break occurs somewhere between the bias settings of 1.0 and 2.0 with regards to which existing estimator is best. By incrementing that region in steps of .25, as opposed to the .5 steps we took, we might better define the line separating Rayleigh from the other estimators. Furthermore, by expanding the level of scaled bias considered to 4.0 or 5.0, researchers could better explore the limits of the CBN method.

   (c) **STDR.** The actual settings for STDR are acceptable for future efforts. However, we did not test the effect from biased ellipses with major axes orthogonal to the axis along which the bias was induced. To do so would double the number of design points with respect to STDR.

(d) **Correlation.** We do not expect to encounter operational miss-distance distributions with correlations of .99. Using .85 as the highest correlation level should suffice. However, the correlation values between 0.0 and −.85 should be addressed. Only then could we make a final conclusion regarding the significance of correlation.

The need for research in this area should be clear. As weapon systems evolve, we may not pool test data from older systems to achieve a large sample estimate for CEP. With the high and escalating costs associated with testing, any efforts aimed at increasing our confidence in smaller sample estimates can only benefit our country. Linear regression analysis of existing estimation techniques opens a new and exciting field of research which could increase our confidence in small sample estimates, and possibly decrease the number of test launches required.

Appendix A. MathCAD Template and Comparison of Numerical Integration Techniques

A.1 MathCAD Template

This is the is the MathCAD template that reads in 11 sets of characteristic values, chosen to represent a wide range of values, and calculates their CEP. This template takes the three characteristics and calculates the crossrange (x) and downrange(y) parameters of mean miss distance (μ) and standard deviation (σ), and uses the correlation (ρ) as given. A tolerance (TOL) greater than .001 will result in less accurate CEP for smaller values of STDR and larger (in absolute terms) values of correlation.

ORIGIN ≡ 1 i := 1 ..11 j := 1 ..3 TOL ≡ .001

PRAMS := READPRN(COMPARAMS)

For this iteration I am pulling characteristic values from a file called COMPARAMS. I have previously used these eleven sets of data in FORTRAN routines using a Taylor series expansion and the correlated bivariate normal (CBN) to calculate the CEP. Their results are included later for comparison purposes. These are the characteristic values used.

PRAMS =

BIAS	COOR	STDR
0	0	1
0	0	0.6
0	0.7	1
0	0.7	0.6
0.75	0	1
0.75	0	0.6
0.75	0.7	1
0.75	0.7	0.6
2	0	1
0	0.99	1
0	0	0.2

The base variance comes from a population with a CEP of 1000 ft.

Here I set the standard de[illegible] (x) permanently to 849 feet, but allow the standard deviation [illegible] with the ellipticity for a given point.

$$\sigma_{x_i} := \frac{1000}{1.1774} \qquad \sigma_{y_i} := \sigma_{x_i} \cdot PRAMS_{i,3}$$

As mentioned earlier, the correlation is simply one of the given parameters...no calculation necessary.

$$\rho_i := PRAMS_{i,2}$$

I chose to pool the variances, and use that to scale the specified bias on the crossrange axis.

$$\sigma_{pooled_i} := \sqrt{\frac{{\sigma_{x_i}}^2 + {\sigma_{y_i}}^2}{2}} \qquad \mu_{y_i} := 0$$

$$BIAS_i := PRAMS_{i,1} \cdot \sigma_{pooled_i} \qquad \mu_{x_i} := BIAS_i$$

Now I need to read in some seed values. I'll use the output from the CBN estimator written in FORTRAN.

GUESS := READPRN(CEP_PTS)

Now I'll enter the functional form of the bivari-‑a normal density function [f(x,y)]. NOTE: This will not work wi‑. ρ = 1!!! This would require division by 0 in the power term of the exponential [Ω(x,y)].

$$\Omega(x,y) := \left[2\cdot\left[1-{\rho_i}^2\right]\right]^{-1} \cdot \left[\left[\frac{x-\mu_{x_i}}{\sigma_{x_i}}\right]^2 - 2\cdot\rho_i\cdot\left[\frac{\left[x-\mu_{x_i}\right]\cdot\left[y-\mu_{y_i}\right]}{\sigma_{x_i}\cdot\sigma_{y_i}}\right] + \left[\frac{y-\mu_{y_i}}{\sigma_{y_i}}\right]^2\right]$$

Which is used in the density function below:

$$f(x,y) := \left[2\cdot\pi\cdot\sigma_{x_i}\cdot\sigma_{y_i}\cdot\sqrt{1-\rho_i^2}\right]^{-1}\cdot\left[e^{-\Omega(x,y)}\right]$$

Now, if one integrates that function over a circle of radius r, then one can get the probability [pr(r)] associated with the circled area over the surface described by the parameters calculated above. MathCAD transforms the closed-form integration below to a numerical algorithm using Simpson's Rule. The algorithm employed is the Romberg algorithm, fully discussed on pg 257 of the User's Guide, MathCAD version 2.5 for UNIX, April 1990, Cambridge MA.

$$pr(r) := \int_{-r}^{r}\int_{-\sqrt{r^2-y^2}}^{\sqrt{r^2-y^2}} f(x,y)\,dx\,dy$$

Now I use MathCAD's "root" function to find the point at which the function pr(r) equals the probability of 50% given an initial guess. RAD, then, is a function of the initial guess and the specified probability. The " - " symbol actaully signifies equality. It's like setting two equations equal, then finding their intercept.

$$RAD(gss,p) := root(pr(gss) - p, gss)$$

Here I set the CEP probability.

$$prob := 0.500000$$

This next line feeds the result of the RAD function, using GUESS and prob in the gss and p positions, into the vector CEP. This vector will give the CEP of the desired design point(s) specified by the counter variable i.

$$CEP_i := \left[RAD\left[GUESS_i, prob\right]\right]$$

Here I place the output in the file "CEP_PTS" for reference by other programs.

$$\mathrm{WRITEPRN(CEP\_PTS)} := \mathrm{CEP} \qquad \mathrm{ROMBERG}_i := \mathrm{floor}\left[\mathrm{CEP}_i + .5\right]$$

$$\mathrm{CBN}_i := \mathrm{floor}\left[\mathrm{GUESS}_i + .5\right] \qquad \mathrm{TAYLOR} := \mathrm{READPRN(TLRESTS)}$$

For comparison purposes I include the eleven solutions from MathCAD (in the CEP vector), and those from the Corrleated Bivarate Normal FORTRAN routine found in the GUESS vector.exct

$$\mathrm{ROMBERG} = \begin{pmatrix} 1\cdot 10^{3} \\ 793 \\ 909 \\ 729 \\ 1.143\cdot 10^{3} \\ 887 \\ 1.082\cdot 10^{3} \\ 843 \\ 1.907\cdot 10^{3} \\ 813 \\ 600 \end{pmatrix} \qquad \mathrm{CBN} = \begin{pmatrix} 1\cdot 10^{3} \\ 793 \\ 909 \\ 729 \\ 1.143\cdot 10^{3} \\ 887 \\ 1.082\cdot 10^{3} \\ 843 \\ 1.907\cdot 10^{3} \\ 813 \\ 600 \end{pmatrix} \qquad \mathrm{TAYLOR} = \begin{pmatrix} 1\cdot 10^{3} \\ 793 \\ 908 \\ 729 \\ 1.142\cdot 10^{3} \\ 887 \\ 1.082\cdot 10^{3} \\ 843 \\ 1.907\cdot 10^{3} \\ 813 \\ 599 \end{pmatrix}$$

Appendix B. Taylor Series

B.1 FORTRAN Code

This Appendix lists the FORTRAN code of the Taylor Series method used to calculate CEP for the 11 representative points listed in Appendix A. It uses the same secant search method employed by the CBN method to converge to CEP. However, it requires that all correlation be rotated out of the characteristics, so there is a ROT routine included for that purpose. The PARAMETERMAKER routine simply converts the characteristic values into parameters.

```
      PROGRAM TAYLOR

      INTEGER RPARS
      INTEGER CEPS(25),ITS,I,S,J,NUMDESIGNPTS
      DIMENSION RPARS(5)
      REAL SAMP(5),SAMPRAMS(3),DAT(25,3),CEP2
C
      LOGICAL ERROR,CHKERR
      REAL PROB,LSTRAD,LSTPRB,TMPRAD,NEWRAD
C

      NUMDESIGNPTS=11

       OPEN(4,FILE='CEPSTAT.DAT',FORM='FORMATTED')
       READ(4,15) (CEPS(I),I=1,NUMDESIGNPTS)

       CLOSE(4)

15    FORMAT(I6)

       OPEN(3,FILE='COMPARAMS')
       READ(3,9) ((DAT(I,J),J=1,3),I=1,NUMDESIGNPTS)

       CLOSE(3)

C     WRITE(*,9) ((DAT(I,J),J=1,3),I=1,NUMDESIGNPTS)


9      FORMAT(F4.2,1X,F4.2,1X,F4.2)

       WRITE(*,*) 'ENTER NUMBER OF ITERATIONS'
       READ(*,*) ITS

      OPEN(8,FILE='TLRESTS')

      DO 100 S = 1, NUMDESIGNPTS

        DO 99 J=1,3
          SAMPRAMS(J) = DAT(S,J)
C          WRITE(*,*) DAT(S,J)
99      CONTINUE

          CALL PARAMETERMAKER(SAMPRAMS,SAMP)

          CALL ROT(SAMP,RPARS)

          CEP2 = CEPS(S)
         ERROR = .TRUE.
```

```
10      IF (ERROR) THEN
           CALL SERIES (RPARS,CEP2,ITS,PROB)
           ERROR = CHKERR (PROB)
           TMPRAD = CEP2
           CEP2 = NEWRAD (CEP2,PROB,LSTRAD,LSTPRB)
           LSTRAD = TMPRAD
           LSTPRB = PROB
           GO TO 10
        ENDIF
C  |                                                                  |
C  |                                                                  |
C  |------------------------------------------------------------------|
C  |  THE OUTPUT PARAMETERS ARE ASSIGNED THEIR VALUES HERE AFTER THE  |
C  |  PROCESSING IS COMPLETE.                                         |
C  |                                                                  |

100   CONTINUE

      CLOSE(8)

      END

****************************************************************************

        SUBROUTINE PARAMETERMAKER(SAMPRAMS,R)

        REAL      R(5),SAMPRAMS(3)
        REAL      SIGMAPOOLED,BIAS,STDEV
        EXTERNAL  CHFAC, RNMVN, RNSET, UMACH

****************************************************
* Here I scale the variances and covariances based on the level of
* ellipticity and correlation desired.
****************************************************

        STDEV = 1000/1.1774

        COV(1,1) = STDEV**2
        COV(2,2) =((SAMPRAMS(3))*STDEV)**2
        COV(1,2) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))
        COV(2,1) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))


****************************************************
*  HERE I POOL THE VARIANCES!
****************************************************

        SIGMAPOOLED = SQRT((COV(1,1)+COV(2,2))/2)

        BIAS =  (SAMPRAMS(1))*SIGMAPOOLED

        R(1) = BIAS

        R(2) = 0.0

        R(3) = SQRT(COV(1,1))

        R(4) = SQRT(COV(2,2))

        R(5) = COV(1,2)


        END
```

```
******************************************************************************
*    This subroutine contains the actual steps involved in the Taylor
*    series expansion.
************************

         SUBROUTINE SERIES(RPARS,CEP2,ITS,PROB)
C
         INTEGER J,K,RPARS(5)
         INTEGER ITS,I,L,M
         REAL CEP2
         REAL X1,X2,S1,S2,SUMX,SUMY,XJ(100),YJ(100),R,FACT
         REAL ETOA,P1,P2,PROB
C
         X1 = DBLE(RPARS(1))
         X2 = DBLE(RPARS(2))
         S1 = DBLE(RPARS(3))
         S2 = DBLE(RPARS(4))
         R =DBLE(CEP2)
C
         DO 40 L=1,ITS+1
             J = L-1
 SUMX = 0.D0
 SUMY = 0.D0

 DO 10 M=1,L

    K = M-1
    SUMX = SUMX + FACT(J)/(FACT(J-K)*
     +      FACT(2*K)) * (-2.D0*X1*X1/(S1*S1))**K

    SUMY = SUMY + FACT(J)/(FACT(J-K)*
     +      FACT(2*K)) * (-2.D0*X2*X2/(S2*S2))**K

10    CONTINUE

     XJ(L) = FACT(2*J)/(FACT(J+1)*FACT(J)**2)
     +        * (-(R*R)/(8.D0*S1*S1))**J * SUMX

     YJ(L) = FACT(2*J)/(FACT(J+1)*FACT(J)**2)
     +        * (-(R*R)/(8.D0*S2*S2))**J * SUMY

40   CONTINUE

         ETOA = -(X1*X1/(2.D0*S1*S1) + X2*X2/(2.D0*S2*S2))

         P1 = 0.D0
         P1 = R*R*EXP(ETOA)/(2.D0*S1*S2)

         P2 = 0.D0

         DO 30 K=1,ITS+1

             I = K-1

             DO 20 L=1,ITS+1

                 J = L-1

       P2 = P2 + XJ(K)*YJ(L)*FACT(I+1)*FACT(J+1)/
     +         FACT(J+I+1)

20         CONTINUE
30         CONTINUE

           PROB = P1*P2


          END
************************************************************************
```

```
      REAL FUNCTION FACT(N)
C
      INTEGER I,N
C
      REAL PROD
C
      PROD = 1.D0
C
      IF (N .EQ. 0) THEN
         PROD = 1.D0
      ELSE
         DO 10 I=N,1,-1
C
            PROD = PROD*DBLE(I)
C
   10    CONTINUE
      ENDIF
C
      FACT = PROD
C
      END
C    |                                                                   |
C    |-------------------------------------------------------------------|
C    |-------------------------------------------------------------------|
C    |                 F U N C T I O N   C H E C K E R R O R             |
C    |-------------------------------------------------------------------|
         LOGICAL FUNCTION CHKERR (PROB)
C    |                                                                   |
C    |   THIS LOGICAL FUNCTION RETURNS A TRUE IF THE CALCULATED PROB-    |
C    |   ABILITY DIFFERS BY MORE THAN THE SPECIFIED TOLERANCE FROM THE   |
C    |   TRUE CEP PROBABILITY OF 0.5.  A TRUE MEANS THE PROCESSING CON-  |
C    |   TINUES AND A NEW RADIUS IS CALCULATED. THE VARIABLE PRBERR      |
C    |   SPECIFIES WHAT THE TOLERANCE IS.                                |
C    |                                                                   |
        REAL PROB,PRBERR
C    |-------------------------------------------------------------------|
        PARAMETER (PRBERR = 0.00001)
        CHKERR = (ABS(0.5-PROB).GT.PRBERR)
        END
C    |                                                                   |
C    |-------------------------------------------------------------------|
C    |-------------------------------------------------------------------|
C    |              F U N C T I O N   N E W   R A D I U S                |
C    |-------------------------------------------------------------------|
         REAL FUNCTION NEWRAD (RADIUS,PROB,LSTRAD,LSTPRB)
C    |                                                                   |
C    |   THIS FUNCTION USES THE SECANT METHOD (MODIFIED) TO DETERMINE A  |
C    |   NEW RADIUS.  IF THE LAST RADIUS AND THE CURRENT RADIUS BOTH     |
C    |   GIVE PROBABILITIES CLOSE TO 1.0 (I.E., THE TWO RADIUSES ARE FAR |
C    |   OUT ON THE DISTRIBUTION CURVE), THE NEW RADIUS IS GIVEN AS HALF |
C    |   THE DURRENT RADIUS TO AVOID DIVISION BY ZERO.  IN ADDITION, IF  |
C    |   THE NEW RADIUS IS CALCULATED TO BE LESS THAN 0.0, THE NEW RADIUS|
C    |   IS RESPECIFIED TO BE HALF THE CURRENT RADIUS;  THE NEW VARIABLE |
C    |   TEMP FACILITATES THIS CHECK.                                    |
C    |                                                                   |
         REAL RADIUS,PROB,LSTRAD,LSTPRB,TEMP
C    |-------------------------------------------------------------------|

        IF ((PROB.GT.0.98).AND.(LSTPRB.GT.0.98)) THEN
           NEWRAD = RADIUS/2.0

        ELSE

           TEMP = ((RADIUS-LSTRAD)/(PROB-LSTPRB))*(0.5-PROB)+RADIUS
           IF (TEMP.LT.0.0) THEN
               NEWRAD = RADIUS/2.0
           ELSE
               NEWRAD = TEMP
           ENDIF
        ENDIF
        END
```

```
************************************************************************

      SUBROUTINE ROT(PARS,RPARS)
C
      REAL THETA,RHO,S1,S2,SXY,PI,B1,B2,C1,C2
      REAL T1,T2,T3,T4,K1,K2,X1,X2,PARS
C
      INTEGER RPARS
      DIMENSION PARS(5),RPARS(5)
C
      PI = 22/7
      X1 = (PARS(1))
      X2 = (PARS(2))
      S1 = (PARS(3)*PARS(3))
      S2 = (PARS(4)*PARS(4))
      SXY = (PARS(5))

      RHO = SXY/(SQRT(S1*S2))

      IF (S1 .NE. S2) THEN
        THETA = 0.5*ATAN2(2.*RHO*SQRT(S1*S2),S1-S2)
      ELSEIF (RHO .GT. 0) THEN
        THETA = PI/4
      ENDIF

      C1 = COS(THETA)
      C2 = SIN(THETA)

      B1 = C1*X1 + C2*X2
      B2 = -C2*X1 + C1*X2

      T1 = C1*S1 + C2*SXY
      T2 = C1*SXY + C2*S2
      T3 = -C2*S1 + C1*SXY
      T4 = -C2*SXY + C1*S2

      K1 = T1*C1 + T2*C2
      K2 = T3*(-C2) + T4*C1

      RPARS(1) = NINT(B1)
      RPARS(2) = NINT(B2)
      RPARS(3) = NINT(SQRT(K1))
      RPARS(4) = NINT(SQRT(K2))
      RPARS(5) = 0

      RETURN

      END
```

Appendix C. CBN Method

This Appendix lists the FORTRAN code of the CBN method used to calculate CEP for the 11 representative points listed in Appendix A. It was also subsequently modified to calculate all 175 $CEP_{pop.}$ values used by the program EXPERIMENT (Appendix D).

```
      PROGRAM CBNCALC

      INTEGER CEP1,CEP2,CEP4,J,I
      INTEGER MRM,MED,MRMSQ
      INTEGER RPARS,S
      INTEGER NUMDESIGNPTS
C
      REAL PARS
      REAL SAMPRAMS(3)
      REAL CEP3,CEPMPI,PARS1(5),DAT(175,3)
      DIMENSION PARS(5),RPARS(5)

     WRITE(*,*) 'ENTER THE NUMBER OF DESIGN POINTS'
 READ(*,*) NUMDESIGNPTS

***********************************************************
*   Here I'll open a 175X3 file of bias, ellipticity, and correlation
*   parameters and read them into a matrix for reference during
*   the outermost loop below.
***********************************************************

          OPEN(3,FILE='COMPARAMS',FORM='FORMATTED')
          READ(3,9) ((DAT(I,J),J=1,3),I=1,NUMDESIGNPTS)

          CLOSE(3)

9       FORMAT(F4.2,1X,F4.2,1X,F4.2)

************************************************
*   This greater loop calls the routine parsmaker with a different
*   set of bias, ellipticity, and correlation parameters each time.
*************************************************

         OPEN(15,FILE='RPARS.DAT',STATUS='UNKNOWN',FORM='FORMATTED')


        OPEN(1,FILE='CEPSTAT.DAT')

       DO 100 S = 1, NUMDESIGNPTS

         DO 99 J=1,3
           SAMPRAMS(J) = DAT(S,J)
99       CONTINUE

           CALL PARSMAKER(SAMPRAMS,PARS)


         CEP1 = 0
         CEP2 = 0
         CEP3 = 0.
         CEP4 = 0
         MRM = 0
         MED = 0
         MRMSQ = 0
         CEPMPI = 0.
C
```

```
*************************************************
*  We use the GRUBBS method to provide an initial guess for
*  the CBN method...and since the GRUBBS method requires rotated
*  parameters, we also invoke the ROT routine.
*************************************************

            CALL ROT(PARS,RPARS)

            WRITE(15,60) RPARS
60          FORMAT(5I11)

            CALL GRUBBSWH(RPARS,CEP2)

            PARS1(1) = (PARS(1))
            PARS1(2) = (PARS(2))
            PARS1(3) = (PARS(3))
            PARS1(4) = (PARS(4))
            PARS1(5) = (PARS(5))

            CALL CBN(PARS1,CEP2,CEP3)

            WRITE(1,70) NINT(CEP3)

70         FORMAT (I6)

100         CONTINUE

            CLOSE (1)

           CLOSE (15)

      END
********************************************************************************
        SUBROUTINE PARSMAKER(SAMPRAMS,R)


REAL      COV(2,2), R(5),SAMPRAMS(3)
        REAL       SIGMAPOOLED,BIAS,STDEV

*****************************************************
* Here I scale the variances and covariances based on the level of
* ellipticity and correlation desired.
*****************************************************
STDEV = 1000/1.1774

COV(1,1) = STDEV**2
COV(2,2) =((SAMPRAMS(3))*STDEV)**2
COV(1,2) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))
COV(2,1) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))

*****************************************************
*  HERE I POOL THE VARIANCES!
*****************************************************

        SIGMAPOOLED = SQRT((COV(1,1)+COV(2,2))/2)

        BIAS =  (SAMPRAMS(1))*SIGMAPOOLED

        R(1) = BIAS

        R(2) = 0.0

        R(3) = SQRT(COV(1,1))

        R(4) = SQRT(COV(2,2))

        R(5) = COV(1,2)
```

```
      END
*********************************************************************
      SUBROUTINE ROT(PARS,RPARS)
C
      REAL THETA,RHO,S1,S2,SXY,PI,B1,B2,C1,C2
      REAL T1,T2,T3,T4,K1,K2,X1,X2,PARS
C
      INTEGER RPARS
      DIMENSION PARS(5),RPARS(5)
C
      PI = 22/7
      X1 = (PARS(1))
      X2 = (PARS(2))
      S1 = (PARS(3)*PARS(3))
      S2 = (PARS(4)*PARS(4))
      SXY = (PARS(5))

      RHO = SXY/(SQRT(S1*S2))
C
      IF (S1 .NE. S2) THEN
         THETA = 0.5*ATAN2(2.*RHO*SQRT(S1*S2),S1-S2)
      ELSEIF (RHO .GT. 0) THEN
         THETA = PI/4
      ELSEIF (RHO .LT. 0) THEN
         THETA = -PI/4
      ENDIF
C

      C1 = COS(THETA)
      C2 = SIN(THETA)
C

      B1 = C1*X1 + C2*X2
      B2 = -C2*X1 + C1*X2
C

      T1 = C1*S1 + C2*SXY
      T2 = C1*SXY + C2*S2
      T3 = -C2*S1 + C1*SXY
      T4 = -C2*SXY + C1*S2
C

      K1 = T1*C1 + T2*C2
      K2 = T3*(-C2) + T4*C1
C

      RPARS(1) = NINT(B1)
      RPARS(2) = NINT(B2)
      RPARS(3) = NINT(SQRT(K1))
      RPARS(4) = NINT(SQRT(K2))
      RPARS(5) = 0
C

      RETURN
C
      END

*************************************************************************
$DEBUG
C  ---------------------------------------------------------------------
C  |                                                                   |
C  |           C O R R E L A T E D   B I V A R I A T E                 |
C  |                                                                   |
C  |                      N O R M A L   C E P                          |
C  |-------------------------------------------------------------------|
C  |                                                                   |
C  |  OPR: 549 WSES (CAPT. WARD)                                       |
C  |  DATE: 29 SEPTEMBER 1986                                          |
C  |  TECHNICAL REFERENCE: THE JOHNS HOPKINS UNIVERSITY                |
C  |                       APPLIED PHYSICS LABORATORY                  |
C  |                       MEMO BY L.S. SIMKINS (PM-4746), 26 MAR 1971 |
```

```
C     |                 SUBJECT: CALCULATION OF CIRCLE OF EQUIPROB-   |
C     |                 ABILITY FOR A BIASED, CORRELATED, BIVARIATE   |
C     |                 NORMAL DISTRIBUTION.                          |
C     | SUMMARY: THIS PROGRAM CALCULATES A CEP FOR THE GENERAL BIVARIATE
C     |          NORMAL CASE.  THE BIVARIATE NORMAL DENSITY IS CONVERTED
C     |          TO POLAR COORDINATES.  FOR A GIVEN ESTIMATE OF THE CEP,
C     |          THE AREA UNDER THE CURVE IS DETERMINED BY SUMMING UP MANY|
C     |          PIE SHAPED WEDGES OVER THE INTERVAL 0 TO 2*PI.        |
C     |-------------------------------------------------------------|
C     |                  M A I N   B L O C K                         |
C     |-------------------------------------------------------------|
      SUBROUTINE CBN (INPUT,SEED,CEP)
C     |-------------------------------------------------------------|
C     |  I N P U T   P A R A M E T E R S                            |
C     |                                                              |
C     |     INPUT: FIVE DIMENSION ARRAY CONTAINING REAL VALUES       |
C     |           (1)  DOWNRANGE MEAN                               |
C     |           (2)  CROSSTRACK MEAN                              |
C     |           (3)  DOWNRANGE SIGMA                              |
C     |           (4)  CROSSTRACK SIGMA                             |
C     |           (5)  DOWNRANGE/CROSSTRACK COVARIANCE              |
C     |     SEED: INITIAL ESTIMATE OF CEP (INTEGER VALUED)           |
C     |                                                              |
C     |  O U T P U T   P A R A M E T E R S  (REAL VALUED)            |
C     |                                                              |
C     |     CEP: CIRCULAR ERROR PROBABLE FOR ELLIPSE SPECIFIED BY INPUT |
C     |          PARAMETERS                                          |
C     |     PRCEP: AREA OF CIRCLE WITHIN RADIUS OF CEP (SHOULD BE APPROX |
C     |          0.5)                                                |
C     |-------------------------------------------------------------|
      REAL DELTA, SIGMAR, SIGMAT, RBAR, TBAR, RADIUS, LSTRAD,
     +        RHO, PROB, LSTPRB, TMPRAD, NEWRAD, CEP, PRCEP, SIGMA,
     +        INPUT(5)
C
      LOGICAL ERROR, CHKERR
C
      INTEGER INCRMT, SEED
C     |-------------------------------------------------------------|
C     |  V A R I A B L E S                                           |
C     |                                                              |
C     |    DELTA: INCREMENT OF 2*PI/(NUMBER OF ITERATIONS) RADIANS   |
C     |    SIGMAR: DOWNRANGE STANDARD DEVIATION (REAL VALUED)        |
C     |    SIGMAT: CROSSTRACK STANDARD DEVIATION (REAL VALUED)       |
C     |    RBAR: DOWNRANGE MEAN (REAL VALUED)                        |
C     |    TBAR: CROSSTRACK MEAN (REAL VALUED)                       |
C     |    RADIUS: HOLDS CURRENT ESTIMATE OF CEP (REAL VALUED).  CHANGES |
C     |            WITH EACH ITERATION.                              |
C     |    LSTRAD: PREVIOUS ESTIMATE OF CEP                          |
C     |    RHO: COMPUTED VALUE OF CORRELATION COEFFICIENT            |
C     |    PROB: ACCUMULATES PROBABILITY OF CIRCLE ASSOCIATED WITH RADIUS|
C     |    LSTPRB: PROBABILITY ASSOCIATED WITH LSTRAD                |
C     |    TMPRAD: TEMPORARY HOLDING VARIABLE FOR RADIUS             |
C     |    NEWRAD: FUNCTION THAT RETURNS A NEW ESTIMATE OF RADIUS    |
C     |    CEP: SEE OUTPUT PARAMETERS                                |
C     |    PRCEP: SEE OUTPUT PARAMETERS                              |
C     |    SIGMA: ROOT-SUM-SQUARED ESTIMATE OF SIGMA USED TO SCALE RAW |
C     |           DATA VALUES                                        |
C     |                                                              |
C     |    ERROR: FLAG DESIGNATING IF PROCESSING IS TO CONTINUE      |
C     |    CHKERR: FUNCTION RETURNS A VALUE OF TRUE IF ESTIMATE IS NOT |
C     |            SUFFICIENTLY TIGHT; FALSE OTHERWISE               |
C     |                                                              |
C     |    INCRMT: MESH SIZE OF SUMMATION PROCESS; DIVIDES POLAR PLANE |
C     |            INTO N=INCRMT PIE SHAPED WEDGES                   |
C     |    INPUT: SEE INPUT PARAMETERS                               |
C     |    SEED: SEE INPUT PARAMETERS                                |
C     |-------------------------------------------------------------|
      CALL INIT (ERROR,LSTRAD,RADIUS,DELTA,INCRMT,LSTPRB,INPUT,
     +           RBAR,TBAR,SIGMAR,SIGMAT,RHO,SEED,SIGMA)
C     |-------------------------------------------------------------|
C     |  THE FOLLOWING PSUEDO DO-WHILE LOOP IS CARRIED OUT WHILE THE CEP |
C     |  ESTIMATE IS NOT WITHIN THE TOLERANCE SPECIFIED IN FUNCTION  |
C     |  CHECKERROR BELOW.  ERROR IS INITIALIZED TO TRUE IN SUBROUTINE |
```

```
C |   INITIALIZE.                                                         |
C |
10      IF (ERROR) THEN

   CALL CALC (PROB,DELTA,RHO,SIGMAR,SIGMAT,RBAR,TBAR,
     +                RADIUS,INCRMT)

   ERROR = CHKERR (PROB)
   TMPRAD = RADIUS
   RADIUS = NEWRAD (RADIUS,PROB,LSTRAD,LSTPRB)
   LSTRAD = TMPRAD
   LSTPRB = PROB
   GO TO 10
ENDIF
C |                                                                       |
C |                                                                       |
C |-----------------------------------------------------------------------|
C |  THE OUTPUT PARAMETERS ARE ASSIGNED THEIR VALUES HERE AFTER THE      |
C |  PROCESSING IS COMPLETE.                                             |
C |                                                                       |
CEP = LSTRAD*SIGMA
PRCEP = LSTPRB
END
C |                                                                       |
C |-----------------------------------------------------------------------|
C |-----------------------------------------------------------------------|
C |          S U B R O U T I N E   I N I T I A L I Z E                   |
C |-----------------------------------------------------------------------|
SUBROUTINE INIT (ERROR,LSTRAD,RADIUS,DELTA,INCRMT,LSTPRB,
     +              INPUT,RBAR,TBAR,SIGMAR,SIGMAT,RHO,SEED,SIGMA)
C |                                                                       |
C |                                                                       |
C |    THIS SUBROUTINE INITIALIZES ALL VARIABLES TO THEIR RESPECTIVE     |
C |    STARTING VALUES.  NO NEW VARIABLES ARE DECLARED.  SCALING OF      |
C |    THE RAW DATA AS WELL AS DETERMINATION OF THE MESH SIZE TAKES      |
C |    PLACE IN THIS SUBROUTINE.                                         |
C |                                                                       |
REAL LSTRAD,RADIUS,DELTA,PI,LSTPRB,INPUT(5),
     +      RBAR,TBAR,SIGMAR,SIGMAT,RHO,SIGMA
C
INTEGER INCRMT,SEED
C
LOGICAL ERROR
C |                                                                       |
C |-----------------------------------------------------------------------|
C |                                                                       |
PI = 3.14159265358979
ERROR = .TRUE.
LSTRAD = 0.0
LSTPRB = 0.0
C |-----------------------------------------------------------------------|
C |   SCALING                                                             |
C |                                                                       |
SIGMA = SQRT(INPUT(3)**2+INPUT(4)**2)
RBAR = INPUT(1)/SIGMA
TBAR = INPUT(2)/SIGMA
SIGMAR = INPUT(3)/SIGMA
SIGMAT = INPUT(4)/SIGMA
RHO = INPUT(5)/(INPUT(4)*INPUT(3))
RADIUS = REAL(SEED)/SIGMA
C | *********************************************************************|
C |-----------------------------------------------------------------------|
C |  DEPENDING ON BIAS AND ELLIPTICITY, THIS SECTION DETERMINES THE      |
C |  HOW FINE THE POLAR PLANE WILL BE DIVIDED (MESH SIZE).               |
C |                                                                       |
IF ((SQRT(RBAR**2+TBAR**2).GT.3.0).AND.(MAX(SIGMAR,SIGMAT)/
     +      MIN(SIGMAR,SIGMAT).GT.2.0)) THEN
   INCRMT = 75
ELSE IF ((INPUT(4)/INPUT(3)).LT.0.1) THEN
   INCRMT = 125
ELSE IF ((INPUT(4)/INPUT(3)).LT.0.25) THEN
   INCRMT = 100
```

```
      ELSE
         INCRMT = 30
ENDIF
C  | ***************************************************************|
C  |----------------------------------------------------------------|
DELTA = 2.0*PI/INCRMT
END
C  |                                                                |
C  |----------------------------------------------------------------|
C  |----------------------------------------------------------------|
C  |                 S U B R O U T I N E   C A L C                  |
C  |----------------------------------------------------------------|
SUBROUTINE CALC (PROB,DELTA,RHO,SIGMAR,SIGMAT,
     +                  RBAR,TBAR,RADIUS,INCRMT)
C  |                                                                |
C  |  THIS SUBROUTINE PERFORMS THE NUMERICAL SUMMATION THAT CALCULATES|
C  |  THE AREA UNDER THE BIVARIATE CURVE FOR A CIRCLE WITH A SPECIFIED|
C  |  RADIUS.  THE FOLLOWING VARIABLES ARE DECLARED LOCAL TO THIS SUB-|
C  |  ROUTINE:                                                      |
C  |     A: HOLDING VARIABLE FOR THE FUNCTION ALPHA.                |
C  |     B: HOLDING VARIABLE FOR THE FUNCTION BETA.                 |
C  |     C: HOLDING VARIABLE FOR THE FUNCTION GAMMA.                |
C  |     D: CONSTANT PART OF THE SUMMATION THAT DOES NOT CHANGE FROM|
C  |        INCREMENT TO INCREMENT.                                 |
C  |     THETA: ANGULAR COUNTER (IN RADIANS) THAT REPRESENTS HOW FAR|
C  |            AROUND THE CIRCLE THE SUMMATION HAS PROGRESSED.     |
C  |     ALPHA,BETA: FUNCTIONS OF THETA SPECIFIED IN THE TECHNICAL  |
C  |                 REFERENCE.                                     |
C  |     GAMMA: FUNCTION WHICH RETURNS A CONSTANT VALUE; SPECIFIED IN|
C  |            THE TECHNICAL REFERENCE.                            |
C  |     ERF: ERROR FUNCTION                                        |
C  |     ROOTA: HOLDING VARIABLE FOR THE SQUARE ROOT OF A.          |
C  |                                                                |
C  |     J: SUMMATION LOOP COUNTER.                                 |
C  |                                                                |
REAL PI,A,B,C,D,THETA,PROB,DELTA,RHO,SIGMAR,SIGMAT,
     +      RBAR,TBAR,ALPHA,BETA,GAMMA,ERF,RADIUS,ROOTA,E
C
INTEGER J,INCRMT
C  |                                                                |
C  |----------------------------------------------------------------|
C  |   THIS SECTION PERFORMS SOME INITIALIZATIONS                   |
C  |                                                                |
PI = 3.14159265358979
D = -1.0 /(4*SQRT(PI)*SIGMAR*SIGMAT*SQRT(1-RHO**2))
C = GAMMA (RHO,SIGMAR,SIGMAT,RBAR,TBAR)
PROB = 0.0
THETA = 0.0
C  |----------------------------------------------------------------|
C  |   THIS SECTION PERFORMS THE SUMMATION FROM THETA = 0 TO 2*PI OVER|
C  |   A CIRCLE OF RADIUS = RADIUS.                                 |
C  |                                                                |
DO 10 J = 1,INCRMT

   A = ALPHA (RHO,SIGMAR,SIGMAT,THETA)
   B = BETA (RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR)
   ROOTA = SQRT(A)
           E =  ERF(RADIUS*ROOTA+B/ROOTA)-ERF(B/ROOTA)

           PROB = PROB + 1.0/A*EXP((B**2-A*C)/A)*(B/ROOTA*
     +          (E)+1.0/SQRT(PI)*(EXP(-A*(RADIUS**2)-2*B*RADIUS
     +           -(B**2)/A)-EXP(-(B**2)/A)))

   THETA = THETA + DELTA
C
10 CONTINUE

   |----------------------------------------------------------------|
   |   CALCULATION OF TOTAL PROBABILITY ASSOCIATED WITH THE CIRCLE. |
   |                                                                |
PROB = PROB*D*DELTA
```

```
        CLOSE (12)
END
C   |                                                                |
C   |----------------------------------------------------------------|
C   |----------------------------------------------------------------|
C   |                    F U N C T I O N   E R F                     |
C   |----------------------------------------------------------------|
REAL FUNCTION ERF (X)
C   |                                                                |
C   |  THIS FUNCTION APPROXIMATES THE ERROR FUNCTION.  REFERENCE FOR  |
C   |  THE POLYNOMIAL APPROXIMATION IS THE NATIONAL BUREAU OF STDS.   |
C   |  HANDBOOK OF MATHEMATICAL FUNCTIONS BY ABRAMOWITZ AND STEEGUN.  |
C   |                                                                |
C   |  V A R I A B L E S                                             |
C   |     X: VALUE FOR WHICH THE ERROR FUNCTION IS DETERMINED.       |
C   |     A(I): APPROXIMATION CONSTANTS SPECIFIED IN THE REFERENCE.  |
C   |     TEMP: TEMPORARY HOLDING VARIABLE FOR ERF.                  |
C   |                                                                |
C   |  NOTE: IF THE ERROR FUNCTION PARAMETER IS GREATER THAN 4.0 OR  |
C   |  LESS THAN 1.0E-7, THE FUNCTION IS AUTOMATICALLY ASSIGNED A VALUE|
C   |  OF 1.0 OR 0.0 RESPECTIVELY.                                    |
C   |                                                                |
REAL X, A1, A2, A3, A4, A5, A6, TEMP
C
PARAMETER (A1 = 0.0705230784,
     +           A2 = 0.0422820123,
     +           A3 = 0.0092705272,
     +           A4 = 0.0001520143,
     +           A5 = 0.0002765672,
     +           A6 = 0.0000430638)
C
        IF (ABS(X).GE.4.0) THEN
   ERF = SIGN(1.0,X)
ELSEIF (ABS(X).LE.1.0E-7) THEN
   ERF = 0.0
ELSE
           TEMP = 1.0 - 1.0/(1.0+A1*ABS(X)+A2*ABS(X)**2+A3*ABS(X)**3+
     +          A4*ABS(X)**4+A5*ABS(X)**5+A6*ABS(X)**6)**16
   ERF = SIGN(TEMP,X)
        ENDIF
END
C   |                                                                |
C   |----------------------------------------------------------------|
C   |----------------------------------------------------------------|
C   |                  F U N C T I O N   A L P H A                   |
C   |----------------------------------------------------------------|
REAL FUNCTION ALPHA (RHO,SIGMAR,SIGMAT,THETA)
C   |                                                                |
C   |  THIS FUNCTION OF THETA IS SPECIFIED IN THE TECHNICAL REFERENCE.|
C   |  NO NEW VARIABLES ARE DECLARED.                                 |
C   |                                                                |
REAL RHO,SIGMAR,SIGMAT,THETA
C   |----------------------------------------------------------------|
ALPHA = 1.0/(2.0*(1-RHO**2))*((SIN(THETA)/SIGMAR)**2-2*RHO*
     +        SIN(THETA)*COS(THETA)/(SIGMAR*SIGMAT)+(COS(THETA)
     +        /SIGMAT)**2)
END
C   |                                                                |
C   |----------------------------------------------------------------|
C   |----------------------------------------------------------------|
C   |                    F U N C T I O N   B E T A                   |
C   |----------------------------------------------------------------|
REAL FUNCTION BETA (RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR)
C   |                                                                |
C   |  THIS FUNCTION OF THETA IS SPECIFIED IN THE TECHNICAL REFERENCE.|
C   |  NO NEW VARIABLES ARE DECLARED.                                 |
C   |                                                                |
REAL RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR
C   |----------------------------------------------------------------|
BETA = -1.0/(2*(1-RHO**2))*(RBAR*SIN(THETA)/SIGMAR**2
     +       - RHO*(TBAR*SIN(THETA)+RBAR*COS(THETA))/(SIGMAR*
     +       SIGMAT)+TBAR*COS(THETA)/SIGMAT**2)
```

```
END
C  |                                                                  |
C  |------------------------------------------------------------------|
C  |                  F U N C T I O N   G A M M A                     |
C  |------------------------------------------------------------------|
REAL FUNCTION GAMMA (RHO,SIGMAR,SIGMAT,RBAR,TBAR)
C  |                                                                  |
C  |   THIS FUNCTION RETURNS A CONSTANT VALUE FOR A GIVEN CASE.  IT IS |
C  |   SPECIFIED IN THE TECHNICAL REFERENCE.  NO NEW VARIABLES ARE     |
C  |   DECLARED.                                                       |
C  |                                                                  |
REAL RHO,SIGMAR,SIGMAT,RBAR,TBAR
C  |------------------------------------------------------------------|
GAMMA = 1.0/(2*(1-RHO**2))*((RBAR/SIGMAR)**2-2*RHO*RBAR*TBAR/
   +         (SIGMAR*SIGMAT)+(TBAR/SIGMAT)**2)
END
C  |                                                                  |
C  |------------------------------------------------------------------|
C  |------------------------------------------------------------------|
C  |                F U N C T I O N   C H E C K E R R O R             |
C  |------------------------------------------------------------------|
LOGICAL FUNCTION CHKERR (PROB)
C  |                                                                  |
C  |   THIS LOGICAL FUNCTION RETURNS A TRUE IF THE CALCULATED PROB-    |
C  |   ABILITY DIFFERS BY MORE THAN THE SPECIFIED TOLERANCE FROM THE   |
C  |   TRUE CEP PROBABILITY OF 0.5.  A TRUE MEANS THE PROCESSING CON-  |
C  |   TINUES AND A NEW RADIUS IS CALCULATED. THE VARIABLE PRBERR      |
C  |   SPECIFIES WHAT THE TOLERANCE IS.                                |
C  |                                                                  |
      REAL PROB,PRBERR
C  |------------------------------------------------------------------|
PARAMETER (PRBERR = 0.0001)
CHKERR = (ABS(0.5-PROB).GT.PRBERR)
END
C  |                                                                  |
C  |------------------------------------------------------------------|
C  |------------------------------------------------------------------|
C  |              F U N C T I O N   N E W   R A D I U S               |
C  |------------------------------------------------------------------|
      REAL FUNCTION NEWRAD (RADIUS,PROB,LSTRAD,LSTPRB)
C  |                                                                  |
C  |   THIS FUNCTION USES THE SECANT METHOD (MODIFIED) TO DETERMINE A  |
C  |   NEW RADIUS.  IF THE LAST RADIUS AND THE CURRENT RADIUS BOTH     |
C  |   GIVE PROBABILITIES CLOSE TO 1.0 (I.E., THE TWO RADIUSES ARE FAR |
C  |   OUT ON THE DISTRIBUTION CURVE), THE NEW RADIUS IS GIVEN AS HALF |
C  |   THE DURRENT RADIUS TO AVOID DIVISION BY ZERO.  IN ADDITION, IF  |
C  |   THE NEW RADIUS IS CALCULATED TO BE LESS THAN 0.0, THE NEW RADIUS|
C  |   IS RESPECIFIED TO BE HALF THE CURRENT RADIUS;  THE NEW VARIABLE |
C  |   TEMP FACILITATES THIS CHECK.                                    |
C  |                                                                  |
REAL RADIUS,PROB,LSTRAD,LSTPRB,TEMP
C  |------------------------------------------------------------------|
IF ((PROB.GT.0.98).AND.(LSTPRB.GT.0.98)) THEN
   NEWRAD = RADIUS/2.0
ELSE
   TEMP = (RADIUS-LSTRAD)/(PROB-LSTPRB)*(0.5-PROB)+RADIUS
          IF (TEMP.LT.0.0) THEN
      NEWRAD = RADIUS/2.0
   ELSE
      NEWRAD = TEMP
   ENDIF
ENDIF

  END
C  |                                                                  |
C  |------------------------------------------------------------------|
C  | E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D    |
C  |------------------------------------------------------------------|

************************************************************************

**********************************************************************
 SUBROUTINE GRUBBSWH(RPARS,CEP2)
```

```
C
      REAL M,V,S12,S22,B12,B22
C
      INTEGER RPARS,CEP2
      DIMENSION RPARS(5)
C
      S12 = REAL(RPARS(3))*REAL(RPARS(3))
      S22 = REAL(RPARS(4))*REAL(RPARS(4))
C
      B12 = REAL(RPARS(1))*REAL(RPARS(1))
      B22 = REAL(RPARS(2))*REAL(RPARS(2))
C
      M = S12+S22+B12+B22
      V = 2.*(S12*S12 + S22*S22) + 4.*(S12*B12 + S22*B22)
C
      CEP2 = NINT(SQRT(M*(1.-V/(9.*M*M))**3.))
C
      END
C    |                                                                  |
C    |------------------------------------------------------------------|
C    | E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D    |
C    |------------------------------------------------------------------|
```

Appendix D. Experimental Code

This Appendix lists the FORTRAN code of the EXPERIMENT program used to generate the large 2000-member sample data (SAMPLEMEKER), divide these large samples into small samples of three to fifteen, and use those small samples to estimate CEP using the five estimation techniques. The ANALYZER routine calculates the mean CEP, RE, VAR(RE), MSE(RE) as well as two Taguchi signal-to-noise ratios. The output for the three MOEs from this study are listed in Apendices G (actual CEP values), I (mean RE), K (VAR(RE)), and M (MSE(RE)).

```
      PROGRAM EXPERIMENT

      INTEGER CEP1,CEP2,CEP4,CEP5,J,I,L,MRM,MED,MRMSQ
      INTEGER RPARS(5),PARS(5),P,S,T,COUNT,CEPA(700,5)
      INTEGER N1,RVBST,DS,BEGINPT,ENDPT,EXACT(175),NUMGOODATA
      INTEGER NUMBADATA,DESIGNPT,SCORES(16,2),NUMR234BAD,COUNT
C     INTEGER R,U

      REAL Q,SAMP(2000,2), SAMPRAMS(3),V2
      REAL PRCEP,CEP3,CEPNPI,PARS1(5),DAT(175,3)
      REAL VARIN(5), MSE(5), SNRS(5),SNRN(5),RE(5),CEP(5)

C     REAL DR,CR
C      CHARACTER*12 DATFIL(875)

      CHARACTER*12 CEPNAME(5)

        CEPNAME(1) = 'R234'
        CEPNAME(2) = 'GRUBBS'
        CEPNAME(3) = 'CBN'
        CEPNAME(4) = 'RAYLEIGH'
        CEPNAME(5) = 'ETHRIDGE'

***********************************
*   The following keyboard inputs allows the user to split the
*   program into smaller sections.  All 175 points would take
*   approximately 30 hours on one sun workstation.  I used
*   six suns simultaneously breaking them into the following
*   groups:
*            1-29, 30-59, 60-89, 90-119, 120-149, 150-175
*
*   The above are the begin and end points.  U is a counter
*   that scales itself to these points, and if all 175 points
*   were run together, could be set to zero.  Breaking them into
*   these intervals requires a U of
*
* U = 0,116,236,356,476,and 596
*
*      For runs using sample size (N1) as the main blocking
*   factor, the following are the begin and endpoints and
*   associated  sample size:
*
* 1,175,3; 176,350,5; 351,525,7; 526,700,10; 701,875,15
*
************************************

         WRITE(*,*) 'ENTER BEGINNING PT'
         READ(*,*) BEGINPT
         WRITE(*,*) 'ENTER ENDING PT'
         READ(*,*) ENDPT
```

```
C  WRITE(*,*) 'ENTER U'
C  READ(*,*) U
         WRITE(*,*) 'ENTER SAMPLE SIZE'
         READ(*,*) N1

DESIGNPT = BEGINPT

C
C      SAMPLE SIZE (N1) REPRESENTS THE NUMBER IN EACH GROUP USED TO
C      ESTIMATE CEP.  THERE WILL ALWAYS BE 2000 IN EACH DATABASE,
C      BUT N1 DETERMINES HOW TO BREAK THAT 2000 UP INTO THE SMALL
C      SAMPLE SIZES REQUIRED BY TODAYS FISCAL REALITIES.
C
C       RVBST IS THE RVS/BOOSTER...ALWAYS ASSUMED TO BE ONE FOR PURPOSES
C       OF THIS STUDY.
C
C
*************************************************************
*   Here I read in a file of filenames for the output from
*   sample test runs.  Each of these contains the actual CEPs
*   calculated from each small sample.   SAMPDAT1, for example,
*   would contain 666 sets of CEPs from each of the five techniques
*   under consideration, or 3330 numbers.  This is because it would
*   split the 2000 sets of xrange and dnrange points into groups of
*   three.  Others would split them into groups of 5, 7, 10, and
*   15, thus having fewer sets in their respective SAMPDAT file.
*   If all 875 potential files are used, over 1.4 million numbers
*   would be committed to disk space.  This is mainly helpful
*   in the diagnostic phase of programming.
*************************************************************
C
C          OPEN(7,FILE='DATNAMS',FORM='FORMATTED')
C          READ(7,'(A)') (DATFIL(N),N=1,25)
C          CLOSE(7)
C
***************************************************************
*   Here I'll open a 175X3 file of bias, ellipticity, and correlation
*   parameters and read them into a matrix for reference during
*   the outermost loop below.
***************************************************************

      OPEN(3,FILE='SPARAMS',FORM='FORMATTED')
      READ(3,9) ((DAT(I,J),J=1,3),I=1,175)

      CLOSE(3)

9     FORMAT(F4.2,1X,F4.2,1X,F4.2)

************************************************************
*   Now I open a file of "exact", or population, solutions as
*   provided by the CBN method.  These will be used in the
*   analysis subroutine to determine estimator bias and variance.
************************************************************

       OPEN(3,FILE='POPULTNVAL',FORM='FORMATTED')
       READ(3,13) (EXACT(I),I=1,175)

       CLOSE(3)

13     FORMAT(1I6)

*********************************************
*   The following files contain the different outputs.
*********************************************

       OPEN(1,FILE='CEPPUT')
       OPEN(6,FILE='REPUT')
       OPEN(20,FILE='VARINPUT')
       OPEN(12,FILE='MSEPUT')
       OPEN(14,FILE='SNRSPUT')
       OPEN(16,FILE='SNRNPUT')
```

```
****************************************************
*   This greater loop calls the routine samplemaker with a different
*   set of bias, ellipticity, and correlation parameters each time.
*   These parameters are taken from an array of values called DAT.
*   Since there are 5 different ellipticities, 5 different
*   correlations, and 7 different biases, the total number of calls
*   is 5 X 5 x 7 = 175.  When blocking on the parameter sets,
*   use the BEGINPT and ENDPT variables input above for the
*   indeces on var I on loop 100 below.
****************************************************
C
C        DO 100 S = BEGINPT, ENDPT
C

       DO 100 S = 1, 175


         DO 99 J=1,3
             SAMPRAMS(J) = DAT(S,J)
99       CONTINUE


         CALL SAMPLEMAKER(SAMPRAMS,SAMP)

**************************************
*  USE THE FOLLOWING TO ANALYZE ACTUAL POPULATIONS CREATED
*  BY SAMPLEMAKER...S CAN EQUAL 1 THRU 175.
**************************************
C
C IF (S.EQ.1) THEN
C OPEN(4,FILE='DATOUT1')
C WRITE(4,46) ((SAMP(I,J),J=1,2),I=1,2000)
C CLOSE(4)
C ENDIF
C46 FORMAT(2F9.3)
C
C
*************************************
*   Comment N1 out when given as input from
*   the keyboard.
*************************************

C
C         N1 = 3
C

         DS = 2000
         RVBST = 1

*****************************************************
*   IF INVOKED,
*   This loop sets the sample size for the five different settings
*   of that dimension.  It then runs the approximation techniques
*   on the configured set of data, checks for any sets that
*   don't converge (discarding them),  and creates an array of
*   CEP estimates from the Rand 234, Grubbs, CBN, Rayleigh, and
*   Ethridge techniques.  This array is fed into the analysis
*   subroutine to calculate the bias (RE), variance, MSE, and SNR
*   of each technique
*****************************************************
C
C          DO 90 R = 1, 5
C
            Q = REAL(DS/N1)

            P =  NINT(Q)

            T = 1
```

```
      COUNT = 0

******************************************
*  Here is where I would open one of the 875 files
*  used for diagnosing estimator behavior.
******************************************
C
C             OPEN(21,FILE=DATFIL(S))
C
*********************************************************
*  This loop actually takes the manufactured sample of 2000 crossrange
*  and downrange misses, cuts it up into the small sample sizes
*  described (3,5,7,10, and 15), and performs the estimation
*  techniques on the parameters of bias, ellipticity, and
*  correlation gleaned from these smaller samples.
*********************************************************

             DO 35 I = 1, P


*************************
*   First I write the number in the sample (N1) and
*   the number of RVs/booster (always 1) to the SCORES
*   array.  Then I take an N1 sized bite out of the
*   SAMP array of 2000 simulated pairs of miss distances
*   and also put that into the file. Variable "T" keeps my
*   place in the 2000x2 array SAMP.
*************************

        SCORES(1,1) = N1
        SCORES(1,2) = RVBST

               DO 50 L=2,(N1+1)

                  DO 49 J=1,2
                     SCORES(L,J)= NINT(SAMP(T,J))
49                CONTINUE

                  T=T+1

50          CONTINUE


**********************************
*  MUVAR takes the little sample and calculates its mean
*  and standard deviation for both cross and down range
*  miss distances, plus their covriance.
**********************************

               CALL MUVAR(SCORES,PARS)


               CEP1 = 0
               CEP2 = 0
               CEP3 = 0.
               CEP4 = 0
        CEP5 = 0
               MRM = 0
               MED = 0
               MRMSQ = 0
               CEPMPI = 0.

**********************************
*  ROT takes the parameters calculated by MUVAR
*  and rotates them.  R234 and GRUBBS need the
*  covariance = 0.  CBN uses Grubbs as a seed value.
*  Because R234 is not valid for values of V2 (the ratio
*  between the bias and the CEP about the mean point of
*  impact) greater than 2.2, I do not use any R234 values
*  when the rotated population parameters generate a
```

```
*  population with a V2 > 2.2.  These design points are 155,
*  160, 165, 170, 173,174,175.  However, from point 125 forward
*  the design parameters occasionally create sample V2's which,
*  especially when derived from small samples,
*  are much greater than 2.2.  Indeed, point 175, at SS=3,
*  generates 97 V2's >6.1, and these values cause R234 to return
*  a NEGATIVE value for CEP.
*********************************

               CALL ROT(PARS,RPARS)
               CALL GRUBBSWH(RPARS,CEP2)

       IF ((S.NE.155).OR.(S.NE.160).OR.(S.NE.165).OR.
     +            (S.NE.170).OR.(S.NE.173).OR.(S.NE.174).OR.
     +            (S.NE.175)) THEN

      CALL R234(RPARS,CEP1,CEPMPI,V2)

       END IF

               PARS1(1) = REAL(PARS(1))
               PARS1(2) = REAL(PARS(2))
               PARS1(3) = REAL(PARS(3))
               PARS1(4) = REAL(PARS(4))
               PARS1(5) = REAL(PARS(5))

               CALL CBN(PARS1,CEP2,CEP3,PRCEP)

               CALL MUMED(SCORES,MRM,MED,MRMSQ)

               CEP4 = NINT(0.9394*REAL(MRM))

       CALL ETHRIDGE(CEP5)

             WRITE(21,70) CEP1,CEP2,NINT(CEP3),MED,MRM,MRMSQ,CEP4,
     +                NINT(CEPMPI), CEP5
70      FORMAT (9I6)

********************************
*  For high bias values in the data relative
*  to the CEP about the mean point of impact (CEPMPI)
*  R234 returns no CEP.  Hi correlation coupled with
*  hi bias occasionally prevents the CBN method
*  from converging.  In both cases the subroutines return
*  a value of zero.  Forcing Grubbs, Rayleigh, and Ethridge to
*  compete at these unruly points places them at a disadvantage
*  WRT the MOEs employed, but it should be noted that they
*  have no problems with any of the parameter sets.
*  In the following loop I include only those CEP sets
*  in which all the estimators return a reasonable value.
*  I place them in the array CEPA.
********************************

       IF (CEP3.GT.1.0) THEN

                COUNT = COUNT+1

  CEPA(COUNT,2) = CEP2
  CEPA(COUNT,3) = NINT(CEP3)
  CEPA(COUNT,4) = CEP4
  CEPA(COUNT,5) = CEP5

************************************
*   THE FOLLOWING ALLOWS FOR EXAMINATION OF THE BAD
*   PARAMETERS CAUSING CBN PROBLEMS.
************************************
C
C ELSE
C
C             WRITE(21,70) CEP2,NINT(CEP3),CEP4,CEP5,PARS
C70      FORMAT (9I6)
C
```

```
            END IF

*******************************
*   ONLY CALL R234 IF V2 IS LESS THAN 2.2.
*******************************

      IF (V2.LT.2.2) THEN

                COUNT1 = COUNT1+1

                CEPA(COUNT1,1) = CEP1

            END IF

35          CONTINUE

******************************************
*   THE ABOVE LOOP RUNS EITHER 666,400,286,200, OR 133 TIMES DPNDING
*   THE SAMPLE SIZE.   AT THIS POINT I HAVE AN ARRAY CEPA(COUNT,5)
*   WITH ALL THE CEP ESTIMATES IN IT FOR EACH ITERATION.  NOW
*   I CALC THE NUMBER OF BAD DATA SETS (P-COUNT) AND CALC THE
*   RE,VAR,MSE, AND SNR ASSOCIATED WITH THAT RUN.
******************************************

NUMGOODATA = COUNT

NUMBADATA = P - COUNT

NUMR234BAD = P - COUNT1
C
C DESIGNPT = S + U  (ONLY IF BLOCKING ON PARAMETERS, NOT SS)
C

CALL ANALYZER(CEPA, NUMGOODATA, COUNT1,EXACT(S),CEP,
     +                    VARIN,MSE, SNRS,SNRN,RE)



***********************
*   OUTPUT TIME!
***********************


***************
*   Average CEP estimates for each design point.
***************

WRITE(1,81) DESIGNPT,NUMGOODATA,NUMBADATA,NUMR234BAD,
     +     N1,SAMPRAMS(1),SAMPRAMS(3),SAMPRAMS(2),
     +     EXACT(S),(CEP(I),I=1,5)


81      FORMAT (I3,2X,I3,2X,I2,2X,I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,1X,I4,1X,F6.1,1X,F6.1,1X,F6.1,1X,F6.1,1X,F6.1)



***************
*   Relative Error for each design point.
***************

WRITE(6,82)DESIGNPT,N1,SAMPRAMS(1),SAMPRAMS(3),
     +        SAMPRAMS(2),(RE(I),I=1,5)
```

```
82     FORMAT (I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,2X,F7.4,2X,F7.4,2X,F7.4,2X,F7.4,2X,F7.4)

***************
*   Variances for each design point.
***************

WRITE(20,83) DESIGNPT,N1,SAMPRAMS(1),SAMPRAMS(3),
     +              SAMPRAMS(2),(VARIN(I),I=1,5)

83     FORMAT (I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,2X,F6.4,2X,F6.4,2X,F6.4,2X,F6.4,2X,F6.4)


***************
*   Mean Squared Errors for each design point.
***************

WRITE(12,84) DESIGNPT,N1,SAMPRAMS(1),SAMPRAMS(3),
     +              SAMPRAMS(2),(MSE(I),I=1,5)


84     FORMAT (I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,2X,F7.5,2X,F7.5,2X,F7.5,2X,F7.5,2X,F7.5)

***************
*   SNR the smallest for each design point.
***************

WRITE(14,85) DESIGNPT,N1,SAMPRAMS(1),SAMPRAMS(3),
     +              SAMPRAMS(2),(SNRS(I),I=1,5)

85     FORMAT (I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,2X,F7.4,2X,F7.4,2X,F7.4,2X,F7.4,2X,F7.4)

***************
*   SNR nominal for each design point.
***************

WRITE(16,86) DESIGNPT,N1,SAMPRAMS(1),SAMPRAMS(3),
     +              SAMPRAMS(2),(SNRN(I),I=1,5)


86     FORMAT (I3,2X,I2,2X,F4.2,2X,F4.2,2X,
     +  F4.2,2X,F8.4,2X,F8.4,2X,F8.4,2X,F8.4,2X,F8.4)

****************************************
*  IF INVOKED
*  I CAN UPDATE THE SAMPLE SIZE (N1) AND CONTINUE WITH THE SAME
*  2000 SIMULATED MISS DISTANCES, ONLY IN LARGER CHUNKS.  I
*  ALSO UPDATE MY DESIGN POINT COUNTER VARIABLE U.
****************************************
C
C
C          IF (N1 .LT. 6) THEN
C
C             N1=N1+2
C      U = U + 1
C
C          ELSE IF (N1 .LT. 8)  THEN
C
C             N1=N1+3
C      U = U + 1
C
C          ELSE IF (N1 .LT. 11) THEN
C
C             N1=N1+5
C             U = U + 1
```

```
C
C          END IF
C
C90        CONTINUE
C
*******************************************
*   NOW I'M FINISHED WITH THAT SET OF PARAMETERS. IT'S TIME TO
*   CREATE A NEW 2000 SETS OF SAMPLE MISS DISTANCES.
*******************************************

COUNT = 0
COUNT1 = 0
NUMGOODATA = 0
NUMBADATA = 0
DESIGNPT = S + BEGINPT

DO 75 I = 1,700
    DO 80 J = 1,5
CEPA(I,J) = 0
80      CONTINUE
75 CONTINUE

100     CONTINUE


      CLOSE (1)
      CLOSE (6)
      CLOSE (20)
      CLOSE (12)
      CLOSE (14)
      CLOSE (16)
      CLOSE (18)
C
      CLOSE (21)
C
      END


*************************************************************************


*************************************************************************

        SUBROUTINE ANALYZER(CEPA,N,CNT,EXACT,CEP,VARIN,MSE,SNRS,
     +                       SNRN,RE)

INTEGER CEPA(700,5),N,EXACT,I,J,SUM(5),CNT
REAL  VARIN(5), MSE(5), SNRS(5),CEP(5),DIFSUM(5),RE(5)
        REAL  SNRN(5), N1,EXACTR,CNT1


DO 5 I = 1, 5

SUM(I) = 0
CEP(I) = 0.
RE(I) = 0.
VARIN(I) = 0.
MSE(I) = 0.
SNRS(I) = 0.
SNRN(I) = 0.
DIFSUM(I) = 0.
5 CONTINUE

N1 = REAL(N)
CNT1 = REAL(CNT)
EXACTR = REAL(EXACT)


****************************
*   FIRST I SUM THE TOTAL FOR EACH COLUMN OF CEP ESTIMATES
****************************
```

```
DO 10 I = 2, 5

  DO 20 J = 1, N

SUM(I) = SUM(I) + CEPA(J,I)

20 CONTINUE

****************************
*   NOW I CAN GET THE AVERAGE CEP ESTIMATE AND RELATIVE ERROR
*   FOR EACH TECHNIQUE
****************************

CEP(I) = (REAL(SUM(I)))/N1

RE(I) =  (CEP(I) - EXACTR)/EXACTR

10 CONTINUE

*****************************
*  Because R234 could have a different number of non-zero
*  values, it must have its values calculated seperately.
*****************************

  DO 40 J = 1, CNT

SUM(1) = SUM(1) + CEPA(J,1)

40 CONTINUE

CEP(1) = (REAL(SUM(1)))/CNT1

RE(1) =  (CEP(1) - EXACTR)/EXACTR


***************************
*   HERE I CALC THE VARIANCE OF THE RELATIVE ERROR.  I USE
*   THAT RESULT TO GET THE MSE AND DIFFERENT SNR'S
*   (S=SMALLEST, N=NOMINAL).
***************************

DO 50 I = 2, 5

       DO 60 J = 1, N

                DIFSUM(I) = DIFSUM(I)+(((REAL(CEPA(J,I))
     +                -EXACTR)/EXACTR) - RE(I))**2

60       CONTINUE

     VARIN(I) =  DIFSUM(I)/(N1 - 1.)

     MSE(I) = VARIN(I) + (RE(I))**2

     SNRS(I) = (-10)*LOG10(DIFSUM(I)/N1)

     SNRN(I) = 10*LOG10((RE(I)**2)/VARIN(I))

50 CONTINUE

       DO 70 J = 1, CNT

               DIFSUM(1) = DIFSUM(1)+(((REAL(CEPA(J,1))
     +                -EXACTR)/EXACTR) - RE(1))**2

70       CONTINUE

     VARIN(1) =  DIFSUM(1)/(CNT1 - 1.)

     MSE(1) = VARIN(1) + (RE(1))**2

     SNRS(1) = (-10)*LOG10(DIFSUM(1)/CNT1)
```

```
    SNRN(1) = 10*LOG10((RE(1)**2)/VARIN(1))

END


*********************************************************************************

        SUBROUTINE SAMPLEMAKER(SAMPRAMS,R)

C  THIS ITERATION OF THE IMSL ROUTINE RMNVN PROVIDES 2000
C  DOWN AND CROSSRANGE MISS DATA WITH THE STANDARD DEVIATION
C  OF 1000/1.1774 FOR THE CROSSRANGE DATA POINTS AND A SCALED
C  VARIANCE FOR THE DOWNRANGE POINTS BASED ON THE PARAMETERS OF
C  THE DESIGN POINT.   THE CORRELATION IS ALSO SCALED.  AFTER
C  CREATION OF THE DATA, THE BIAS, AS A FUNCTION OF THE POOLED
C  VARIANCES, IS ADDED TO THE CROSSRANGE SCORES.


      INTEGER    I, IRANK,ISEED, K, LDR, LDRSIG, NOUT, NR
REAL        COV(2,2), R(2000,2), RSIG(2,2),SAMPRAMS(3)
        REAL       SIGMAPOOLED,BIAS,STDEV
EXTERNAL  CHFAC, RNMVN, RNSET, UMACH

CALL UMACH(2,NOUT)
NR        =2000
K         =2
LDRSIG    =2
LDR       =2000
*****************************************************
* Here I scale the variances and covariances based on the level of
* ellipticity and correlation desired.
******************************************************
STDEV = 1000./1.1774


COV(1,1) = STDEV**2
COV(2,2) =((SAMPRAMS(3))*STDEV)**2
COV(1,2) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))
COV(2,1) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))


**************************************************
*  HERE I POOL THE VARIANCES!
**************************************************

        SIGMAPOOLED = SQRT((COV(1,1)+COV(2,2))/2.)

        BIAS =   (SAMPRAMS(1))*SIGMAPOOLED

CALL CHFAC  (K, COV, 2, 0.00001, IRANK, RSIG, LDRSIG)

ISEED = 123457
CALL RNSET(ISEED)
CALL RNMVN (NR, K, RSIG, LDRSIG, R, LDR)

*****************************************************
* Here I add in the bias to the crossrange coordinate only.
* Other schemes are possible for inducing bias, but this seems
* the most direct.
*****************************************************

       DO 89 I=1,NR
          R(I,1) = R(I,1) + BIAS
89     CONTINUE

       END

C
C
C    USER'S MANUAL IMSL STAT/LIBRARY FORTRAN SUBROUTINES FOR STATISTICAL
```

```
C    ANALYSIS  VERSION 1.1 JAN 89  IMSL HOUSTON TX PG 1033
C
C
C

***********************************************************************


      SUBROUTINE ROT(PARS,RPARS)
C
      REAL THETA,RHO,S1,S2,SXY,PI,B1,B2,C1,C2
      REAL T1,T2,T3,T4,K1,K2,X1,X2
C
      INTEGER PARS,RPARS
      DIMENSION PARS(5),RPARS(5)
C
      PI = 22/7
      X1 = REAL(PARS(1))
      X2 = REAL(PARS(2))
      S1 = REAL(PARS(3)*PARS(3))
      S2 = REAL(PARS(4)*PARS(4))
      SXY = REAL(PARS(5))

      RHO = SXY/(SQRT(S1*S2))

      IF (S1 .NE. S2) THEN
         THETA = 0.5*ATAN2(2.*RHO*SQRT(S1*S2),S1-S2)
      ELSEIF (RHO .GT. 0) THEN
         THETA = PI/4
      ELSEIF (RHO .LT. 0) THEN
         THETA = -PI/4
      ENDIF

      C1 = COS(THETA)
      C2 = SIN(THETA)

      B1 = C1*X1 + C2*X2
      B2 = -C2*X1 + C1*X2

      T1 = C1*S1 + C2*SXY
      T2 = C1*SXY + C2*S2
      T3 = -C2*S1 + C1*SXY
      T4 = -C2*SXY + C1*S2

      K1 = T1*C1 + T2*C2
      K2 = T3*(-C2) + T4*C1

      RPARS(1) = NINT(B1)
      RPARS(2) = NINT(B2)
      RPARS(3) = NINT(SQRT(K1))
      RPARS(4) = NINT(SQRT(K2))
      RPARS(5) = 0

      RETURN
C
      END

***************************************************************************

$DEBUG
C   -----------------------------------------------------------------------
C  |                                                                       |
C  |            C O R R E L A T E D   B I V A R I A T E                    |
C  |                                                                       |
C  |                        N O R M A L   C E P                            |
C  |-----------------------------------------------------------------------|
C  |                                                                       |
C  |  OPR: 549 WSES (CAPT. WARD)                                           |
C  |  DATE: 29 SEPTEMBER 1986                                              |
C  |  TECHNICAL REFERENCE: THE JOHNS HOPKINS UNIVERSITY                    |
C  |                       APPLIED PHYSICS LABORATORY                      |
```

```
C  |                    MEMO BY L.S. SIMKINS (PM-4746), 26 MAR 1974  |
C  |                    SUBJECT: CALCULATION OF CIRCLE OF EQUIPROB-   |
C  |                    ABILITY FOR A BIASED, CORRELATED, BIVARIATE   |
C  |                    NORMAL DISTRIBUTION.                          |
C  | SUMMARY: THIS PROGRAM CALCULATES A CEP FOR THE GENERAL BIVARIATE |
C  |          NORMAL CASE.  THE BIVARIATE NORMAL DENSITY IS CONVERTED |
C  |          TO POLAR COORDINATES.  FOR A GIVEN ESTIMATE OF THE CEP, |
C  |          THE AREA UNDER THE CURVE IS DETERMINED BY SUMMING UP MANY|
C  |          PIE SHAPED WEDGES OVER THE INTERVAL 0 TO 2*PI.          |
C  |------------------------------------------------------------------|
C  |                    M A I N   B L O C K                            |
C  |------------------------------------------------------------------|
SUBROUTINE CBN (INPUT,SEED,CEP,PRCEP)
C  |------------------------------------------------------------------|
C  |  I N P U T   P A R A M E T E R S                                 |
C  |                                                                  |
C  |     INPUT: FIVE DIMENSION ARRAY CONTAINING REAL VALUES           |
C  |          (1)  DOWNRANGE MEAN                                     |
C  |          (2)  CROSSTRACK MEAN                                    |
C  |          (3)  DOWNRANGE SIGMA                                    |
C  |          (4)  CROSSTRACK SIGMA                                   |
C  |          (5)  DOWNRANGE/CROSSTRACK COVARIANCE                    |
C  |     SEED: INITIAL ESTIMATE OF CEP (INTEGER VALUED)               |
C  |                                                                  |
C  |  O U T P U T   P A R A M E T E R S  (REAL VALUED)                |
C  |                                                                  |
C  |     CEP: CIRCULAR ERROR PROBABLE FOR ELLIPSE SPECIFIED BY INPUT  |
C  |          PARAMETERS                                              |
C  |     PRCEP: AREA OF CIRCLE WITHIN RADIUS OF CEP (SHOULD BE APPROX |
C  |            0.5)                                                  |
C  |------------------------------------------------------------------|
REAL DELTA, SIGMAR, SIGMAT, RBAR, TBAR, RADIUS, LSTRAD,
     +       RHO, PROB, LSTPRB, TMPRAD, NEWRAD, CEP, PRCEP, SIGMA,
     +       INPUT(5)
C
LOGICAL ERROR, CHKERR
C
INTEGER INCRMT, SEED, I
C  |------------------------------------------------------------------|
C  |  V A R I A B L E S                                               |
C  |                                                                  |
C  |    DELTA: INCREMENT OF 2*PI/(NUMBER OF ITERATIONS) RADIANS       |
C  |    SIGMAR: DOWNRANGE STANDARD DEVIATION (REAL VALUED)            |
C  |    SIGMAT: CROSSTRACK STANDARD DEVIATION (REAL VALUED)           |
C  |    RBAR: DOWNRANGE MEAN (REAL VALUED)                            |
C  |    TBAR: CROSSTRACK MEAN (REAL VALUED)                           |
C  |    RADIUS: HOLDS CURRENT ESTIMATE OF CEP (REAL VALUED).  CHANGES |
C  |            WITH EACH ITERATION.                                  |
C  |    LSTRAD: PREVIOUS ESTIMATE OF CEP                              |
C  |    RHO: COMPUTED VALUE OF CORRELATION COEFFICIENT                |
C  |    PROB: ACCUMULATES PROBABILITY OF CIRCLE ASSOCIATED WITH RADIUS|
C  |    LSTPRB: PROBABILITY ASSOCIATED WITH LSTRAD                    |
C  |    TMPRAD: TEMPORARY HOLDING VARIABLE FOR RADIUS                 |
C  |    NEWRAD: FUNCTION THAT RETURNS A NEW ESTIMATE OF RADIUS        |
C  |    CEP: SEE OUTPUT PARAMETERS                                    |
C  |    PRCEP: SEE OUTPUT PARAMETERS                                  |
C  |    SIGMA: ROOT-SUM-SQUARED ESTIMATE OF SIGMA USED TO SCALE RAW   |
C  |           DATA VALUES                                            |
C  |                                                                  |
C  |    ERROR: FLAG DESIGNATING IF PROCESSING IS TO CONTINUE          |
C  |    CHKERR: FUNCTION RETURNS A VALUE OF TRUE IF ESTIMATE IS NOT   |
C  |            SUFFICIENTLY TIGHT; FALSE OTHERWISE                   |
C  |                                                                  |
C  |    INCRMT: MESH SIZE OF SUMMATION PROCESS; DIVIDES POLAR PLANE   |
C  |            INTO N=INCRMT PIE SHAPED WEDGES                       |
C  |    INPUT: SEE INPUT PARAMETERS                                   |
C  |    SEED: SEE INPUT PARAMETERS                                    |
C  |------------------------------------------------------------------|
C
C OPEN(12,FILE='CBNCHK')
C
I = 1
```

```
      CALL INIT (ERROR,LSTRAD,RADIUS,DELTA,INCRMT,LSTPRB,INPUT,
     +                  RBAR,TBAR,SIGMAR,SIGMAT,RHO,SEED,SIGMA)

C     |-----------------------------------------------------------------|
C     |     THE FOLLOWING PSUEDO DO-WHILE LOOP IS CARRIED OUT WHILE THE CEP |
C     |     ESTIMATE IS NOT WITHIN THE TOLERANCE SPECIFIED IN FUNCTION  |
C     |     CHECKERROR BELOW.  ERROR IS INITIALIZED TO TRUE IN SUBROUTINE |
C     |     INITIALIZE.                                                 |
C     |                                                                 |
10      IF (ERROR) THEN

         CALL CALC (PROB,DELTA,RHO,SIGMAR,SIGMAT,RBAR,TBAR,
     +                  RADIUS,INCRMT)

         ERROR = CHKERR (PROB)
         TMPRAD = RADIUS
         RADIUS = NEWRAD (RADIUS,PROB,LSTRAD,LSTPRB)

         LSTRAD = TMPRAD
         LSTPRB = PROB
***********************************************
*  Some parameter sets cause an infinite loop where the difference
*  between .5 and the prob assoc with the current CEP is
*  never less than 0.0001.  Thus, after a few (200) tries at that,
*  I change the required difference to 0.1, and give it 1000 attempts
*  to converge.  If it still doesn't converge, I
*  let the estimate equal the current guess.
***********************************************
         I = I + 1
            IF (I.GT.50) THEN
      GO TO 20
         ENDIF

         GO TO 10
      ENDIF
C     |                                                                 |
C     |                                                                 |
C     |-----------------------------------------------------------------|
C     |   THE OUTPUT PARAMETERS ARE ASSIGNED THEIR VALUES HERE AFTER THE |
C     |   PROCESSING IS COMPLETE.                                       |
C     |                                                                 |

20    CEP = LSTRAD*SIGMA

***********************************
*  To reflect the problem with convergence for
*  high bias and high ellipticity sample sets.
***********************************

          IF ((ABS(CEP)).GT.10000) THEN
             CEP=0
          ENDIF

      PRCEP = LSTPRB
C
C           CLOSE(12)
C
      END
C     |                                                                 |
C     |-----------------------------------------------------------------|
C     |-----------------------------------------------------------------|
C     |             S U B R O U T I N E   I N I T I A L I Z E           |
C     |-----------------------------------------------------------------|
      SUBROUTINE INIT (ERROR,LSTRAD,RADIUS,DELTA,INCRMT,LSTPRB,
     +                  INPUT,RBAR,TBAR,SIGMAR,SIGMAT,RHO,SEED,SIGMA)
C     |                                                                 |
C     |                                                                 |
C     |     THIS SUBROUTINE INITIALIZES ALL VARIABLES TO THEIR RESPECTIVE |
C     |     STARTING VALUES.  NO NEW VARIABLES ARE DECLARED.  SCALING OF |
C     |     THE RAW DATA AS WELL AS DETERMINATION OF THE MESH SIZE TAKES |
```

```
C  |     PLACE IN THIS SUBROUTINE.                                      |
C  |                                                                    |
      REAL LSTRAD,RADIUS,DELTA,PI,LSTPRB,INPUT(5),
     +         RBAR,TBAR,SIGMAR,SIGMAT,RHO,SIGMA
C
      INTEGER INCRMT,SEED
C
      LOGICAL ERROR

C OPEN(12,FILE='FUNCHK')

C  |                                                                    |
C  |--------------------------------------------------------------------|
C  |                                                                    |
      PI = 3.14159265358979
      ERROR = .TRUE.
      LSTRAD = 0.0
      LSTPRB = 0.0
C  |--------------------------------------------------------------------|
C  |    SCALING                                                         |
C  |                                                                    |
      SIGMA = SQRT(INPUT(3)**2+INPUT(4)**2)
      RBAR = INPUT(1)/SIGMA
      TBAR = INPUT(2)/SIGMA
      SIGMAR = INPUT(3)/SIGMA
      SIGMAT = INPUT(4)/SIGMA
      RHO = INPUT(5)/(INPUT(4)*INPUT(3))
      RADIUS = REAL(SEED)/SIGMA
C  | ****************************************************************** |
C  |--------------------------------------------------------------------|
C  |   DEPENDING ON BIAS AND ELLIPTICITY, THIS SECTION DETERMINES       |
C  |   HOW FINE THE POLAR PLANE WILL BE DIVIDED (MESH SIZE).            |
C  |                                                                    |
      IF ((SQRT(RBAR**2+TBAR**2).GT.3.0).AND.(MAX(SIGMAR,SIGMAT)/
     +       MIN(SIGMAR,SIGMAT).GT.2.0)) THEN
         INCRMT = 75
      ELSE IF (((INPUT(4)/INPUT(3)).LT.0.1).OR.((INPUT(3)/INPUT(4))
     +     .LT.0.1).OR.(RHO.GT.0.99)) THEN
         INCRMT = 200
      ELSE IF (((INPUT(4)/INPUT(3)).LT.0.25).OR.((INPUT(3)/INPUT(4))
     +     .LT.0.25).OR.(RHO.GT.C.96)) THEN
         INCRMT = 100
            ELSE
               INCRMT = 30
      ENDIF

C  | ****************************************************************** |
C  |--------------------------------------------------------------------|
      DELTA = 2.0*PI/INCRMT
      END
C  |                                                                    |
C  |--------------------------------------------------------------------|
C  |--------------------------------------------------------------------|
C  |                  S U B R O U T I N E   C A L C                     |
C  |--------------------------------------------------------------------|
      SUBROUTINE CALC (PROB,DELTA,RHO,SIGMAR,SIGMAT,
     +                         RBAR,TBAR,RADIUS,INCRMT)
C  |                                                                    |
C  |   THIS SUBROUTINE PERFORMS THE NUMERICAL SUMMATION THAT CALCULATES |
C  |   THE AREA UNDER THE BIVARIATE CURVE FOR A CIRCLE WITH A SPECIFIED |
C  |   RADIUS.  THE FOLLOWING VARIABLES ARE DECLARED LOCAL TO THIS SUB- |
C  |   ROUTINE:                                                         |
C  |      A: HOLDING VARIABLE FOR THE FUNCTION ALPHA.                   |
C  |      B: HOLDING VARIABLE FOR THE FUNCTION BETA.                    |
C  |      C: HOLDING VARIABLE FOR THE FUNCTION GAMMA.                   |
C  |      D: CONSTANT PART OF THE SUMMATION THAT DOES NOT CHANGE FROM   |
C  |         INCREMENT TO INCREMENT.                                    |
C  |      E: HOLDING VARIABLE FOR THE ERROR FUNCTION.                   |
C  |      THETA: ANGULAR COUNTER (IN RADIANS) THAT REPRESENTS HOW FAR   |
C  |             AROUND THE CIRCLE THE SUMMATION HAS PROGRESSED.        |
C  |      ALPHA,BETA: FUNCTIONS OF THETA SPECIFIED IN THE TECHNICAL     |
C  |                  REFERENCE.                                        |
C  |      GAMMA: FUNCTION WHICH RETURNS A CONSTANT VALUE; SPECIFIED IN  |
```

```
C  |          THE TECHNICAL REFERENCE.                                  |
C  |      ERF: ERROR FUNCTION                                           |
C  |      ROOTA: HOLDING VARIABLE FOR THE SQUARE ROOT OF A.             |
C  |                                                                    |
C  |      J: SUMMATION LOOP COUNTER.                                    |
C  |                                                                    |
REAL PI,A,B,C,D,THETA,PROB,DELTA,RHO,SIGMAR,SIGMAT,
     +       RBAR,TBAR,ALPHA,BETA,GAMMA,ERF,RADIUS,ROOTA,E
C
INTEGER J,INCRMT
C  |                                                                    |
C  |--------------------------------------------------------------------|
C  |    THIS SECTION PERFORMS SOME INITIALIZATIONS                      |
C  |                                                                    |
PI = 3.14159265358979
D = -1.0 /(4*SQRT(PI)*SIGMAR*SIGMAT*SQRT(1-RHO**2))
C = GAMMA (RHO,SIGMAR,SIGMAT,RBAR,TBAR)
PROB = 0.0
THETA = 0.0
C  |--------------------------------------------------------------------|
C  |    THIS SECTION PERFORMS THE SUMMATION FROM THETA = 0 TO 2*PI OVER |
C  |    A CIRCLE OF RADIUS = RADIUS.                                    |
C  |                                                                    |
DO 10 J = 1,INCRMT

   A = ALPHA (RHO,SIGMAR,SIGMAT,THETA)
   B = BETA (RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR)
   ROOTA = SQRT(A)
           E =  ERF(RADIUS*ROOTA+B/ROOTA)-ERF(B/ROOTA)

           PROB = PROB + 1.0/A*EXP((B**2-A*C)/A)*(B/ROOTA*
     +             (E)+1.0/SQRT(PI)*(EXP(-A*(RADIUS**2)-2*B*RADIUS
     +              -(B**2)/A)-EXP(-(B**2)/A)))

   THETA = THETA + DELTA
C
10 CONTINUE


C  |--------------------------------------------------------------------|
C  |    CALCULATION OF TOTAL PROBABILITY ASSOCIATED WITH THE CIRCLE.    |
C  |                                                                    |
PROB = PROB*D*DELTA


END
C  |                                                                    |
C  |--------------------------------------------------------------------|
C  |--------------------------------------------------------------------|
C  |                    F U N C T I O N   E R F                         |
C  |--------------------------------------------------------------------|
REAL FUNCTION ERF (X)
C  |                                                                    |
C  |    THIS FUNCTION APPROXIMATES THE ERROR FUNCTION.  REFERENCE FOR   |
C  |    THE POLYNOMIAL APPROXIMATION IS THE NATIONAL BUREAU OF STDS.    |
C  |    HANDBOOK OF MATHEMATICAL FUNCTIONS BY ABRAMOWITZ AND STEEGUN.   |
C  |                                                                    |
C  |    V A R I A B L E S                                               |
C  |       X: VALUE FOR WHICH THE ERROR FUNCTION IS DETERMINED.         |
C  |       A(I): APPROXIMATION CONSTANTS SPECIFIED IN THE REFERENCE.    |
C  |       TEMP: TEMPORARY HOLDING VARIABLE FOR ERF.                    |
C  |                                                                    |
C  |    NOTE: IF THE ERROR FUNCTION PARAMETER IS GREATER THAN 4.0 OR    |
C  |    LESS THAN 1.0E-7, THE FUNCTION IS AUTOMATICALLY ASSIGNED A VALUE|
C  |    OF 1.0 OR 0.0 RESPECTIVELY.                                     |
C  |                                                                    |
REAL X, A1, A2, A3, A4, A5, A6, TEMP
C
PARAMETER (A1 = 0.0705230784,
     +             A2 = 0.0422820123,
     +             A3 = 0.0092705272,
     +             A4 = 0.0001520143,
     +             A5 = 0.0002765672,
```

```
     +              A6 = 0.0000430638)
C
         IF (ABS(X).GE.4.0) THEN
   ERF = SIGN(1.0,X)
ELSEIF (ABS(X).LE.1.0E-7) THEN
   ERF = 0.0
ELSE
           TEMP = 1.0 - 1.0/(1.0+A1*ABS(X)+A2*ABS(X)**2+A3*ABS(X)**3+
     +              A4*ABS(X)**4+A5*ABS(X)**5+A6*ABS(X)**6)**16
   ERF = SIGN(TEMP,X)
         ENDIF
END
C  |                                                                 |
C  |-----------------------------------------------------------------|
C  |-----------------------------------------------------------------|
C  |                    F U N C T I O N   A L P H A                  |
C  |-----------------------------------------------------------------|
REAL FUNCTION ALPHA (RHO,SIGMAR,SIGMAT,THETA)
C  |                                                                 |
C  |    THIS FUNCTION OF THETA IS SPECIFIED IN THE TECHNICAL REFERENCE. |
C  |    NO NEW VARIABLES ARE DECLARED.                               |
C  |                                                                 |
REAL RHO,SIGMAR,SIGMAT,THETA
C  |-----------------------------------------------------------------|
ALPHA = 1.0/(2.0*(1-RHO**2))*((SIN(THETA)/SIGMAR)**2-2*RHO*
     +          SIN(THETA)*COS(THETA)/(SIGMAR*SIGMAT)+(COS(THETA)
     +          /SIGMAT)**2)
END
C  |                                                                 |
C  |-----------------------------------------------------------------|
C  |-----------------------------------------------------------------|
C  |                    F U N C T I O N   B E T A                    |
C  |-----------------------------------------------------------------|
REAL FUNCTION BETA (RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR)
C  |                                                                 |
C  |    THIS FUNCTION OF THETA IS SPECIFIED IN THE TECHNICAL REFERENCE. |
C  |    NO NEW VARIABLES ARE DECLARED.                               |
C  |                                                                 |
REAL RHO,SIGMAR,SIGMAT,THETA,RBAR,TBAR
C  |-----------------------------------------------------------------|
BETA = -1.0/(2*(1-RHO**2))*(RBAR*SIN(THETA)/SIGMAR**2
     +         - RHO*(TBAR*SIN(THETA)+RBAR*COS(THETA))/(SIGMAR*
     +         SIGMAT)+TBAR*COS(THETA)/SIGMAT**2)
END
C  |                                                                 |
C  |-----------------------------------------------------------------|
C  |                    F U N C T I O N   G A M M A                  |
C  |-----------------------------------------------------------------|
REAL FUNCTION GAMMA (RHO,SIGMAR,SIGMAT,RBAR,TBAR)
C  |                                                                 |
C  |    THIS FUNCTION RETURNS A CONSTANT VALUE FOR A GIVEN CASE.  IT IS |
C  |    SPECIFIED IN THE TECHNICAL REFERENCE.  NO NEW VARIABLES ARE  |
C  |    DECLARED.                                                    |
C  |                                                                 |
REAL RHO,SIGMAR,SIGMAT,RBAR,TBAR
C  |-----------------------------------------------------------------|
GAMMA = 1.0/(2*(1-RHO**2))*((RBAR/SIGMAR)**2-2*RHO*RBAR*TBAR/
     +         (SIGMAR*SIGMAT)+(TBAR/SIGMAT)**2)
END
C  |                                                                 |
C  |-----------------------------------------------------------------|
C  |-----------------------------------------------------------------|
C  |                F U N C T I O N   C H E C K E R R O R            |
C  |-----------------------------------------------------------------|
LOGICAL FUNCTION CHKERR (PROB)
C  |                                                                 |
C  |    THIS LOGICAL FUNCTION RETURNS A TRUE IF THE CALCULATED PROB- |
C  |    ABILITY DIFFERS BY MORE THAN THE SPECIFIED TOLERANCE FROM THE |
C  |    TRUE CEP PROBABILITY OF 0.5.  A TRUE MEANS THE PROCESSING CON- |
C  |    TINUES AND A NEW RADIUS IS CALCULATED. THE VARIABLE PRBERR   |
C  |    SPECIFIES WHAT THE TOLERANCE IS.                             |
C  |                                                                 |
     REAL PROB,PRBERR
```

```
C |------------------------------------------------------------------|
PRBERR = 0.0001
CHKERR = (ABS(0.5-PROB).GT.PRBERR)
END
C |                                                                  |
C |------------------------------------------------------------------|
C |------------------------------------------------------------------|
C |             F U N C T I O N   N E W   R A D I U S                |
C |------------------------------------------------------------------|
        REAL FUNCTION NEWRAD (RADIUS,PROB,LSTRAD,LSTPRB)
C |                                                                  |
C |    THIS FUNCTION USES THE SECANT METHOD (MODIFIED) TO DETERMINE A |
C |    NEW RADIUS.  IF THE LAST RADIUS AND THE CURRENT RADIUS BOTH    |
C |    GIVE PROBABILITIES CLOSE TO 1.0 (I.E., THE TWO RADIUSES ARE FAR |
C |    OUT ON THE DISTRIBUTION CURVE), THE NEW RADIUS IS GIVEN AS HALF |
C |    THE DURRENT RADIUS TO AVOID DIVISION BY ZERO.  IN ADDITION, IF |
C |    THE NEW RADIUS IS CALCULATED TO BE LESS THAN 0.0, THE NEW RADIUS|
C |    IS RESPECIFIED TO BE HALF THE CURRENT RADIUS;  THE NEW VARIABLE |
C |    TEMP FACILITATES THIS CHECK.                                   |
C |                                                                  |
REAL RADIUS,PROB,LSTRAD,LSTPRB,TEMP
C |------------------------------------------------------------------|
IF ((PROB.GT.0.98).AND.(LSTPRB.GT.0.98)) THEN
   NEWRAD = RADIUS/2.0
ELSE
   TEMP = (RADIUS-LSTRAD)/(PROB-LSTPRB)*(0.5-PROB)
     +              +RADIUS
           IF (TEMP.LT.0.0) THEN
      NEWRAD = RADIUS/2.0
   ELSE
      NEWRAD = TEMP
   ENDIF
ENDIF

  END
C |                                                                  |
C |------------------------------------------------------------------|
C | E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D    |
C |------------------------------------------------------------------|


*****************************************************************************
 SUBROUTINE MUVAR (SCORES,PARS)
C
 REAL S11,S12,S13,S14,S15
 REAL XBAR,YBAR,SX,SY,SXY,RHO
 INTEGER N1,CNTR,I,SCORES(16,2),PARS(5)


 S11 = 0.
 S12 = 0.
 S13 = 0.
 S14 = 0.
 S15 = 0.
 XBAR = 0.
 YBAR = 0.
 SX = 0.
 SY = 0.
 SXY = 0.
        N1 = SCORES(1,1)
 CNTR = REAL(SCORES(1,1))

C
 DO 20 I=2,N1+1

S11 = S11 + REAL(SCORES(I,1))
S12 = S12 + REAL(SCORES(I,2))
              S13 = S13 + REAL(SCORES(I,1) * SCORES(I,1))
S14 = S14 + REAL(SCORES(I,2) * SCORES(I,2))
S15 = S15 + REAL(SCORES(I,1) * SCORES(I,2))
C
20  CONTINUE
```

```
          XBAR = S11/CNTR
      YBAR = S12/CNTR
      SX = SQRT((S13-CNTR*XBAR*XBAR)/(CNTR-1.))+1.
      SY = SQRT((S14-CNTR*YBAR*YBAR)/(CNTR-1.))+1.
      SXY = (S15-CNTR*XBAR*YBAR)/(CNTR-1.)
      RHO = SXY/(SX*SY)

 PARS(1) = NINT(XBAR)
 PARS(2) = NINT(YBAR)
 PARS(3) = NINT(SX)
 PARS(4) = NINT(SY)
 PARS(5) = NINT(SXY)

 RETURN

 END

**********************************************************************

     SUBROUTINE NUMED(SCORES,MRM,MED,MRMSQ)

   INTEGER MRM,MED,N1,MRM1,MRM2,A,T1
   INTEGER MRMSQ,CNTR,I,J,SCORES(16,2)


 OPEN(11,FILE='MRM.DAT',FORM='FORMATTED')
C
   N1 = SCORES(1,1)

 WRITE(11,'(I6)') N1
C
 CNTR = 0
 MRM = 0
 MRMSQ = 0
C
 DO 10 I=2,(N1+1)

    A = NINT(SQRT(REAL(SCORES(I,1))**2 +
     +                       REAL(SCORES(I,2))**2))
    MRM = MRM + A
    MRMSQ = MRMSQ + NINT(REAL(A**2))

    WRITE(11,'(I6)') A

10  CONTINUE
C
 MRM = NINT(REAL(MRM)/REAL(N1))
 MRMSQ = NINT(1.1774*(SQRT(REAL(MRMSQ)/(2.*REAL(N1)-1.))))

 REWIND 11
 READ(11,'(I6)') N1

 OPEN(10,FILE='TEMP.DAT',ACCESS='DIRECT',
     +    FORM='FORMATTED',RECL=6)

 WRITE(10,'(I6)',REC=1) N1

 DO 20 I=2,N1+1

    READ(11,'(I6)') T1
    WRITE(10,'(I6)',REC=I) T1

20  CONTINUE


 DO 40 I=2,N1+1

    DO 30 J=I+1,N1+1

       READ(10,'(I6)',REC=I) MRM1
       READ(10,'(I6)',REC=J) MRM2
```

```
       IF (NRM1 .GT. NRM2) THEN

      WRITE(10,'(I6)',REC=I) NRM2
  WRITE(10,'(I6)',REC=J) NRM1

  NRM1 = NRM2

       ENDIF

30     CONTINUE

40  CONTINUE

 READ(10,'(I6)',REC=NINT(REAL(N1+1)/2.)) MED

 REWIND 11
 WRITE(11,'(I6)') N1

 DO 50 I=2,N1+1

 READ(10,'(I6)',REC=I) T1
 WRITE(11,'(I6)')T1

50  CONTINUE

 CLOSE(11)
 CLOSE(10,STATUS='DELETE')

   RETURN
 END

**********************************************************************
 SUBROUTINE R234(RPARS,CEP1,CEPMPI,V2)

 REAL CEPMPI,ELLIP,BIAS,V2

 INTEGER RPARS,CEP1
 DIMENSION RPARS(5)

        CALL MPICEP(RPARS(3),RPARS(4),ELLIP,CEPMPI)

 BIAS = SQRT((REAL(RPARS(1))**2) + (REAL(RPARS(2))**2))

 V2 = BIAS/CEPMPI

      CEP1 = NINT(CEPMPI*(1.0039 - 0.0528*V2 + 0.478*(V2**2)
     +    - 0.0793*(V2**3)))

****************************************
*  This technique returns a negative value when the ratio (V2) of
*  bias to the special combination of variances (CEPMPI) becomes
*  large.  By returning a zero value for these I set up a more
*  uniform response which is also more countable.
****************************************

        IF (CEP1.LT. 0) THEN
          CEP1=0
        ENDIF

 END

*******************************************************************
      SUBROUTINE MPICEP(RP3,RP4,ELLIP,CEPMPI)
C
      REAL CEPMPI,ELLIP
C
      INTEGER RP3,RP4
C
      IF (RP3 .LE. RP4) THEN
```

```
         CEPMPI = 0.614*REAL(RP3) + 0.563*REAL(RP4)
         ELLIP = REAL(RP3)/REAL(RP4)
      ELSE
         CEPMPI = 0.614*REAL(RP4) + 0.563*REAL(RP3)
         ELLIP = REAL(RP4)/REAL(RP3)
      ENDIF
C
      END


*************************************************************************
 SUBROUTINE GRUBBSWH(RPARS,CEP2)

 REAL M,V,S12,S22,B12,B22

 INTEGER RPARS,CEP2
 DIMENSION RPARS(5)

 S12 = REAL(RPARS(3))*REAL(RPARS(3))
 S22 = REAL(RPARS(4))*REAL(RPARS(4))

 B12 = REAL(RPARS(1))*REAL(RPARS(1))
 B22 = REAL(RPARS(2))*REAL(RPARS(2))

 M = S12+S22+B12+B22
 V = 2.*(S12*S12 + S22*S22) + 4.*(S12*B12 + S22*B22)

 CEP2 = NINT(SQRT(M*(1.-V/(9.*M*M))**3.))

 END

***************************************************************************

SUBROUTINE ETHRIDGE(CEP5)

REAL T(15),SSQR,TBAR,DIFSUM,KDIFSUM,KNUMER,KDENOM
REAL DDIFSUM,D(15),W(15),MOOHAT,DSUM,K,SUM,TDOT
INTEGER N1,R(15),I,J,CEP5
C
C DOUBLE PRECISION T(15),SSQR,TBAR,DIFSUM,KDIFSUM
C DOUBLE PRECISION DDIFSUM,D(15),W(15),MOOHAT,DSUM
C DOUBLE PRECISION KNUMER,KDENOM,K,SUM,TDOT

SUM=0
TBAR = 0.
SSQR=0.
DIFSUM=0.
DDIFSUM=0.
TDOT = 0.
KDIFSUM = 0.
KNUMER=0.
KDENOM=0.
MOOHAT = 0.
DSUM = 0.
N1=0
K=0

DO 5 I = 1,15
    R(I)=0
    T(I)=0.
            D(I)=0.
    W(I)=0.
5 CONTINUE

***********************************
*    The subroutine MUMED creates a file called MRM.DAT.
*    This file has the sample size (N1) and the mean radial
*    miss distances for each pair of cross and downrange
*    error scores in each sample.  Since MUMED is invoked
*    before this routine, I can use that file to calculate the
*    Ethridge estimator.   MRM.DAT also has the radial miss
*    distances sorted from smallest to largest, so finding the
```

```
*    is simplified.  Here I read the sample size into N1, and the
*    radial miss distances into R.
**********************************

OPEN(11,FILE='MRM.DAT',FORM='FORMATTED')

     READ(11,10) N1

     READ(11,10) (R(I),I=1,N1)

CLOSE(11)

10 FORMAT(I6)


************************************
*   The basic unit of the Ethridge estimator is the natural
*   log of the radial miss distance.  I calculate that here
*   and feed the result into the vector T.
************************************

        DO 20 I = 1, N1

     T(I) = LOG(REAL(R(I)))

20 CONTINUE

************************************
*  Now I sum them in preparation for taking their mean
*  and variance:TBAR and SSQR.
************************************

        DO 30 I = 1, N1

     SUM = SUM + T(I)

30 CONTINUE

TBAR = SUM/(REAL(N1))

  DO 40 I = 1, N1

             DIFSUM = DIFSUM + (T(I) - TBAR)**2

40 CONTINUE

SSQR = DIFSUM/(REAL(N1-1))

**************************************
*  Now I find the median (TDOT) of the ln(radial miss) datum.
*  Since most sample sizes are odd (only SS=10 is even) this
*  is easy.
**************************************

IF ((REAL(N1/2)).NE.5.0) THEN

     TDOT = T((N1+1)/2)

ELSE

     I=(N1/2)

         J=(N1/2)+1

     TDOT = (T(I) + T(J))/2.

END IF

*************************************
*   Now I find the sample kurtosis (K).  I use a previous result
*   for the denominator.
```

```
*************************************
KDENOM = DIFSUM**2
DO 50 I = 1, N1
             KDIFSUM = KDIFSUM + (T(I) - TBAR)**4
50 CONTINUE
KNUMER=(REAL(N1))*KDIFSUM
K = KNUMER/KDENOM
*************************************
*   Now I have all the pieces to begin building up to the
*   Ethridge estimator.  First I select d.i.
*************************************
DO 60 I = 1, N1
             DDIFSUM = (T(I) - TDOT)**2
     IF((1-(.03*((K-3)**3)*DDIFSUM)/SSQR).GT.0.01) THEN
          D(I) = (1-(.03*((K-3)**3)*DDIFSUM)/SSQR)
     ELSE
  D(I) = 0.01
     END IF
60 CONTINUE
*************************************
*   Now I sum their reciprocals for the numerator expression
*   in w.i (W).
*************************************
DO 70 J = 1, N1
     DSUM = DSUM + (1./D(J))
70 CONTINUE

DO 80 I = 1, N1
     W(I) = (1./D(I))/DSUM
80 CONTINUE
*****************************************
* This final summation calculates mu.
*****************************************
DO 90 I = 1, N1
     MOOHAT = MOOHAT + W(I)*T(I)
90 CONTINUE
CEP5 = NINT(EXP(MOOHAT))
END
*************************************************************************
C  |                                                                    |
C  |--------------------------------------------------------------------|
C  | E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D      |
C  |--------------------------------------------------------------------|
```

Appendix E. Factorial Design Strategy

To construct a factorial design, determine the factor levels, then hold the first variable constant while the second cycles through its levels. Then, increment the first to its next level, cycle the second once more. In this way we proceed logically through all combinations of the factors' levels.

In the case of four factors, three remain constant while the fourth cycles through its levels. Then we increment the third to its next level, and allow the fourth to cycle once more. We repeat this process until the factors have cycled through every possible combination of their different levels. Table E.1, extracted from columns six through eight in Appendix G, illustrates the factorial strategy involved in creating the first 30 coordinates of the design space.

The first 25 design points hold bias and sample size constant while cycling through all the combinations of *STDR* and correlation. At test point #26, bias assumes its next value, and the process repeats itself. After test point 175, having cycled through all the combinations of characteristic values, sample size can now change from 3 to 5, and the previous 175 points repeat for the new sample size. Appendices I through N have all 875 test points listed in their leftmost columns.

Table E.1. Factorial Strategy for Design Space

DESIGN POINT	SAMPLE SIZE	BIAS	STDR	CORRELATION
1	3	0.00	1.00	0.00
2	3	0.00	1.00	0.40
3	3	0.00	1.00	0.70
4	3	0.00	1.00	0.85
5	3	0.00	1.00	0.99
6	3	0.00	0.80	0.00
7	3	0.00	0.80	0.40
8	3	0.00	0.80	0.70
9	3	0.00	0.80	0.85
10	3	0.00	0.80	0.99
11	3	0.00	0.60	0.00
12	3	0.00	0.60	0.40
13	3	0.00	0.60	0.70
14	3	0.00	0.60	0.85
15	3	0.00	0.60	0.99
16	3	0.00	0.40	0.00
17	3	0.00	0.40	0.40
18	3	0.00	0.40	0.70
19	3	0.00	0.40	0.85
20	3	0.00	0.40	0.99
21	3	0.00	0.20	0.00
22	3	0.00	0.20	0.40
23	3	0.00	0.20	0.70
24	3	0.00	0.20	0.85
25	3	0.00	0.20	0.99
26	3	0.25	1.00	0.00
27	3	0.25	1.00	0.40
28	3	0.25	1.00	0.70
29	3	0.25	1.00	0.85
30	3	0.25	1.00	0.99

Appendix F. Checking Large Sample Integrity

This Appendix lists the FORTRAN code used to read in the 175 different combinations of characteristic values, generate a sample of 2000 miss distance coordinates from them, then calculate the characteristics from the sample of 2000 miss distance coordinates to assure their agreement with the input characteristics.

F.1 FORTRAN Code

```
      PROGRAM POPCHECKER

      INTEGER S,T,U,I,J
      INTEGER BEGINPT,ENDPT
C
      REAL XBAR,YBAR
      REAL S13,SAMP(2000,2), SAMPRAMS(3),S15,RHO
      REAL S14,DAT(175,3),SUMX,SUMY,SX,SY,BIASX,BIASY
      REAL SIGMAPOOLED,ELLIP,SXY,BIASXY


 WRITE(*,*) 'ENTER BEGINNING PT'
 READ(*,*) BEGINPT
 WRITE(*,*) 'ENTER ENDING PT'
 READ(*,*) ENDPT
************************************************************
*   Here I'll open a 175X3 file of bias, ellipticity, and correlation
*   parameters and read them into a matrix for reference during
*   the outermost loop below.
************************************************************

          OPEN(3,FILE='SPARAMS',FORM='FORMATTED')
          READ(3,9) ((DAT(I,J),J=1,3),I=1,175)

          CLOSE(3)

9       FORMAT(F4.2,1X,F4.2,1X,F4.2)

           OPEN(9,FILE='SAMP.DAT',STATUS='UNKNOWN',FORM='FORMATTED')


**************************************************
*   This greater loop calls the routine samplemaker with a different
*   set of bias, ellipticity, and correlation parameters each time.
**************************************************

C       DO 100 S = 1, 666

         DO 99 J=1,3
           SAMPRAMS(J) = DAT(1,J)
99       CONTINUE

           CALL SAMPLEMAKER(SAMPRAMS,SAMP)

 DO 98 I = 1,3

    SUMX=SUMX+SAMP(I,1)
    SUMY=SUMY+SAMP(I,2)
```

```
          S15 = S15 + SAMP(I,1) * SAMP(I,2)
98 CONTINUE
            XBAR = SUMX/3.
   YBAR = SUMY/3.

DO 97 I = 1,3
          S13 = S13 + (SAMP(I,1) - XBAR)**2
            S14 = S14 + (SAMP(I,2) - YBAR)**2
97 CONTINUE
    SX = SQRT((S13)/(3.-1.))
    SY = SQRT((S14)/(3.-1.))
    SXY = (S15-3.*XBAR*YBAR)/(3.-1.)
    RHO = SXY/(SX*SY)
ELLIP = SY/SX
        SIGMAPOOLED = SQRT((SX**2+SY**2)/2.)

        BIASXY =  (SQRT(XBAR**2+YBAR**2))/SIGMAPOOLED

WRITE(9,19) BIASXY,RHO,ELLIP
19       FORMAT(F6.4,2X,F6.4,2X,F6.4)
100 CONTINUE

CLOSE(9)
      END
*************************************************************************

        SUBROUTINE SAMPLEMAKER(SAMPRAMS,R)
C  THIS ITERATION OF THE IMSL ROUTINE RMNVN PROVIDES 2000
C  DOWN AND CROSSRANGE MISS DATA WITH THE STANDARD DEVIATION
C  OF 1000/1.1774 FOR THE CROSSRANGE DATA POINTS AND A SCALED
C  VARIANCE FOR THE DOWNRANGE POINTS BASED ON THE PARAMETERS OF
C  THE DESIGN POINT.  THE CORRELATION AND IS ALSO SCALED.  AFTER
C  CREATION OF THE DATA, THE BIAS, AS A FUNCTION OF THE POOLED
C  VARIANCES, IS ADDED TO THE CROSSRANGE SCORES.



      INTEGER   I, IRANK,ISEED, K, LDR, LDRSIG, NOUT, NR,J
REAL      COV(2,2), R(2000,2), RSIG(2,2),SAMPRAMS(3)
        REAL      SIGMAPOOLED,BIAS,STDEV
EXTERNAL  CHFAC, RNMVN, RNSET, UMACH

CALL UMACH(2,NOUT)
NR       =2000
K        =2
LDRSIG   =2
LDR      =2000

DO 10 I = 1,2
    DO 15 J = 1,2
   COV(I,J) = 0
15     CONTINUE
10 CONTINUE

BIAS = 0
```

```
SIGMAPOOLED = 0
*****************************************************
* Here I scale the variances and covariances based on the level of
* ellipticity and correlation desired.
*****************************************************
STDEV = 1000/1.1774

COV(1,1) = STDEV**2
COV(2,2) =((SAMPRAMS(3))*STDEV)**2
COV(1,2) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))
COV(2,1) =(SAMPRAMS(2))*(SQRT(COV(1,1)))*(SQRT(COV(2,2)))


****************************************************
*  HERE I POOL THE VARIANCES!
****************************************************

        SIGMAPOOLED = SQRT((COV(1,1)+COV(2,2))/2.)

        BIAS =  (SAMPRAMS(1))*SIGMAPOOLED

CALL CHFAC  (K, COV, 2, 0.00001, IRANK, RSIG, LDRSIG)

ISEED = 123457
CALL RNSET(ISEED)
CALL RNMVN (NR, K, RSIG, LDRSIG, R, LDR)

******************************************************
* Here I add in the bias to the crossrange coordinate only.
* Other schemes are possible for inducing bias, but this seems
* the most direct.
******************************************************

       DO 89 I=1,NR
           R(I,1) = R(I,1) + BIAS
89     CONTINUE

       END

******************************************************************

 SUBROUTINE MUVAR (SCORES,PARS)
C
 REAL S11,S12,S13,S14,S15
 REAL XBAR,YBAR,SX,SY,SXY,RHO
 INTEGER N1,CNTR,I,SCORES(16,2),PARS(5)

        N1 = SCORES(1,1)
 CNTR = REAL(SCORES(1,1))

C
 DO 20 I=2,N1+1

S11 = S11 + REAL(SCORES(I,1))
S12 = S12 + REAL(SCORES(I,2))
             S13 = S13 + REAL(SCORES(I,1) * SCORES(I,1))
S14 = S14 + REAL(SCORES(I,2) * SCORES(I,2))
S15 = S15 + REAL(SCORES(I,1) * SCORES(I,2))
C
20  CONTINUE

          XBAR = S11/CNTR
    YBAR = S12/CNTR
    SX = SQRT((S13-CNTR*XBAR*XBAR)/(CNTR-1.))+1.
    SY = SQRT((S14-CNTR*YBAR*YBAR)/(CNTR-1.))+1.
    SXY = (S15-CNTR*XBAR*YBAR)/(CNTR-1.)
    RHO = SXY/(SX*SY)

 PARS(1) = NINT(XBAR)
 PARS(2) = NINT(YBAR)
```

```
      PARS(3) = NINT(SX)
      PARS(4) = NINT(SY)
      PARS(5) = NINT(SXY)

      RETURN

      END

**********************************************************************
*************************************************************************
C   |                                                                    |
C   |--------------------------------------------------------------------|
C   | E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D  E N D      |
C   |--------------------------------------------------------------------|
```

F.2 Input and Output Characteristics

Here are displayed the results of the above program, with the input characterisitc values in the "IN" column, and the characteristics calculated from a sample of 2000 generated from those inputs in the "OUT" column.

BIAS		CORR		ELLIP	
IN	OUT	IN	OUT	IN	OUT
0.00	0.00	0.00	-.04	1.00	0.98
0.00	0.00	0.40	0.38	1.00	0.97
0.00	0.00	0.70	0.69	1.00	0.97
0.00	0.00	0.85	0.85	1.00	0.98
0.00	0.00	0.99	0.99	1.00	0.99
0.00	0.00	0.00	-.04	0.80	0.78
0.00	0.00	0.40	0.38	0.80	0.78
0.00	0.00	0.70	0.69	0.80	0.78
0.00	0.00	0.85	0.85	0.80	0.78
0.00	0.00	0.99	0.99	0.80	0.80
0.00	-.01	0.00	-.04	0.60	0.59
0.00	-.01	0.40	0.38	0.60	0.58
0.00	-.01	0.70	0.69	0.60	0.58
0.00	-.01	0.85	0.85	0.60	0.59
0.00	-.01	0.99	0.99	0.60	0.60
0.00	-.01	0.00	-.04	0.40	0.39
0.00	-.01	0.40	0.38	0.40	0.39
0.00	-.01	0.70	0.69	0.40	0.39
0.00	-.01	0.85	0.85	0.40	0.39
0.00	-.01	0.99	0.99	0.40	0.40
0.00	-.01	0.00	-.04	0.20	0.20
0.00	-.01	0.40	0.38	0.20	0.19
0.00	-.01	0.70	0.69	0.20	0.19
0.00	-.01	0.85	0.85	0.20	0.20
0.00	-.01	0.99	0.99	0.20	0.20
0.25	0.25	0.00	-.04	1.00	0.98
0.25	0.25	0.40	0.38	1.00	0.97
0.25	0.25	0.70	0.69	1.00	0.97
0.25	0.25	0.85	0.85	1.00	0.98
0.25	0.24	0.99	0.99	1.00	0.99
0.25	0.25	0.00	-.04	0.80	0.78
0.25	0.25	0.40	0.38	0.80	0.78
0.25	0.25	0.70	0.69	0.80	0.78
0.25	0.25	0.85	0.85	0.80	0.78
0.25	0.24	0.99	0.99	0.80	0.80
0.25	0.24	0.00	-.04	0.60	0.59
0.25	0.24	0.40	0.38	0.60	0.58
0.25	0.24	0.70	0.69	0.60	0.58
0.25	0.24	0.85	0.85	0.60	0.59
0.25	0.24	0.99	0.99	0.60	0.60
0.25	0.24	0.00	-.04	0.40	0.39
0.25	0.24	0.40	0.38	0.40	0.39
0.25	0.24	0.70	0.69	0.40	0.39
0.25	0.24	0.85	0.85	0.40	0.39
0.25	0.24	0.99	0.99	0.40	0.40
0.25	0.24	0.00	-.04	0.20	0.20
0.25	0.24	0.40	0.38	0.20	0.19
0.25	0.24	0.70	0.69	0.20	0.19
0.25	0.24	0.85	0.85	0.20	0.20
0.25	0.24	0.99	0.99	0.20	0.20
0.50	0.50	0.00	-.04	1.00	0.98
0.50	0.50	0.40	0.38	1.00	0.97

0.50	0.50	0.70	0.69	1.00	0.97
0.50	0.50	0.85	0.85	1.00	0.98
0.50	0.49	0.99	0.99	1.00	0.99
0.50	0.50	0.00	-.04	0.80	0.78
0.50	0.50	0.40	0.38	0.80	0.78
0.50	0.50	0.70	0.69	0.80	0.78
0.50	0.50	0.85	0.85	0.80	0.78
0.50	0.49	0.99	0.99	0.80	0.80
0.50	0.49	0.00	-.04	0.60	0.59
0.50	0.50	0.40	0.38	0.60	0.58
0.50	0.49	0.70	0.69	0.60	0.58
0.50	0.49	0.85	0.85	0.60	0.59
0.50	0.49	0.99	0.99	0.60	0.60
0.50	0.49	0.00	-.04	0.40	0.39
0.50	0.49	0.40	0.38	0.40	0.39
0.50	0.49	0.70	0.69	0.40	0.39
0.50	0.49	0.85	0.85	0.40	0.39
0.50	0.49	0.99	0.99	0.40	0.40
0.50	0.49	0.00	-.04	0.20	0.20
0.50	0.49	0.40	0.38	0.20	0.19
0.50	0.49	0.70	0.69	0.20	0.19
0.50	0.49	0.85	0.85	0.20	0.20
0.50	0.49	0.90	0.90	0.20	0.20
0.75	0.75	0.00	-.04	1.00	0.98
0.75	0.75	0.40	0.38	1.00	0.97
0.75	0.75	0.70	0.69	1.00	0.97
0.75	0.75	0.85	0.85	1.00	0.98
0.75	0.74	0.99	0.99	1.00	0.99
0.75	0.75	0.00	-.04	0.80	0.78
0.75	0.75	0.40	0.38	0.80	0.78
0.75	0.75	0.70	0.69	0.80	0.78
0.75	0.75	0.85	0.85	0.80	0.78
0.75	0.74	0.99	0.99	0.80	0.80
0.75	0.74	0.00	-.04	0.60	0.59
0.75	0.75	0.40	0.38	0.60	0.58
0.75	0.75	0.70	0.69	0.60	0.58
0.75	0.74	0.85	0.85	0.60	0.59
0.75	0.74	0.99	0.99	0.60	0.60
0.75	0.74	0.00	-.04	0.40	0.39
0.75	0.74	0.40	0.38	0.40	0.39
0.75	0.74	0.70	0.69	0.40	0.39
0.75	0.74	0.85	0.85	0.40	0.39
0.75	0.74	0.99	0.99	0.40	0.40
0.75	0.74	0.00	-.04	0.20	0.20
0.75	0.74	0.40	0.38	0.20	0.19
0.75	0.74	0.70	0.69	0.20	0.19
0.75	0.74	0.85	0.85	0.20	0.20
0.75	0.74	0.99	0.99	0.20	0.20
1.00	1.00	0.00	-.04	1.00	0.98
1.00	1.00	0.40	0.38	1.00	0.97
1.00	1.00	0.70	0.69	1.00	0.97
1.00	1.00	0.85	0.85	1.00	0.98
1.00	0.99	0.99	0.99	1.00	0.99
1.00	1.00	0.00	-.04	0.80	0.78
1.00	1.00	0.40	0.38	0.80	0.78
1.00	1.00	0.70	0.69	0.80	0.78
1.00	1.00	0.85	0.85	0.80	0.78
1.00	0.99	0.99	0.99	0.80	0.80
1.00	0.99	0.00	-.04	0.60	0.59
1.00	1.00	0.40	0.38	0.60	0.58
1.00	1.00	0.70	0.69	0.60	0.58
1.00	0.99	0.85	0.85	0.60	0.59
1.00	0.99	0.99	0.99	0.60	0.60
1.00	0.99	0.00	-.04	0.40	0.39
1.00	0.99	0.40	0.38	0.40	0.39
1.00	0.99	0.70	0.69	0.40	0.39
1.00	0.99	0.85	0.85	0.40	0.39
1.00	0.99	0.99	0.99	0.40	0.40
1.00	0.99	0.00	-.04	0.20	0.20
1.00	0.99	0.40	0.38	0.20	0.19
1.00	0.99	0.70	0.69	0.20	0.19
1.00	0.99	0.85	0.85	0.20	0.20
1.00	0.99	0.99	0.99	0.20	0.20
1.50	1.50	0.00	-.04	1.00	0.98
1.50	1.51	0.40	0.38	1.00	0.97
1.50	1.51	0.70	0.69	1.00	0.97
1.50	1.50	0.85	0.85	1.00	0.98
1.50	1.49	0.99	0.99	1.00	0.99
1.50	1.50	0.00	-.04	0.80	0.78
1.50	1.50	0.40	0.38	0.80	0.78
1.50	1.50	0.70	0.69	0.80	0.78
1.50	1.50	0.85	0.85	0.80	0.78
1.50	1.49	0.99	0.99	0.80	0.80
1.50	1.49	0.00	-.04	0.60	0.59
1.50	1.50	0.40	0.38	0.60	0.58
1.50	1.50	0.70	0.69	0.60	0.58
1.50	1.49	0.85	0.85	0.60	0.59
1.50	1.49	0.99	0.99	0.60	0.60
1.50	1.49	0.00	-.04	0.40	0.39
1.50	1.49	0.40	0.38	0.40	0.39
1.50	1.49	0.70	0.69	0.40	0.39
1.50	1.49	0.85	0.85	0.40	0.39

1.50	1.48	0.99	0.99	0.40	0.40
1.50	1.48	0.00	-.04	0.20	0.20
1.50	1.49	0.40	0.38	0.20	0.19
1.50	1.49	0.70	0.69	0.20	0.19
1.50	1.48	0.85	0.85	0.20	0.20
1.50	1.48	0.99	0.99	0.20	0.20
2.00	2.00	0.00	-.04	1.00	0.98
2.00	2.01	0.40	0.38	1.00	0.97
2.00	2.01	0.70	0.69	1.00	0.97
2.00	2.00	0.85	0.85	1.00	0.98
2.00	1.99	0.99	0.99	1.00	0.99
2.00	2.00	0.00	-.04	0.80	0.78
2.00	2.00	0.40	0.38	0.80	0.78
2.00	2.00	0.70	0.69	0.80	0.78
2.00	2.00	0.85	0.85	0.80	0.78
2.00	1.99	0.99	0.99	0.80	0.80
2.00	1.99	0.00	-.04	0.60	0.59
2.00	2.00	0.40	0.38	0.60	0.58
2.00	2.00	0.70	0.69	0.60	0.58
2.00	1.99	0.85	0.85	0.60	0.59
2.00	1.98	0.99	0.99	0.60	0.60
2.00	1.99	0.00	-.04	0.40	0.39
2.00	1.99	0.40	0.38	0.40	0.39
2.00	1.99	0.70	0.69	0.40	0.39
2.00	1.99	0.85	0.85	0.40	0.39
2.00	1.98	0.99	0.99	0.40	0.40
2.00	1.98	0.00	-.04	0.20	0.20
2.00	1.98	0.40	0.38	0.20	0.19
2.00	1.98	0.70	0.69	0.20	0.19
2.00	1.98	0.85	0.85	0.20	0.20
2.00	1.98	0.99	0.99	0.20	0.20

Appendix G. Comparative Summary

This Appendix lists the CEP estimates from each technique for each of the 875 test design points. The names of the four parameters and the names of the CEP estimation methods for this experiment are abbreviated in the table headings as follows:

<u>Index</u>

Design Point - DP

<u>Sample Considerations</u>

Total Number of Samples Used at DP - SU

Number of Samples Rejected by CBN at DP - SRC

Number of Samples Rejected by R234 at DP - SRR

<u>Factor Levels</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Target</u>

Population CEP - CEPp

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/Wilson-Hilferty method - Grubbs

Correlated Bivariate Normal method - CBN

Rayleigh method - RAYL

Ethridge method - Eth

DP	SU	SRC	SRR	SS	Bias	STDR	Corr	CE[illegible]	[illegible]34	Grubbs	CBE	RAYL	Eth
1	666	0	32	3	0.00	1.00	0.00	1000	1002.8	1052.5	1031.2	997.9	969.4
2	666	0	38	3	0.00	1.00	0.40	973	982.8	1035.5	1014.3	984.9	951.3
3	666	0	44	3	0.00	1.00	0.70	908	947.3	1002.1	980.7	961.2	909.6
4	666	0	62	3	0.00	1.00	0.85	857	917.1	975.2	954.2	942.6	873.7
5	664	2	93	3	0.00	1.00	0.99	813	858.3	939.1	923.1	911.9	800.2
6	666	0	33	3	0.00	0.80	0.00	898	905.8	950.8	931.4	902.2	874.5
7	666	0	37	3	0.00	0.80	0.40	874	886.9	936.2	916.9	391.3	858.4
8	666	0	45	3	0.00	0.80	0.70	818	865.6	906.8	887.4	870.6	822.2
9	666	0	60	3	0.00	0.80	0.85	774	828.5	883.1	864.0	853.8	790.0
10	666	0	93	3	0.00	0.80	0.99	736	777.4	852.1	837.2	827.1	725.8
11	666	0	37	3	0.00	0.60	0.00	793	811.9	854.1	836.4	813.6	781.6
12	666	0	38	3	0.00	0.60	0.40	773	799.1	842.6	825.0	805.3	768.6
13	666	0	51	3	0.00	0.60	0.70	729	771.6	819.0	801.6	788.5	738.9
14	666	0	65	3	0.00	0.60	0.85	696	747.6	800.3	783.5	774.7	712.0
15	666	0	97	3	0.00	0.60	0.99	670	708.0	775.9	762.6	752.7	658.9
16	666	0	49	3	0.00	0.40	0.00	686	718.9	765.8	749.5	735.3	692.4
17	666	0	49	3	0.00	0.40	0.40	673	711.7	758.3	742.0	729.8	683.3
18	666	0	66	3	0.00	0.40	0.70	647	692.0	742.8	727.0	718.4	661.9
19	666	0	72	3	0.00	0.40	0.85	631	676.0	730.9	716.1	709.0	642.4
20	663	3	99	3	0.00	0.40	0.99	618	651.6	714.4	702.6	692.8	602.9
21	666	0	72	3	0.00	0.20	0.00	599	642.3	694.7	680.5	673.4	611.3
22	666	0	76	3	0.00	0.20	0.40	597	639.4	691.8	677.8	671.1	606.7
23	665	1	83	3	0.00	0.20	0.70	591	629.3	686.1	672.9	666.1	595.7
24	665	1	91	3	0.00	0.20	0.85	588	622.0	681.9	669.5	662.0	586.0
25	663	3	97	3	0.00	0.20	0.99	584	610.3	676.4	665.8	655.5	566.4
26	666	0	35	3	0.25	1.00	0.00	1016	1017.9	1070.5	1049.5	1011.9	982.6
27	666	0	36	3	0.25	1.00	0.40	990	998.8	1054.4	1032.9	999.9	965.0
28	666	0	55	3	0.25	1.00	0.70	929	963.3	1023.2	1001.0	978.4	926.4
29	666	0	62	3	0.25	1.00	0.85	880	936.0	998.2	975.9	962.1	894.9
30	665	1	104	3	0.25	1.00	0.99	833	886.4	967.2	948.1	940.2	848.1
31	666	0	33	3	0.25	0.80	0.00	911	918.0	966.5	947.5	914.5	885.5
32	666	0	36	3	0.25	0.80	0.40	888	903.8	952.6	933.4	904.3	870.4
33	666	0	54	3	0.25	0.80	0.70	834	870.6	924.8	905.1	885.3	835.8
34	666	0	62	3	0.25	0.80	0.85	792	847.7	902.6	882.5	870.4	807.0
35	664	2	101	3	0.25	0.80	0.99	753	800.1	873.0	857.0	847.8	760.4
36	666	0	39	3	0.25	0.60	0.00	803	821.4	868.0	851.0	824.5	791.3
37	666	0	45	3	0.25	0.60	0.40	784	809.6	857.0	839.1	816.7	779.0
38	666	0	56	3	0.25	0.60	0.70	742	787.0	834.5	816.6	801.3	750.3
39	666	0	66	3	0.25	0.60	0.85	710	769.0	816.8	799.4	788.8	725.7
40	665	1	102	3	0.25	0.60	0.99	683	722.0	794.2	780.0	770.3	686.2
41	666	0	52	3	0.25	0.40	0.00	695	735.2	778.4	762.3	745.5	701.2
42	666	0	57	3	0.25	0.40	0.40	683	727.6	771.2	754.7	740.4	692.5
43	666	0	63	3	0.25	0.40	0.70	658	710.6	756.5	740.5	729.8	672.0
44	666	0	81	3	0.25	0.40	0.85	642	689.3	745.2	730.3	721.1	654.4
45	664	2	107	3	0.25	0.40	0.99	629	661.1	729.6	716.5	706.7	622.7
46	665	1	82	3	0.25	0.20	0.00	608	651.0	706.7	692.8	683.1	619.6
47	666	0	81	3	0.25	0.20	0.40	606	648.1	704.3	690.3	681.2	615.7
48	666	0	87	3	0.25	0.20	0.70	601	638.0	698.8	686.4	676.6	605.5
49	666	0	97	3	0.25	0.20	0.85	597	631.0	694.9	683.6	672.8	596.6
50	661	5	109	3	0.25	0.20	0.99	594	620.5	687.0	677.0	664.4	577.5
51	666	0	48	3	0.50	1.00	0.00	1063	1065.9	1123.2	1101.1	1056.7	1025.7
52	666	0	51	3	0.50	1.00	0.40	1041	1051.1	1108.9	1086.3	1046.3	1010.7
53	666	0	70	3	0.50	1.00	0.70	989	1017.0	1082.1	1057.8	1029.2	979.8
54	666	0	82	3	0.50	1.00	0.85	944	992.4	1061.8	1035.9	1018.1	958.0
55	665	1	123	3	0.50	1.00	0.99	891	949.3	1039.3	1013.7	1009.2	943.8
56	665	1	50	3	0.50	0.80	0.00	949	959.9	1011.4	992.0	952.9	921.3
57	666	0	58	3	0.50	0.80	0.40	929	945.5	999.4	979.0	944.5	908.1
58	666	0	69	3	0.50	0.80	0.70	882	918.1	975.2	953.5	929.0	879.9
59	666	0	81	3	0.50	0.80	0.85	844	896.7	956.6	934.3	918.0	858.4
60	665	1	120	3	0.50	0.80	0.99	801	851.2	935.9	913.2	908.0	841.8
61	666	0	55	3	0.50	0.60	0.00	834	859.7	907.6	889.1	858.8	821.4
62	666	0	60	3	0.50	0.60	0.40	817	850.0	897.6	879.3	851.9	810.9
63	666	0	69	3	0.50	0.60	0.70	780	827.1	877.9	858.6	839.1	786.8
64	665	1	88	3	0.50	0.60	0.85	751	804.1	862.3	843.0	828.9	766.7
65	664	2	121	3	0.50	0 60	0.99	724	767.2	844.0	827.0	817.8	748.6
66	666	0	69	3	0.50	0.40	0.00	722	765.8	814.2	797.9	776.5	727.4
67	666	0	70	3	0.50	0.40	0.40	711	759.8	807.7	790.9	772.1	720.1
68	666	0	90	3	0.50	0.40	0.70	689	740.3	794.7	777.9	763.1	702.3
69	666	0	100	3	0.50	0.40	0.85	675	728.1	785.0	769.5	756.2	688.5
70	661	5	123	3	0.50	0.40	0.99	663	700.8	772.9	758.7	747.4	672.3
71	666	0	98	3	0.50	0.20	0.00	636	687.6	741.3	727.2	712.9	644.0
72	666	0	100	3	0.50	0.20	0.40	633	684.4	738.8	726.2	711.2	640.9
73	664	2	106	3	0.50	0.20	0.70	629	675.7	733.6	720.4	706.8	631.8
74	664	2	114	3	0.50	0.20	0.85	626	666.9	729.5	717.5	703.1	624.0
75	662	4	129	3	0.50	0.20	0.99	623	650.6	725.0	715.0	698.6	614.9
76	665	1	75	3	0.75	1.00	0.00	1142	1142.5	1207.8	1186.3	1130.1	1097.7
77	666	0	81	3	0.75	1.00	0.40	1125	1125.1	1195.1	1170.3	1121.3	1085.8
78	666	0	97	3	0.75	1.00	0.70	1082	1099.0	1174.1	1146.6	1110.1	1065.0
79	666	0	120	3	0.75	1.00	0.85	1041	1082.2	1159.6	1129.0	1105.0	1055.0
80	665	1	151	3	0.75	1.00	0.99	982	1039.9	1146.8	1117.4	1107.2	1062.1
81	666	0	77	3	0.75	0.80	0.00	1013	1027.7	1084.6	1063.1	1016.7	980.0
82	666	0	83	3	0.75	0.80	0.40	997	1011.9	1073.8	1051.8	1009.3	969.4
83	666	0	99	3	0.75	0.80	0.70	959	987.1	1054.4	1030.2	998.7	950.5
84	665	1	121	3	0.75	0.80	0.85	924	965.9	1039.9	1014.2	992.1	938.1
85	664	2	151	3	0.75	0.80	0.99	879	926.7	1026.2	998.4	990.9	940.4
86	665	1	81	3	0.75	0.60	0.00	887	917.4	970.8	951.6	914.3	871.4
87	666	0	80	3	0.75	0.60	0.40	874	908.9	962.5	943.9	908.8	862.5
88	666	0	112	3	0.75	0.60	0.70	843	882.5	946.4	926.[illegible]	899.5	846.3
89	666	0	124	3	0.75	0.60	0.85	817	864.8	934.9	913.7	893.8	834.7
90	663	3	154	3	0.75	0.60	0.99	789	829.8	920.4	898.3	888.4	830.1

91	666	0	101	3	0.75	0.40	0.00	769	813.2	871.6	854.0	827.1	771.9
92	666	0	107	3	0.75	0.40	0.40	760	805.1	866.0	848.7	823.5	765.7
93	665	1	117	3	0.75	0.40	0.70	742	791.3	854.7	837.3	816.2	751.9
94	664	2	129	3	0.75	0.40	0.85	730	778.5	846.7	829.5	811.2	742.9
95	660	6	163	3	0.75	0.40	0.99	719	745.4	835.3	821.3	804.8	735.4
96	665	1	128	3	0.75	0.20	0.00	683	727.4	795.6	781.7	760.7	686.1
97	665	1	134	3	0.75	0.20	0.40	681	725.3	793.1	780.8	758.8	682.8
98	666	0	141	3	0.75	0.20	0.70	678	713.8	790.1	777.3	756.7	677.5
99	665	1	147	3	0.75	0.20	0.85	675	707.3	786.9	774.5	754.2	672.6
100	657	9	166	3	0.75	0.20	0.99	673	691.0	781.0	769.5	749.3	665.0
101	665	1	111	3	1.00	1.00	0.00	1253	1241.3	1319.0	1292.2	1229.4	1199.4
102	666	0	120	3	1.00	1.00	0.40	1239	1229.6	1308.3	1281.0	1222.7	1190.8
103	666	0	144	3	1.00	1.00	0.70	1202	1208.4	1293.2	1262.1	1216.9	1179.9
104	665	1	167	3	1.00	1.00	0.85	1162	1189.3	1283.4	1248.1	1216.5	1178.9
105	664	2	213	3	1.00	1.00	0.99	1099	1149.4	1276.1	1233.7	1223.4	1195.1
106	665	1	118	3	1.00	0.80	0.00	1106	1111.2	1180.9	1158.2	1102.8	1066.1
107	666	0	123	3	1.00	0.80	0.40	1093	1099.9	1172.1	1148.2	1097.5	1058.5
108	666	0	141	3	1.00	0.80	0.70	1061	1073.1	1157.7	1131.4	1091.5	1047.6
109	666	0	165	3	1.00	0.80	0.85	1027	1056.5	1148.7	1119.3	1090.4	1045.0
110	662	4	207	3	1.00	0.80	0.99	980	1023.5	1139.7	1104.6	1093.9	1056.3
111	666	0	123	3	1.00	0.60	0.00	965	986.7	1056.2	1037.2	990.5	943.3
112	666	0	132	3	1.00	0.60	0.40	955	978.7	1048.8	1027.6	986.1	937.5
113	666	0	146	3	1.00	0.60	0.70	929	956.0	1036.7	1014.3	980.6	927.1
114	664	2	167	3	1.00	0.60	0.85	905	942.6	1027.7	1004.0	977.6	922.4
115	663	3	207	3	1.00	0.60	0.99	877	908.7	1018.3	992.0	977.8	928.8
116	666	0	143	3	1.00	0.40	0.00	839	876.0	948.6	929.7	895.6	834.3
117	666	0	144	3	1.00	0.40	0.40	832	872.3	943.9	926.1	892.8	830.1
118	665	1	160	3	1.00	0.40	0.70	818	855.0	935.0	917.1	888.0	821.1
119	664	2	178	3	1.00	0.40	0.85	807	842.3	929.0	911.8	885.5	817.5
120	659	7	208	3	1.00	0.40	0.99	797	813.3	920.4	904.1	882.7	818.3
121	664	2	174	3	1.00	0.20	0.00	753	779.2	867.4	854.3	824.0	742.2
122	666	0	176	3	1.00	0.20	0.40	752	776.3	867.5	855.8	824.5	742.1
123	664	2	182	3	1.00	0.20	0.70	749	767.9	862.8	851.2	821.0	736.4
124	663	3	197	3	1.00	0.20	0.85	747	756.0	860.1	849.1	819.3	733.6
125	652	14	216	3	1.00	0.20	0.99	745	743.1	853.4	842.9	814.5	728.6
126	664	2	222	3	1.50	1.00	0.00	1550	1477.8	1601.1	1571.8	1487.4	1469.5
127	664	2	228	3	1.50	1.00	0.40	1538	1481.7	1595.2	1563.1	1485.6	1469.9
128	666	0	257	3	1.50	1.00	0.70	1500	1466.7	1589.8	1552.5	1489.3	1477.2
129	663	3	290	3	1.50	1.00	0.85	1459	1455.1	1586.2	1542.1	1493.6	1485.6
130	661	5	335	3	1.50	1.00	0.99	1393	1438.5	1589.3	1526.8	1506.8	1507.5
131	663	3	228	3	1.50	0.80	0.00	1366	1315.0	1428.6	1404.1	1329.8	1297.7
132	666	0	230	3	1.50	0.80	0.40	1355	1312.3	1424.9	1399.9	1329.7	1300.5
133	666	0	256	3	1.50	0.80	0.70	1323	1297.4	1418.9	1387.7	1331.6	1304.1
134	665	1	287	3	1.50	0.80	0.85	1289	1283.6	1415.8	1380.4	1335.6	1312.3
135	663	3	326	3	1.50	0.80	0.99	1243	1259.1	1415.0	1367.9	1344.5	1331.3
136	666	0	242	3	1.50	0.60	0.00	1196	1162.7	1278.1	1256.1	1193.9	1147.2
137	666	0	242	3	1.50	0.60	0.40	1187	1159.9	1273.3	1251.6	1192.3	1147.6
138	665	1	263	3	1.50	0.60	0.70	1163	1151.5	1266.9	1242.3	1192.1	1147.4
139	663	3	288	3	1.50	0.60	0.85	1140	1127.5	1262.9	1238.0	1194.0	1153.8
140	660	6	321	3	1.50	0.60	0.99	1115	1111.3	1261.9	1230.3	1201.3	1170.9
141	664	2	260	3	1.50	0.40	0.00	1054	1024.6	1148.9	1131.6	1078.5	1014.6
142	666	0	261	3	1.50	0.40	0.40	1049	1026.1	1148.1	1133.4	1079.6	1017.2
143	665	1	284	3	1.50	0.40	0.70	1036	1009.4	1143.4	1125.5	1078.9	1016.4
144	663	3	294	3	1.50	0.40	0.85	1027	1003.4	1139.2	1120.7	1078.6	1019.2
145	658	8	316	3	1.50	0.40	0.99	1017	985.1	1133.9	1114.4	1079.3	1027.4
146	662	4	290	3	1.50	0.20	0.00	964	918.4	1057.9	1049.9	996.5	910.5
147	665	1	289	3	1.50	0.20	0.40	962	919.6	1061.1	1052.3	1000.2	915.5
148	665	1	299	3	1.50	0.20	0.70	960	909.9	1059.8	1050.8	1000.3	915.7
149	658	8	307	3	1.50	0.20	0.85	957	903.8	1051.2	1042.8	993.6	909.3
150	647	19	326	3	1.50	0.20	0.99	952	896.9	1041.5	1032.0	986.5	904.5
151	662	4	354	3	2.00	1.00	0.00	1907	1777.7	1937.2	1909.3	1803.2	1813.2
152	663	3	362	3	2.00	1.00	0.40	1892	1774.4	1936.6	1905.9	1805.9	1820.4
153	666	0	389	3	2.00	1.00	0.70	1850	1761.0	1935.8	1894.1	1812.7	1833.7
154	663	3	407	3	2.00	1.00	0.85	1807	1756.7	1935.7	1884.3	1818.4	1843.6
155	655	11	444	3	2.00	1.00	0.99	1746	1774.1	1940.8	1869.8	1829.3	1858.3
156	662	4	352	3	2.00	0.80	0.00	1691	1563.6	1733.2	1707.7	1616.2	1607.1
157	665	1	353	3	2.00	0.80	0.40	1677	1557.2	1729.2	1703.9	1615.2	1608.3
158	664	2	384	3	2.00	0.80	0.70	1641	1543.6	1726.2	1693.0	1619.6	1619.2
159	661	5	407	3	2.00	0.80	0.85	1608	1542.9	1725.7	1685.5	1624.7	1629.3
160	656	10	433	3	2.00	0.80	0.99	1568	1548.0	1730.0	1676.6	1635.3	1646.8
161	663	3	354	3	2.00	0.60	0.00	1497	1375.2	1548.0	1527.0	1447.3	1416.5
162	663	3	362	3	2.00	0.60	0.40	1486	1371.7	1545.3	1525.7	1447.0	1417.7
163	664	2	379	3	2.00	0.60	0.70	1460	1358.3	1544.6	1521.2	1452.4	1430.0
164	661	5	395	3	2.00	0.60	0.85	1440	1361.7	1542.7	1514.2	1455.7	1438.5
165	656	10	422	3	2.00	0.60	0.99	1418	1342.6	1540.4	1503.3	1459.8	1450.9
166	661	5	365	3	2.00	0.40	0.00	1342	1224.6	1397.4	1386.7	1310.8	1257.5
167	664	2	372	3	2.00	0.40	0.40	1335	1213.2	1396.4	1386.4	1311.3	1259.5
168	663	3	384	3	2.00	0.40	0.70	1322	1208.3	1397.0	1383.2	1316.0	1269.3
169	661	5	395	3	2.00	0.40	0.85	1313	1203.6	1394.0	1380.3	1316.9	1276.1
170	653	13	416	3	2.00	0.40	0.99	1303	1182.6	1388.2	1369.0	1316.6	1282.7
171	658	8	391	3	2.00	0.20	0.00	1241	1102.1	1294.4	1296.6	1216.4	1137.7
172	661	5	394	3	2.00	0.20	0.40	1239	1100.1	1296.1	1294.0	1218.6	1141.3
173	656	10	399	3	2.00	0.20	0.70	1236	1099.7	1292.7	1287.8	1217.2	1142.9
174	653	13	408	3	2.00	0.20	0.85	1233	1083.8	1287.9	1282.6	1214.4	1142.8
175	647	19	418	3	2.00	0.20	0.99	1226	1072.9	1286.7	1288.2	1215.8	1149.1
176	400	0	0	5	0.00	1.00	0.00	1000	1008.7	1028.2	1019.4	99'.5	941.3
177	400	0	0	5	0.00	1.00	0.40	973	988.5	1007.2	996.4	984.6	922.4
178	400	0	2	5	0.00	1.00	0.70	908	947.5	964.8	948.6	961.1	878.5
179	400	0	3	5	0.00	1.00	0.85	857	910.4	932.2	912.1	942.4	840.1
180	400	0	10	5	0.00	1.00	0.99	813	833.8	892.8	874.6	913.3	759.2
181	400	0	0	5	0.00	0.80	0.00	898	910.0	927.1	918.4	901.9	848.9
182	400	0	0	5	0.00	0.80	0.40	874	892.8	909.1	898.5	891.1	832.2

183	400	0	3	5	0.00	0.80	0.70	818	856.6	872.1	856.8	870.5	794.2
184	400	0	3	5	0.00	0.80	0.85	774	823.5	843.6	825.1	853.7	759.7
185	400	0	10	5	0.00	0.80	0.99	736	755.2	808.8	792.2	827.1	686.5
186	400	0	1	5	0.00	0.60	0.00	793	814.4	828.3	818.1	813.4	757.8
187	400	0	1	5	0.00	0.60	0.40	773	800.6	814.3	802.5	805.1	744.3
188	400	0	3	5	0.00	0.60	0.70	729	770.5	785.3	770.0	788.4	713.0
189	400	0	3	5	0.00	0.60	0.85	696	742.9	763.1	746.0	774.7	683.8
190	400	0	11	5	0.00	0.60	0.99	670	686.7	736.5	721.5	752.7	622.4
191	400	0	1	5	0.00	0.40	0.00	686	723.1	735.7	722.4	735.2	669.1
192	400	0	2	5	0.00	0.40	0.40	673	713.6	726.8	712.6	729.8	659.5
193	400	0	3	5	0.00	0.40	0.70	647	691.2	708.8	693.0	718.4	636.5
194	400	0	6	5	0.00	0.40	0.85	631	668.4	695.2	679.3	708.9	615.1
195	400	0	12	5	0.00	0.40	0.99	618	629.8	679.5	666.7	694.2	569.8
196	400	0	5	5	0.00	0.20	0.00	599	636.7	661.1	646.0	673.3	585.8
197	400	0	7	5	0.00	0.20	0.40	597	630.9	658.0	643.0	671.1	580.6
198	400	0	8	5	0.00	0.20	0.70	591	619.3	651.8	637.3	666.1	568.2
199	400	0	10	5	0.00	0.20	0.85	588	609.4	647.4	633.6	662.0	556.6
200	399	1	16	5	0.00	0.20	0.99	584	589.5	642.6	630.2	656.1	532.2
201	400	0	0	5	0.25	1.00	0.00	1016	1026.6	1045.9	1036.9	1011.6	951.1
202	400	0	0	5	0.25	1.00	0.40	990	1006.7	1026.0	1015.1	999.5	933.2
203	400	0	1	5	0.25	1.00	0.70	929	965.9	985.8	969.6	978.2	894.1
204	400	0	4	5	0.25	1.00	0.85	880	931.6	955.0	934.5	962.0	861.9
205	400	0	16	5	0.25	1.00	0.99	833	856.3	918.9	897.4	940.5	813.3
206	400	0	0	5	0.25	0.80	0.00	911	926.1	942.4	933.4	914.3	857.2
207	400	0	0	5	0.25	0.80	0.40	888	909.2	925.1	914.4	904.1	841.3
208	400	0	1	5	0.25	0.80	0.70	834	873.2	889.9	874.5	885.2	806.2
209	400	0	5	5	0.25	0.80	0.85	792	842.8	862.8	844.0	870.3	776.5
210	400	0	16	5	0.25	0.80	0.99	753	775.1	830.7	811.9	849.4	729.4
211	400	0	1	5	0.25	0.60	0.00	803	828.2	841.7	831.3	824.3	765.1
212	400	0	1	5	0.25	0.60	0.40	784	815.1	828.2	816.2	816.6	752.0
213	400	0	2	5	0.25	0.60	0.70	742	785.8	800.5	785.0	801.1	722.7
214	400	0	7	5	0.25	0.60	0.85	710	757.3	779.3	761.8	788.7	697.0
215	400	0	17	5	0.25	0.60	0.99	683	704.1	754.5	738.2	770.6	655.1
216	400	0	4	5	0.25	0.40	0.00	695	736.2	748.0	734.5	745.3	675.5
217	400	0	4	5	0.25	0.40	0.40	683	726.5	739.5	725.1	740.3	666.6
218	400	0	7	5	0.25	0.40	0.70	658	704.1	722.1	706.1	729.7	645.4
219	400	0	8	5	0.25	0.40	0.85	642	684.5	709.2	693.0	721.0	626.8
220	400	0	19	5	0.25	0.40	0.99	629	644.8	694.5	680.0	708.4	593.9
221	400	0	9	5	0.25	0.20	0.00	608	651.0	673.1	657.9	683.3	593.1
222	400	0	9	5	0.25	0.20	0.40	606	646.0	670.1	655.1	681.1	588.7
223	400	0	13	5	0.25	0.20	0.70	601	634.2	664.2	649.7	676.5	577.7
224	400	0	17	5	0.25	0.20	0.85	597	622.9	660.1	646.2	672.8	567.9
225	399	1	20	5	0.25	0.20	0.99	594	602.0	655.7	643.1	667.8	549.6
226	400	0	1	5	0.50	1.00	0.00	1063	1079.1	1098.1	1088.6	1053.3	991.1
227	400	0	2	5	0.50	1.00	0.40	1041	1059.5	1080.3	1069.0	1045.9	976.9
228	400	0	5	5	0.50	1.00	0.70	989	1021.4	1045.6	1028.6	1029.0	946.6
229	400	0	10	5	0.50	1.00	0.85	944	984.3	1019.8	997.4	1017.9	926.4
230	400	0	28	5	0.50	1.00	0.99	891	913.1	991.0	962.1	1009.5	917.4
231	400	0	2	5	0.50	0.80	0.00	949	972.0	987.1	977.5	953.1	890.4
232	400	0	3	5	0.50	0.80	0.40	929	956.5	971.5	960.2	944.2	877.7
233	400	0	7	5	0.50	0.80	0.70	882	921.8	940.6	924.5	928.8	849.7
234	400	0	11	5	0.50	0.80	0.85	844	888.1	917.5	897.3	917.9	879.2
235	400	0	27	5	0.50	0.80	0.99	801	824.1	891.4	867.2	907.8	815.3
236	400	0	4	5	0.50	0.60	0.00	834	870.7	880.7	869.5	858.6	794.0
237	400	0	5	5	0.50	0.60	0.40	817	857.8	868.4	655.8	851.8	783.4
238	400	0	9	5	0.50	0.60	0.70	780	827.7	843.9	827.7	838.9	759.0
239	400	0	14	5	0.50	0.60	0.85	751	800.3	825.7	807.0	829.3	739.3
240	399	1	28	5	0.50	0.60	0.99	724	746.5	804.1	784.1	818.4	722.7
241	400	0	11	5	0.50	0.40	0.00	722	772.8	783.5	769.4	776.4	701.8
242	400	0	12	5	0.50	0.40	0.40	711	763.7	775.7	760.7	772.0	694.3
243	400	0	16	5	0.50	0.40	0.70	689	742.7	760.3	743.8	763.0	675.4
244	400	0	19	5	0.50	0.40	0.85	675	723.9	749.2	732.3	756.1	660.9
245	400	0	29	5	0.50	0.40	0.99	663	683.4	736.7	720.9	748.2	646.2
246	400	0	20	5	0.50	0.20	0.00	636	687.4	707.4	692.0	712.8	616.9
247	400	0	20	5	0.50	0.20	0.40	633	682.4	704.7	689.7	711.1	613.6
248	400	0	22	5	0.50	0.20	0.70	629	670.9	699.5	684.9	707.1	604.0
249	400	0	26	5	0.50	0.20	0.85	626	658.0	695.8	681.7	704.1	595.9
250	399	1	33	5	0.50	0.20	0.99	623	635.9	692.1	678.8	700.8	586.4
251	400	0	10	5	0.75	1.00	0.00	1142	1161.4	1182.0	1172.0	1129.4	1061.5
252	400	0	11	5	0.75	1.00	0.40	1125	1144.1	1166.8	1154.8	1120.9	1049.8
253	400	0	15	5	0.75	1.00	0.70	1082	1106.2	1139.2	1120.7	1109.7	1031.2
254	400	0	23	5	0.75	1.00	0.85	1041	1071.3	1119.7	1093.8	1104.7	1024.6
255	400	0	49	5	0.75	1.00	0.99	982	1003.7	1099.4	1059.6	1107.0	1040.9
256	400	0	9	5	0.75	0.80	0.00	1013	1046.1	1059.2	1048.8	1016.3	947.2
257	400	0	12	5	0.75	0.80	0.40	997	1030.2	1045.8	1033.6	1009.0	936.0
258	400	0	17	5	0.75	0.80	0.70	959	99[illegible].6	1020.9	1003.4	998.4	919.2
259	400	0	29	[illegible]	0.75	0.80	0.85	924	965.8	1003.0	980.2	992.5	909.1
260	400	0	48	5	0.75	0.80	0.99	879	902.1	984.0	952.3	991.8	920.2
261	400	0	14	5	0.75	0.60	0.00	887	935.7	943.8	931.6	914.2	841.2
262	400	0	16	5	0.75	0.60	0.40	874	921.5	933.2	919.6	908.6	832.6
263	400	0	21	5	0.75	0.60	0.70	843	895.0	913.1	895.7	899.3	815.7
264	400	0	32	5	0.75	0.60	0.85	817	866.5	898.7	878.2	893.6	805.7
265	400	0	52	5	0.75	0.60	0.99	789	810.2	883.3	858.5	890.7	810.7
266	400	0	24	5	0.75	0.40	0.00	769	832.8	841.0	826.0	827.0	744.1
267	400	0	24	5	0.75	0.40	0.40	760	824.8	834.2	818.5	823.3	737.5
268	400	0	30	5	0.75	0.40	0.70	742	801.7	821.5	804.2	816.6	723.2
269	400	0	35	5	0.75	0.40	0.85	730	781.2	812.6	794.7	812.2	714.9
270	400	0	55	5	0.75	0.40	0.99	719	735.1	803.0	786.8	808.8	716.0
271	400	0	37	5	0.75	0.20	0.00	683	737.5	762.7	747.4	761.0	667.6
272	400	0	39	5	0.75	0.20	0.40	681	732.3	760.4	745.6	759.5	653.9
273	400	0	44	5	0.75	0.20	0.70	678	718.3	756.1	741.7	756.6	646.7
274	400	0	49	5	0.75	0.20	0.85	675	705.7	753.1	738.8	754.6	642.2

275	400	0	62	5	0.75	0.20	0.99	673	681.8	750.1	736.6	752.6	641.0
276	400	0	22	5	1.00	1.00	0.00	1253	1269.8	1293.2	1282.8	1228.5	1165.4
277	400	0	23	5	1.00	1.00	0.40	1239	1252.3	1280.8	1268.0	1222.1	1156.1
278	400	0	31	5	1.00	1.00	0.70	1202	1213.3	1260.5	1239.7	1216.5	1147.2
279	400	0	43	5	1.00	1.00	0.85	1162	1181.1	1246.8	1216.3	1217.0	1152.9
280	400	0	73	5	1.00	1.00	0.99	1099	1116.7	1234.0	1184.6	1225.6	1180.9
281	400	0	24	5	1.00	0.80	0.00	1106	1140.8	1155.6	1144.6	1102.8	1034.6
282	400	0	28	5	1.00	0.80	0.40	1093	1123.5	1144.6	1131.6	1097.1	1025.7
283	400	0	36	5	1.00	0.80	0.70	1061	1089.2	1125.8	1106.5	1091.2	1016.5
284	400	0	44	5	1.00	0.80	0.85	1027	1056.5	1113.1	1086.8	1090.2	1018.2
285	400	0	71	5	1.00	0.80	0.99	980	998.1	1100.6	1060.6	1095.6	1041.0
286	400	0	29	5	1.00	0.60	0.00	965	1019.1	1028.7	1015.8	990.2	912.7
287	400	0	34	5	1.00	0.60	0.40	955	1004.5	1020.0	1005.5	985.8	905.8
288	400	0	40	5	1.00	0.60	0.70	929	978.0	1004.6	985.9	980.3	896.3
289	400	0	51	5	1.00	0.60	0.85	905	945.0	994.1	971.2	978.4	896.0
290	400	0	80	5	1.00	0.60	0.99	877	887.5	983.6	953.9	980.9	913.0
291	400	0	43	5	1.00	0.40	0.00	839	901.9	918.4	903.2	895.3	804.1
292	400	0	45	5	1.00	0.40	0.40	832	893.0	912.9	896.9	892.5	798.8
293	400	0	53	5	1.00	0.40	0.70	818	869.2	903.2	885.3	888.5	790.7
294	400	0	63	5	1.00	0.40	0.85	807	846.4	896.5	877.9	886.6	789.8
295	400	0	83	5	1.00	0.40	0.99	797	802.4	889.7	869.8	887.0	800.7
296	400	0	67	5	1.00	0.20	0.00	753	797.3	837.0	822.2	825.4	711.4
297	400	0	68	5	1.00	0.20	0.40	752	792.0	835.1	821.1	824.3	708.1
298	400	0	72	5	1.00	0.20	0.70	749	778.1	831.9	818.2	822.5	704.0
299	400	0	79	5	1.00	0.20	0.85	747	763.3	829.7	815.8	821.6	702.7
300	399	1	90	5	1.00	0.20	0.99	745	[illegible]	826.2	812.8	820.0	706.1
301	400	0	67	5	1.50	1.00	0.00	1550	1524.7	1578.3	1568.8	1488.3	[illegible]
302	400	0	76	5	1.50	1.00	0.40	1538	1500.3	1571.0	1557.2	1485.5	1437.7
303	400	0	93	5	1.50	1.00	0.70	1500	1475.0	1561.7	1536.7	1489.0	1450.6
304	400	0	119	5	1.50	1.00	0.85	1459	1442.5	1556.4	1516.1	1495.4	1467.4
305	399	1	161	5	1.50	1.00	0.99	1393	1388.9	1552.9	1483.7	1508.6	1500.3
306	400	0	73	5	1.50	0.80	0.00	1366	1365.2	1406.6	1395.9	1331.6	1268.2
307	400	0	76	5	1.50	0.80	0.40	1355	1345.4	1400.0	1386.3	1329.3	1269.9
308	400	0	103	5	1.50	0.80	0.70	1323	1312.5	1391.0	1368.6	1331.2	1276.8
309	400	0	120	5	1.50	0.80	0.85	1289	1288.9	1385.7	1352.2	1336.2	1291.7
310	400	0	161	5	1.50	0.80	0.99	1243	1235.5	1381.8	1328.8	1347.1	1322.8
311	400	0	81	5	1.50	0.60	0.00	1196	1212.7	1252.4	1239.8	1193.6	1116.0
312	400	0	88	5	1.50	0.60	0.40	1187	1194.2	1247.1	1232.6	1192.0	1117.4
313	400	0	107	5	1.50	0.60	0.70	1163	1166.2	1239.5	1218.7	1192.6	1119.7
314	400	0	129	5	1.50	0.60	0.85	1140	1144.9	1234.9	1208.1	1196.0	1132.7
315	400	0	164	5	1.50	0.60	0.99	1115	1097.2	1231.2	1194.5	1203.9	1160.0
316	400	0	100	5	1.50	0.40	0.00	1054	1072.1	1123.7	1109.9	1080.3	985.2
317	400	0	104	5	1.50	0.40	0.40	1049	1062.4	1120.4	1106.0	1079.3	985.5
318	400	0	121	5	1.50	0.40	0.70	1036	1038.1	1115.5	1098.9	1079.4	987.3
319	399	1	135	5	1.50	0.40	0.85	1027	1021.5	1111.4	1091.3	1080.3	994.6
320	400	0	163	5	1.50	0.40	0.99	1017	984.7	1109.8	1089.1	1085.8	1016.3
321	400	0	135	5	1.50	0.20	0.00	964	951.7	1033.6	1022.5	1000.0	879.6
322	400	0	137	5	1.50	0.20	0.40	962	948.7	1032.5	1021.4	999.6	879.7
323	400	0	147	5	1.50	0.20	0.70	960	934.2	1030.9	1021.1	999.7	880.7
324	400	0	156	5	1.50	0.20	0.85	957	922.0	1029.8	1020.3	1000.3	885.2
325	399	1	169	5	1.50	0.20	0.99	952	900.4	1027.4	1014.8	1000.4	893.9
326	400	0	161	5	2.00	1.00	0.00	1907	1823.7	1918.9	1912.4	1806.3	1785.1
327	400	0	166	5	2.00	1.00	0.40	1892	1810.2	1914.6	[illegible]	1805.3	1791.1
328	400	0	187	5	2.00	1.00	0.70	1850	1774.1	1911.5	[illegible]	1812.4	1811.0
329	400	0	209	5	2.00	1.00	0.85	1807	1758.7	1910.4	1862.4	1820.2	1830.4
330	400	0	255	5	2.00	1.00	0.99	1746	1724.6	1911.4	1832.2	1832.5	1866.8
331	400	0	155	5	2.00	0.80	0.00	1691	1627.7	1711.0	1702.9	1615.4	1574.1
332	400	0	161	5	2.00	0.80	0.40	1677	1611.8	1707.2	1695.2	1614.6	1577.4
333	400	0	183	5	2.00	0.80	0.70	1641	1582.4	1703.8	1678.8	1620.7	1595.8
334	400	0	206	5	2.00	0.80	0.85	1608	1550.6	1702.5	1664.3	1627.5	1614.1
335	400	0	249	5	2.00	0.80	0.99	1568	1516.5	1702.6	1643.4	1638.3	1641.8
336	400	0	160	5	2.00	0.60	0.00	1497	1446.9	1527.3	1518.0	1448.2	1383.4
337	400	0	169	5	2.00	0.60	0.40	1486	1427.5	1524.3	1513.0	1447.7	1385.6
338	399	1	190	5	2.00	0.60	0.70	1460	1401.7	1521.2	1502.0	1452.6	1402.0
339	400	0	207	5	2.00	0.60	0.85	1440	1379.2	1519.8	1493.3	1458.0	1418.5
340	400	0	250	5	2.00	0.60	0.99	1418	1331.4	1519.4	1480.6	1466.8	1445.9
341	400	0	182	5	2.00	0.40	0.00	1342	1277.6	1377.7	1369.3	1313.1	1223.2
342	400	0	187	5	2.00	0.40	0.40	1335	1265.4	1375.9	1366.6	1313.0	1224.9
343	400	0	205	5	2.00	0.40	0.70	1322	1250.2	1373.8	1360.4	1316.2	1236.8
344	400	0	216	5	2.00	0.40	0.85	1313	1231.1	1372.7	1354.7	1320.0	1251.4
345	400	0	248	5	2.00	0.40	0.99	1303	1186.3	1372.2	1354.3	1325.9	1274.2
346	400	0	214	5	2.00	0.20	0.00	1241	1148.6	1276.6	1272.4	1220.4	1101.4
347	400	0	221	5	2.00	0.20	0.40	1239	1138.3	1275.9	1272.1	1220.5	1101.4
348	400	0	227	5	2.00	0.20	0.70	1236	1127.8	1275.2	1274.0	1222.0	1109.9
349	400	0	239	5	2.00	0.20	0.85	1233	1114.8	1274.9	1275.4	1223.6	1117.7
350	399	1	252	5	2.00	0.20	0.99	1226	1091.4	1274.0	1269.5	1225.5	1130.9
351	285	0	0	7	0.00	1.00	0.00	1000	1001.2	1015.4	1008.9	997.2	920.5
352	285	0	0	7	0.00	1.00	0.40	973	978.6	991.7	983.6	984.2	901.6
353	285	0	0	7	0.00	1.00	0.70	908	932.7	945.2	931.3	960.6	860.5
354	285	0	0	7	0.00	1.00	0.85	857	891.6	911.1	892.2	941.9	821.1
355	285	0	3	7	0.00	1.00	0.99	813	805.9	873.3	855.3	912.7	727.0
356	285	0	0	7	0.00	0.80	0.00	898	902.6	914.8	908.4	901.6	826.8
357	285	0	0	7	0.00	0.80	0.40	874	883.4	894.7	886.7	890.7	811.9
358	285	0	0	7	0.00	0.80	0.70	818	842.9	854.6	841.3	870.1	776.0
359	285	0	0	7	0.00	0.80	0.85	774	806.3	824.8	807.4	853.3	740.0
360	285	0	3	7	0.00	0.80	0.99	736	729.9	791.3	775.0	826.5	657.1
361	285	0	0	7	0.00	0.60	0.00	793	805.7	815.3	807.5	813.0	737.3
362	285	0	0	7	0.00	0.60	0.40	773	790.5	800.0	790.5	804.7	725.1
363	285	0	0	7	0.00	0.60	0.70	729	767.0	769.2	755.3	788.0	694.2
364	285	0	0	7	0.00	0.60	0.85	696	726.6	746.4	729.9	774.3	663.7
365	285	0	3	7	0.00	0.60	0.99	670	662.6	720.5	705.9	752.2	595.2
366	285	0	1	7	0.00	0.40	0.00	686	710.9	721.7	710.0	734.8	650.5

367	285	0	0	7	0.00	0.40	0.40	673	701.1	712.3	699.4	729.4	640.9
368	285	0	1	7	0.00	0.40	0.70	647	675.6	693.6	678.6	717.9	617.3
369	285	0	1	7	0.00	0.40	0.85	631	652.9	680.1	664.6	708.5	595.4
370	285	0	3	7	0.00	0.40	0.99	618	607.3	665.0	651.7	693.6	542.9
371	285	0	1	7	0.00	0.20	0.00	599	622.4	647.0	632.3	673.0	567.7
372	285	0	1	7	0.00	0.20	0.40	597	616.7	643.8	629.2	670.7	562.3
373	285	0	2	7	0.00	0.20	0.70	591	602.7	637.8	623.6	665.6	548.8
374	285	0	2	7	0.00	0.20	0.85	588	590.4	633.5	619.8	661.6	535.8
375	284	1	4	7	0.00	0.20	0.99	584	567.6	628.5	616.1	655.3	502.8
376	285	0	0	7	0.25	1.00	0.00	1016	1019.6	1034.5	1027.9	1011.6	928.2
377	285	0	0	7	0.25	1.00	0.40	990	997.5	1011.2	1003.1	999.5	915.8
378	285	0	0	7	0.25	1.00	0.70	929	952.5	966.9	952.8	978.0	879.4
379	285	0	1	7	0.25	1.00	0.85	880	912.6	934.7	915.3	961.8	842.9
380	285	0	6	7	0.25	1.00	0.99	833	828.0	899.8	878.8	940.1	794.0
381	285	0	0	7	0.25	0.80	0.00	911	919.3	931.1	924.5	914.1	836.4
382	285	0	0	7	0.25	0.80	0.40	888	900.4	911.3	903.1	904.0	826.0
383	285	0	0	7	0.25	0.80	0.70	834	860.9	872.9	859.3	884.9	791.5
384	285	0	2	7	0.25	0.80	0.85	792	823.7	844.8	826.8	870.1	757.9
385	285	0	6	7	0.25	0.80	0.99	753	749.6	813.6	795.1	849.1	710.4
386	285	0	1	7	0.25	0.60	0.00	803	819.9	829.5	821.3	824.2	746.1
387	285	0	0	7	0.25	0.60	0.40	784	806.3	814.5	804.6	816.4	737.2
388	285	0	1	7	0.25	0.60	0.70	742	772.2	784.9	770.7	800.9	707.6
389	285	0	2	7	0.25	0.60	0.85	710	742.2	763.2	746.2	788.5	678.1
390	285	0	6	7	0.25	0.60	0.99	683	680.3	739.1	723.0	770.4	636.0
391	285	0	1	7	0.25	0.40	0.00	695	725.5	734.7	722.5	745.2	659.7
392	285	0	1	7	0.25	0.40	0.40	683	714.9	725.5	712.2	740.1	651.1
393	285	0	2	7	0.25	0.40	0.70	658	690.8	707.5	692.1	729.5	629.2
394	285	0	3	7	0.25	0.40	0.85	642	667.5	694.7	678.7	720.8	609.1
395	285	0	6	7	0.25	0.40	0.99	629	623.4	680.5	666.3	708.2	573.3
396	285	0	3	7	0.25	0.20	0.00	608	636.0	659.6	644.5	683.1	575.3
397	285	0	3	7	0.25	0.20	0.40	606	630.4	656.6	641.7	681.0	570.6
398	285	0	4	7	0.25	0.20	0.70	601	617.8	650.8	636.4	676.3	558.5
399	285	0	5	7	0.25	0.20	0.85	597	606.1	646.8	632.9	672.6	547.5
400	285	0	6	7	0.25	0.20	0.99	594	582.1	642.5	629.9	667.3	525.7
401	285	0	1	7	0.50	1.00	0.00	1063	1071.0	1087.6	1080.8	1056.5	962.1
402	285	0	0	7	0.50	1.00	0.40	1041	1051.7	1066.2	1057.6	1046.1	956.9
403	285	0	1	7	0.50	1.00	0.70	989	1009.4	1027.4	1012.7	1029.2	933.7
404	285	0	2	7	0.50	1.00	0.85	944	970.0	1000.1	979.0	1017.9	901.5
405	285	0	8	7	0.50	1.00	0.99	891	891.6	972.3	942.7	1009.5	904.0
406	285	0	1	7	0.50	0.80	0.00	949	965.6	976.4	969.0	953.3	863.0
407	285	0	1	7	0.50	0.80	0.40	929	947.9	958.1	949.0	944.4	858.6
408	285	0	2	7	0.50	0.80	0.70	882	910.3	924.1	909.7	928.9	834.5
409	285	0	3	7	0.50	0.80	0.85	844	875.0	900.0	880.5	918.0	806.1
410	285	0	10	7	0.50	0.80	0.99	801	801.9	874.7	849.9	907.7	801.5
411	285	0	1	7	0.50	0.60	0.00	834	863.8	868.9	859.5	858.8	770.8
412	285	0	1	7	0.50	0.60	0.40	817	849.7	855.0	843.9	851.9	766.3
413	285	0	2	7	0.50	0.60	0.70	780	818.5	828.6	813.2	839.0	740.6
414	285	0	3	7	0.50	0.60	0.85	751	788.9	809.9	791.3	829.4	714.0
415	285	0	12	7	0.50	0.60	0.99	724	726.5	789.9	769.6	819.1	708.5
416	285	0	2	7	0.50	0.40	0.00	722	767.1	770.6	757.1	776.5	681.4
417	285	0	2	7	0.50	0.40	0.40	711	757.2	762.1	747.5	772.1	678.1
418	285	0	3	7	0.50	0.40	0.70	689	733.1	746.1	729.5	763.2	655.5
419	285	0	6	7	0.50	0.40	0.85	675	711.4	735.0	717.5	756.3	638.9
420	285	0	15	7	0.50	0.40	0.99	663	664.8	723.1	706.7	748.3	628.6
421	285	0	5	7	0.50	0.20	0.00	636	677.9	694.4	678.6	713.0	596.9
422	285	0	6	7	0.50	0.20	0.40	633	671.6	691.6	676.0	711.2	593.3
423	285	0	8	7	0.50	0.20	0.70	629	656.1	686.5	671.5	707.2	582.4
424	285	0	10	7	0.50	0.20	0.85	626	642.5	683.0	668.3	704.2	573.0
425	285	0	16	7	0.50	0.20	0.99	623	618.9	679.3	664.7	700.6	564.7
426	285	0	1	7	0.75	1.00	0.00	1142	1156.0	1172.0	1164.9	1129.8	1027.1
427	285	0	1	7	0.75	1.00	0.40	1125	11[illegible]3.9	1153.3	1144.1	1121.4	1028.1
428	285	0	2	7	0.75	1.00	0.70	1082	1098.2	1121.8	1105.9	1110.3	1014.5
429	285	0	4	7	0.75	1.00	0.85	1041	1062.4	1100.7	1076.2	1105.1	1009.0
430	285	0	19	7	0.75	1.00	0.99	982	984.0	1081.0	1039.9	1107.2	1037.2
431	285	0	1	7	0.75	0.80	0.00	1013	1042.3	1048.8	1040.4	1016.9	912.6
432	285	0	2	7	0.75	0.80	0.40	997	1025.6	1032.7	1022.4	1009.5	910.9
433	285	0	2	7	0.75	0.80	0.70	959	991.6	1004.8	988.8	998.9	902.2
434	285	0	6	7	0.75	0.80	0.85	924	956.8	985.8	963.4	992.9	891.5
435	285	0	21	7	0.75	0.80	0.99	879	885.7	967.4	934.2	992.1	915.5
436	285	0	2	7	0.75	0.60	0.00	867	933.8	932.2	921.3	914.7	8[illegible]5.0
437	285	0	2	7	0.75	0.60	0.40	874	920.8	920.0	907.2	909.0	810.6
438	285	0	4	7	0.75	0.60	0.70	843	890.9	898.1	881.0	899.7	798.9
439	285	0	9	7	0.75	0.60	0.85	817	859.0	883.2	862.1	894.0	787.4
440	285	0	22	7	0.75	0.60	0.99	789	798.5	868.3	842.1	891.0	798.8
441	285	0	4	7	0.75	0.40	0.00	769	831.4	828.3	813.2	827.4	723.3
442	285	0	6	7	0.75	0.40	0.40	760	819.7	820.9	804.7	823.7	718.2
443	285	0	9	7	0.75	0.40	0.70	742	796.2	807.6	789.4	817.0	706.2
444	285	0	14	7	0.75	0.40	0.85	730	775.3	798.6	779.2	812.6	694.0
445	285	0	25	7	0.75	0.40	0.99	719	730.4	789.5	770.5	809.2	701.8
446	285	0	17	7	0.75	0.20	0.00	683	732.2	750.2	733.6	761.4	636.8
447	285	0	17	7	0.75	0.20	0.40	681	727.3	747.8	731.5	760.0	634.4
448	285	0	20	7	0.75	0.20	0.70	678	714.4	743.5	727.9	757.1	626.5
449	285	0	22	7	0.75	0.20	0.85	675	701.9	740.7	725.2	755.0	620.1
450	285	0	28	7	0.75	0.20	0.99	673	680.5	737.8	723.4	753.1	622.3
451	285	0	2	7	1.00	1.00	0.00	1253	1268.7	1283.3	1276.3	1229.4	1136.4
452	285	0	2	7	1.00	1.00	0.40	1239	1251.8	1267.8	1258.2	1223.0	1140.4
453	285	0	3	7	1.00	1.00	0.70	1202	1215.4	1243.9	1226.1	1217.3	1132.2
454	285	0	14	7	1.00	1.00	0.85	1162	1176.8	1228.8	1199.4	1217.6	1137.0
455	285	0	34	7	1.00	1.00	0.99	1099	1103.2	1216.2	1163.0	1226.2	1176.5
456	285	0	3	7	1.00	0.80	0.00	1106	1143.0	1145.3	1136.3	1103.6	1005.3
457	285	0	2	7	1.00	0.80	0.40	1093	1129.6	1131.8	1120.7	1097.9	1008.5
458	285	0	7	7	1.00	0.80	0.70	1061	1092.0	1110.4	1092.5	1092.0	1000.7

459	285	0	16	7	1.00	0.80	0.85	1027	1058.9	1096.5	1070.1	1090.8	1001.6
460	285	0	36	7	1.00	0.80	0.99	980	992.1	1084.2	1041.7	1096.2	1030.1
461	285	0	5	7	1.00	0.60	0.00	965	1022.3	1017.4	1005.2	990.9	883.2
462	285	0	6	7	1.00	0.60	0.40	955	1010.2	1007.2	993.1	986.6	886.3
463	285	0	13	7	1.00	0.60	0.70	929	979.7	990.2	971.2	981.1	878.9
464	285	0	22	7	1.00	0.60	0.85	905	950.8	979.1	954.9	979.1	878.5
465	285	0	40	7	1.00	0.60	0.99	877	894.1	968.8	936.7	981.5	900.4
466	285	0	12	7	1.00	0.40	0.00	839	912.9	906.3	890.1	896.1	776.5
467	285	0	14	7	1.00	0.40	0.40	832	902.9	900.1	882.8	893.3	777.1
468	285	0	22	7	1.00	0.40	0.70	818	877.7	889.7	870.3	889.3	767.8
469	285	0	29	7	1.00	0.40	0.85	807	851.1	882.9	861.7	887.3	768.9
470	285	0	42	7	1.00	0.40	0.99	797	816.2	876.5	854.3	887.7	784.6
471	285	0	30	7	1.00	0.20	0.00	753	807.1	825.2	808.5	826.2	684.3
472	285	0	31	7	1.00	0.20	0.40	752	801.2	823.2	807.0	825.1	680.5
473	285	0	33	7	1.00	0.20	0.70	749	791.3	819.9	804.3	823.3	676.0
474	285	0	37	7	1.00	0.20	0.85	747	780.0	817.7	802.0	822.3	676.3
475	285	0	51	7	1.00	0.20	0.99	745	753.0	815.7	801.1	822.0	685.0
476	285	0	24	7	1.50	1.00	0.00	1550	1545.1	1568.8	1563.7	1489.6	1404.7
477	285	0	36	7	1.50	1.00	0.40	1538	1521.1	1558.9	1550.2	1486.7	1409.5
478	285	0	47	7	1.50	1.00	0.70	1500	1480.1	1547.0	1524.5	1489.9	1431.4
479	285	0	63	7	1.50	1.00	0.85	1459	1448.6	1540.6	1500.5	1496.4	1445.4
480	285	0	93	7	1.50	1.00	0.99	1393	1397.8	1537.3	1463.4	1509.7	1493.4
481	285	0	32	7	1.50	0.80	0.00	1366	1384.4	1396.8	1389.0	1332.9	1239.6
482	285	0	39	7	1.50	0.80	0.40	1355	1364.3	1388.3	1377.7	1330.5	1248.2
483	285	0	51	7	1.50	0.80	0.70	1323	1326.7	1377.4	1356.2	1332.4	1255.3
484	285	0	64	7	1.50	0.80	0.85	1289	1298.4	1371.2	1336.8	1337.2	1274.6
485	285	0	92	7	1.50	0.80	0.99	1243	1248.3	1367.2	1309.6	1348.1	1314.0
486	285	0	40	7	1.50	0.60	0.00	1196	1230.3	1242.1	1230.6	1194.8	1091.7
487	285	0	44	7	1.50	0.60	0.40	1187	1217.3	1235.7	1222.1	1193.1	1100.6
488	285	0	61	7	1.50	0.60	0.70	1163	1190.0	1226.8	1206.1	1193.8	1100.3
489	285	0	68	7	1.50	0.60	0.85	1140	1166.6	1221.7	1193.0	1197.1	1118.0
490	285	0	95	7	1.50	0.60	0.99	1115	1116.7	1217.8	1177.4	1205.0	1150.4
491	285	0	52	7	1.50	0.40	0.00	1054	1102.6	1113.2	1098.7	1081.6	964.2
492	285	0	62	7	1.50	0.40	0.40	1049	1086.8	1109.4	1094.1	1080.5	969.5
493	285	0	65	7	1.50	0.40	0.70	1036	1071.8	1104.0	1085.5	1080.6	970.7
494	285	0	79	7	1.50	0.40	0.85	1027	1043.4	1100.7	1078.7	1082.4	981.9
495	285	0	102	7	1.50	0.40	0.99	1017	1004.9	1098.0	1072.0	1087.1	1005.2
496	285	0	73	7	1.50	0.20	0.00	964	991.8	1023.6	1011.0	1001.3	856.8
497	285	0	75	7	1.50	0.20	0.40	962	983.4	1022.5	1009.8	1001.0	859.7
498	285	0	82	7	1.50	0.20	0.70	960	966.3	1020.8	1008.2	1001.0	858.8
499	285	0	89	7	1.50	0.20	0.85	957	952.7	1019.7	1007.2	1001.6	867.4
500	285	0	106	7	1.50	0.20	0.99	952	922.2	1018.8	1004.7	1003.1	880.4
501	285	0	98	7	2.00	1.00	0.00	1907	1836.1	1910.4	1909.3	1807.7	1744.4
502	285	0	99	7	2.00	1.00	0.40	1892	1820.9	1904.2	1897.7	1806.7	1754.7
503	285	0	122	7	2.00	1.00	0.70	1850	1791.9	1899.0	1872.6	1813.6	1793.8
504	285	0	139	7	2.00	1.00	0.85	1807	1766.8	1897.1	1849.0	1821.4	1818.0
505	285	0	179	7	2.00	1.00	0.99	1746	1692.5	1898.2	1812.9	1833.6	1852.6
506	285	0	97	7	2.00	0.80	0.00	1691	1639.3	1702.7	1699.6	1616.9	1541.2
507	285	0	102	7	2.00	0.80	0.40	1677	1624.3	1697.5	1690.0	1615.9	1545.5
508	285	0	123	7	2.00	0.80	0.70	1641	1596.6	1692.6	1669.8	1622.0	1576.8
509	285	0	140	7	2.00	0.80	0.85	1608	1575.9	1690.4	1651.5	1628.7	1600.9
510	285	0	178	7	2.00	0.80	0.99	1568	1496.4	1690.5	1626.4	1639.5	1633.3
511	285	0	104	7	2.00	0.60	0.00	1497	1461.7	1518.9	1513.1	1449.7	1354.1
512	285	0	107	7	2.00	0.60	0.40	1486	1447.9	1515.1	1506.2	1449.1	1353.1
513	285	0	127	7	2.00	0.60	0.70	1460	1424.8	1511.0	1492.1	1453.9	1382.8
514	285	0	143	7	2.00	0.60	0.85	1440	1407.0	1509.1	1480.2	1459.3	1403.7
515	285	0	175	7	2.00	0.60	0.99	1418	1328.4	1508.4	1466.3	1468.1	1436.0
516	285	0	118	7	2.00	0.40	0.00	1342	1302.3	1369.6	1362.7	1314.7	1198.2
517	285	0	122	7	2.00	0.40	0.40	1335	1302.3	1367.4	1359.3	1314.5	1201.0
518	285	0	138	7	2.00	0.40	0.70	1322	1272.5	1364.7	1352.4	1317.6	1211.8
519	285	0	155	7	2.00	0.40	0.85	1313	1239.0	1363.5	1347.2	1321.4	1233.5
520	285	0	177	7	2.00	0.40	0.99	1303	1195.6	1362.8	1341.1	1327.3	1262.3
521	285	0	151	7	2.00	0.20	0.00	1241	1182.5	1268.9	1265.5	1222.0	1076.0
522	285	0	156	7	2.00	0.20	0.40	1239	1155.4	1288.3	1264.6	1222.0	1074.2
523	285	0	162	7	2.00	0.20	0.70	1236	1140.2	1267.5	1264.8	1223.6	1084.4
524	285	0	168	7	2.00	0.20	0.85	1233	1123.6	1267.1	1265.1	1225.1	1093.9
525	285	0	180	7	2.00	0.20	0.99	1226	1101.6	1266.8	1261.6	1227.6	1116.2
526	200	0	0	10	0.00	1.00	0.00	1000	998.0	1009.5	1004.5	997.5	858.5
527	200	0	0	10	0.00	1.00	0.40	973	974.2	984.6	978.3	984.6	845.4
528	200	0	0	10	0.00	1.00	0.70	908	924.1	934.3	922.3	961.1	820.9
529	200	0	0	10	0.00	1.00	0.85	857	878.7	897.8	879.7	942.5	792.6
530	200	0	0	10	0.00	1.00	0.99	813	785.4	858.0	840.5	913.4	760.2
531	200	0	0	10	0.00	0.80	0.00	898	899.2	908.7	903.9	902.0	775.2
532	200	0	0	10	0.00	0.80	0.40	874	878.8	887.4	881.2	891.1	766.2
533	200	0	0	10	0.00	0.80	0.70	818	834.5	843.9	832.3	870.0	742.4
534	200	0	0	10	0.00	0.80	0.85	774	794.3	812.4	795.6	853.6	714.3
535	200	0	0	10	0.00	0.80	0.99	736	711.2	777.3	761.4	827.1	632.2
536	200	0	0	10	0.00	0.60	0.00	793	800.8	807.7	801.7	813.5	700.1
537	200	0	0	10	0.00	0.60	0.40	773	784.5	791.5	783.7	805.1	689.0
538	200	0	0	10	0.00	0.60	0.70	729	748.0	758.5	745.8	788.5	664.5
539	200	0	0	10	0.00	0.60	0.85	696	714.4	734.4	718.4	774.7	641.2
540	200	0	0	10	0.00	0.60	0.99	670	645.5	707.8	693.5	752.8	568.9
541	200	0	0	10	0.00	0.40	0.00	686	704.3	711.9	701.5	735.3	620.2
542	200	0	0	10	0.00	0.40	0.40	673	692.6	702.1	690.4	729.8	611.2
543	200	0	0	10	0.00	0.40	0.70	647	665.9	682.6	668.0	718.4	595.6
544	200	0	0	10	0.00	0.40	0.85	631	641.1	668.6	653.3	709.0	573.1
545	200	0	0	10	0.00	0.40	0.99	618	590.6	653.1	640.2	694.2	512.4
546	200	0	0	10	0.00	0.20	0.00	599	611.5	635.9	621.5	673.4	548.1
547	200	0	0	10	0.00	0.20	0.40	597	605.3	632.8	618.4	671.1	541.6
548	200	0	0	10	0.00	0.20	0.70	591	590.5	626.6	612.7	666.1	529.3
549	200	0	0	10	0.00	0.20	0.85	588	577.0	622.3	609.1	662.0	516.6
550	200	0	0	10	0.00	0.20	0.99	584	560.4	617.6	605.7	656.1	462.5

551	200	0	0	10	0.25	1.00	0.00	1016	1015.2	1027.1	1022.3	1011.7	855.9
552	200	0	0	10	0.25	1.00	0.40	990	991.8	1003.3	997.1	999.6	835.1
553	200	0	0	10	0.25	1.00	0.70	929	943.0	955.5	943.6	978.2	814.5
554	200	0	0	10	0.25	1.00	0.85	880	898.8	920.9	902.7	962.1	808.1
555	200	0	0	10	0.25	1.00	0.99	833	808.3	883.8	862.8	940.6	767.6
556	200	0	0	10	0.25	0.80	0.00	911	914.9	923.5	918.5	914.3	772.9
557	200	0	0	10	0.25	0.80	0.40	888	894.9	903.1	896.6	904.2	748.9
558	200	0	0	10	0.25	0.80	0.70	834	851.7	861.6	849.8	885.2	736.5
559	200	0	0	10	0.25	0.80	0.85	792	812.5	831.7	814.5	870.3	724.9
560	200	0	0	10	0.25	0.80	0.99	753	732.0	798.9	780.4	849.4	684.3
561	200	0	0	10	0.25	0.60	0.00	803	815.5	820.7	814.0	824.4	688.1
562	200	0	0	10	0.25	0.60	0.40	784	799.5	804.9	796.6	816.6	677.2
563	200	0	0	10	0.25	0.60	0.70	742	764.0	773.4	760.2	801.2	664.1
564	200	0	0	10	0.25	0.60	0.85	710	731.1	750.6	733.9	788.7	652.6
565	200	0	0	10	0.25	0.60	0.99	683	664.5	725.6	709.4	770.6	607.8
566	200	0	0	10	0.25	0.40	0.00	695	718.6	723.8	712.7	745.3	618.2
567	200	0	0	10	0.25	0.40	0.40	683	707.2	714.3	701.8	740.3	609.6
568	200	0	0	10	0.25	0.40	0.70	658	681.2	695.6	680.4	729.7	604.6
569	200	0	0	10	0.25	0.40	0.85	642	657.2	682.4	666.3	721.1	581.7
570	200	0	0	10	0.25	0.40	0.99	629	608.4	667.8	653.7	708.4	540.9
571	200	0	0	10	0.25	0.20	0.00	608	626.5	647.6	632.4	683.3	542.4
572	200	0	0	10	0.25	0.20	0.40	606	620.5	644.6	629.5	681.2	540.1
573	200	0	0	10	0.25	0.20	0.70	601	606.2	638.7	624.1	676.5	530.9
574	200	0	0	10	0.25	0.20	0.85	597	593.1	634.7	620.8	672.8	516.2
575	200	0	0	10	0.25	0.20	0.99	594	567.5	630.3	617.6	667.6	485.1
576	200	0	0	10	0.50	1.00	0.00	1063	1067.1	1078.7	1073.8	1056.4	894.3
577	200	0	0	10	0.50	1.00	0.40	1041	1044.9	1057.3	1051.1	1045.9	882.4
578	200	0	0	10	0.50	1.00	0.70	989	998.9	1015.9	1003.9	1029.0	885.1
579	200	0	0	10	0.50	1.00	0.85	944	958.0	986.4	966.8	1017.9	870.3
580	200	0	1	10	0.50	1.00	0.99	891	875.3	955.8	925.6	1009.7	892.6
581	200	0	0	10	0.50	0.80	0.00	949	961.9	967.2	961.5	953.1	802.6
582	200	0	0	10	0.50	0.80	0.40	929	942.9	948.8	941.6	944.3	793.3
583	200	0	0	10	0.50	0.80	0.70	882	902.3	912.5	899.9	928.9	797.2
584	200	0	0	10	0.50	0.80	0.85	844	865.8	886.7	868.1	917.9	770.7
585	200	0	1	10	0.50	0.80	0.99	801	792.0	859.3	834.0	907.8	790.6
586	200	0	0	10	0.50	0.60	0.00	834	859.1	858.5	850.5	858.7	716.4
587	200	0	0	10	0.50	0.60	0.40	817	844.0	844.3	834.6	851.8	720.4
588	200	0	0	10	0.50	0.60	0.70	780	810.5	816.5	802.1	838.9	714.7
589	200	0	0	10	0.50	0.60	0.85	751	780.1	796.8	778.3	829.3	687.2
590	200	0	1	10	0.50	0.60	0.99	724	718.5	775.6	754.7	819.1	693.6
591	200	0	0	10	0.50	0.40	0.00	722	760.8	758.4	745.4	776.5	651.3
592	200	0	0	10	0.50	0.40	0.40	711	750.0	749.9	735.6	772.1	650.6
593	200	0	0	10	0.50	0.40	0.70	689	725.8	733.4	716.7	763.1	630.1
594	200	0	0	10	0.50	0.40	0.85	675	703.4	721.9	704.0	756.2	610.7
595	200	0	2	10	0.50	0.40	0.99	663	658.7	709.5	692.4	748.3	606.5
596	200	0	0	10	0.50	0.20	0.00	636	669.8	681.5	665.0	712.9	573.2
597	200	0	0	10	0.50	0.20	0.40	633	664.2	678.8	662.5	711.1	566.0
598	200	0	1	10	0.50	0.20	0.70	629	650.6	673.6	657.8	707.2	557.6
599	200	0	1	10	0.50	0.20	0.85	626	638.4	670.1	654.8	704.2	546.2
600	200	0	2	10	0.50	0.20	0.99	623	615.4	666.4	652.0	700.6	536.5
601	200	0	0	10	0.75	1.00	0.00	1142	1151.3	1161.6	1156.9	1129.4	960.7
602	200	0	0	10	0.75	1.00	0.40	1125	1131.0	1143.5	1137.4	1120.9	970.6
603	200	0	0	10	0.75	1.00	0.70	1082	1089.4	1110.3	1097.4	1109.8	951.8
604	200	0	0	10	0.75	1.00	0.85	1041	1052.9	1087.1	1064.3	1104.8	940.2
605	200	0	5	10	0.75	1.00	0.99	982	983.3	1064.1	1021.6	1107.0	1034.6
606	200	0	0	10	0.75	0.80	0.00	1013	1038.2	1038.1	1031.5	1016.3	859.8
607	200	0	0	10	0.75	0.80	0.40	997	1020.8	1022.4	1014.3	1009.0	847.6
608	200	0	0	10	0.75	0.80	0.70	959	984.0	992.8	979.0	998.4	854.6
609	200	0	1	10	0.75	0.80	0.85	924	951.0	972.5	950.9	992.5	840.7
610	200	0	7	10	0.75	0.80	0.99	879	884.3	951.6	917.0	991.9	895.6
611	200	0	0	10	0.75	0.60	0.00	887	929.6	920.4	910.6	914.3	758.5
612	200	0	0	10	0.75	0.60	0.40	874	915.8	908.3	896.8	908.6	752.4
613	200	0	0	10	0.75	0.60	0.70	843	885.6	885.6	869.3	899.3	755.7
614	200	0	1	10	0.75	0.60	0.85	817	857.8	869.7	848.5	893.7	748.8
615	200	0	8	10	0.75	0.60	0.99	789	800.0	853.5	826.1	890.8	784.1
616	200	0	0	10	0.75	0.40	0.00	769	828.5	815.3	799.9	827.0	684.3
617	200	0	1	10	0.75	0.40	0.40	760	818.2	808.0	791.6	823.4	683.3
618	200	0	1	10	0.75	0.40	0.70	742	796.2	794.5	775.7	816.7	675.4
619	200	0	1	10	0.75	0.40	0.85	730	776.2	785.1	765.0	812.2	661.2
620	200	0	9	10	0.75	0.40	0.99	719	733.3	775.5	754.6	808.8	685.3
621	200	0	1	10	0.75	0.20	0.00	683	737.9	736.7	719.1	761.1	611.9
622	200	0	2	10	0.75	0.20	0.40	681	733.1	734.4	716.9	759.6	608.4
623	200	0	5	10	0.75	0.20	0.70	678	719.3	730.2	713.1	756.7	599.3
624	200	0	8	10	0.75	0.20	0.85	675	706.3	[illegible]	710.7	754.6	592.6
625	200	0	12	10	0.75	0.20	0.99	673	681.9	[illegible]	708.4	752.7	600.5
626	200	0	0	10	1.00	1.00	0.00	1253	1264.4	1272.3	1268.0	1228.6	051.1
627	200	0	1	10	1.00	1.00	0.40	1239	1244.8	1257.4	1251.4	1222.2	1083.2
628	200	0	2	10	1.00	1.00	0.70	1202	1207.5	1232.2	1217.7	1216.6	1081.3
629	200	0	4	10	1.00	1.00	0.85	1162	1176.7	1215.3	1187.5	1217.0	1107.3
630	200	0	13	10	1.00	1.00	0.99	1099	1105.6	1199.5	1143.9	1225.8	1179.4
631	200	0	0	10	1.00	0.80	0.00	1106	1140.5	1133.8	1126.7	1102.8	938.1
632	200	0	1	10	1.00	0.80	0.40	1093	1123.5	1120.8	1112.0	1097.2	968.6
633	200	0	2	10	1.00	0.80	0.70	1061	1090.2	1098.2	1082.5	1091.2	956.7
634	200	0	4	10	1.00	0.80	0.85	1027	1062.5	1083.1	1057.3	1090.2	964.4
635	200	0	14	10	1.00	0.80	0.99	980	994.4	1068.5	1023.9	1095.7	1031.5
636	200	0	1	10	1.00	0.60	0.00	965	1023.2	1005.0	993.5	990.2	827.9
637	200	0	2	10	1.00	0.60	0.40	955	1009.4	995.1	981.9	985.8	843.6
638	200	0	4	10	1.00	0.60	0.70	929	983.3	977.4	959.0	980.3	835.3
639	200	0	6	10	1.00	0.60	0.85	905	956.5	965.6	940.8	978.4	834.8
640	200	0	17	10	1.00	0.60	0.99	877	897.8	954.0	919.9	981.0	893.4
641	200	0	2	10	1.00	0.40	0.00	839	916.1	893.0	876.0	895.4	738.5
642	200	0	4	10	1.00	0.40	0.40	832	907.9	887.0	869.1	892.6	746.1

643	200	0	6	10	1.00	0.40	0.70	818	885.6	876.6	856.1	888.5	733.3
644	200	0	13	10	1.00	0.40	0.85	807	862.0	869.5	847.1	886.6	738.6
645	200	0	23	10	1.00	0.40	0.99	797	815.0	862.4	838.2	887.0	774.7
646	200	0	13	10	1.00	0.20	0.00	753	817.6	811.8	793.7	825.5	643.2
647	200	0	13	10	1.00	0.20	0.40	752	813.1	810.0	792.0	824.3	637.3
648	200	0	13	10	1.00	0.20	0.70	749	802.4	806.7	789.0	822.6	637.3
649	200	0	16	10	1.00	0.20	0.85	747	786.5	804.5	787.0	821.6	641.5
650	200	0	27	10	1.00	0.20	0.99	745	755.4	802.3	785.0	821.3	655.9
651	200	0	10	10	1.50	1.00	0.00	1550	1548.7	1557.9	1557.0	1488.4	1301.5
652	200	0	12	10	1.50	1.00	0.40	1538	1529.6	1548.3	1543.3	1485.5	1332.5
653	200	0	20	10	1.50	1.00	0.70	1500	1492.0	1535.4	1515.3	1489.0	1370.8
654	200	0	32	10	1.50	1.00	0.85	1459	1459.0	1527.6	1487.6	1495.5	1432.2
655	200	0	60	10	1.50	1.00	0.99	1393	1401.0	1522.0	1444.2	1508.8	1511.2
656	200	0	13	10	1.50	0.80	0.00	1366	1389.6	1385.7	1380.4	1331.6	1161.2
657	200	0	15	10	1.50	0.80	0.40	1355	1377.0	1377.4	1368.8	1329.4	1185.3
658	200	0	21	10	1.50	0.80	0.70	1323	1342.3	1365.5	1345.1	1331.3	1197.3
659	200	0	34	10	1.50	0.80	0.85	1289	1310.7	1358.3	1323.1	1336.2	1246.1
660	200	0	62	10	1.50	0.80	0.99	1243	1249.5	1352.6	1291.8	1347.1	1321.7
661	200	0	16	10	1.50	0.60	0.00	1196	1250.7	1230.5	1219.8	1193.7	1018.0
662	200	0	18	10	1.50	0.60	0.40	1187	1237.3	1224.2	1210.9	1192.0	1045.5
663	200	0	25	10	1.50	0.60	0.70	1163	1204.8	1214.8	1193.5	1192.6	1047.0
664	200	0	39	10	1.50	0.60	0.85	1140	1170.7	1209.0	1178.6	1196.0	1084.0
665	200	0	60	10	1.50	0.60	0.99	1115	1117.6	1204.1	1160.8	1204.0	1143.8
666	200	0	26	10	1.50	0.40	0.00	1054	1115.8	1101.3	1086.2	1080.4	899.2
667	200	0	28	10	1.50	0.40	0.40	1049	1104.8	1097.5	1081.1	1079.4	916.7
668	200	0	37	10	1.50	0.40	0.70	1036	1079.8	1091.9	1071.6	1079.4	926.2
669	200	0	40	10	1.50	0.40	0.85	1027	1063.4	1088.3	1064.0	1081.3	945.3
670	200	0	62	10	1.50	0.40	0.99	1017	1015.1	1085.3	1058.8	1085.9	989.7
671	200	0	40	10	1.50	0.20	0.00	964	1002.1	1012.0	998.1	1000.0	795.7
672	200	0	43	10	1.50	0.20	0.40	962	996.4	1010.9	996.9	999.6	806.6
673	200	0	50	10	1.50	0.20	0.70	960	983.1	1009.1	995.0	999.7	818.5
674	200	0	57	10	1.50	0.20	0.85	957	961.1	1008.0	994.0	1000.3	829.8
675	200	0	68	10	1.50	0.20	0.99	952	941.6	1007.0	991.0	1001.9	845.6
676	200	0	45	10	2.00	1.00	0.00	1907	1864.9	1900.9	1905.1	1806.4	1633.2
677	200	0	50	10	2.00	1.00	0.40	1892	1845.4	1894.5	1891.3	1805.4	1687.7
678	200	0	65	10	2.00	1.00	0.70	1850	1813.3	1888.2	1862.9	1812.5	1731.4
679	200	0	87	10	2.00	1.00	0.85	1807	1772.6	1885.3	1835.6	1820.2	1783.8
680	200	0	124	10	2.00	1.00	0.99	1746	1690.0	1884.8	1795.0	1832.6	1862.4
681	200	0	47	10	2.00	0.80	0.00	1691	1674.0	1693.2	1693.8	1615.4	1436.5
682	200	0	54	10	2.00	0.80	0.40	1677	1657.2	1687.8	1682.4	1614.7	1467.6
683	200	0	69	10	2.00	0.80	0.70	1641	1621.6	1681.8	1659.0	1620.8	1516.4
684	200	0	87	10	2.00	0.80	0.85	1008	1589.0	1678.9	1637.9	1627.5	1560.7
685	200	0	122	10	2.00	0.80	0.99	1568	1500.4	1677.8	1610.3	1638.3	1637.6
686	200	0	54	10	2.00	0.60	0.00	1497	1497.0	1509.3	1505.9	1448.3	1273.8
687	200	0	58	10	2.00	0.60	0.40	1486	1481.5	1505.3	1497.4	1447.7	1280.5
688	200	0	76	10	2.00	0.60	0.70	1460	1451.1	1500.5	1480.8	1452.6	1314.6
689	200	0	89	10	2.00	0.60	0.85	1440	1426.4	1498.1	1466.8	1458.0	1356.3
690	200	0	123	10	2.00	0.60	0.99	1418	1341.1	1496.8	1452.9	1466.8	1426.5
691	200	0	67	10	2.00	0.40	0.00	1342	1345.2	1360.0	1364.4	1313.2	1116.3
692	200	0	75	10	2.00	0.40	0.40	1335	1329.8	1357.7	1349.7	1313.1	1136.8
693	200	0	91	10	2.00	0.40	0.70	1322	1299.1	1354.8	1341.3	1316.3	1147.2
694	200	0	104	10	2.00	0.40	0.85	1313	1262.3	1353.2	1334.7	1319.9	1193.7
695	200	0	123	10	2.00	0.40	0.99	1303	1216.4	1352.4	1328.0	1325.9	1239.1
696	200	0	105	10	2.00	0.20	0.00	1241	1183.6	1259.9	1256.3	1220.4	989.1
697	200	0	107	10	2.00	0.20	0.40	1239	1176.9	1259.2	1255.7	1220.6	993.7
698	200	0	111	10	2.00	0.20	0.70	1236	1159.3	1258.2	1254.8	1222.1	1014.6
699	200	0	115	10	2.00	0.20	0.85	1233	1148.0	1257.7	1254.7	1223.6	1035.4
700	200	0	129	10	2.00	0.20	0.99	1226	1113.0	1257.5	1255.0	1226.1	1075.7
701	133	0	0	15	0.00	1.00	0.00	1000	996.1	1007.2	1002.2	997.3	834.1
702	133	0	0	15	0.00	1.00	0.40	973	971.5	980.0	974.8	984.2	808.5
703	133	0	0	15	0.00	1.00	0.70	908	919.3	926.6	916.1	960.6	802.9
704	133	0	0	15	0.00	1.00	0.85	867	871.7	888.9	871.6	941.9	771.3
705	133	0	0	15	0.00	1.00	0.99	813	772.2	849.0	832.2	912.8	657.9
706	133	0	0	15	0.00	0.80	0.00	898	897.2	906.3	901.8	901.7	748.0
707	133	0	0	15	0.00	0.80	0.40	874	876.2	883.1	878.0	890.7	741.3
708	133	0	0	15	0.00	0.80	0.70	818	830.1	837.1	826.8	870.0	722.4
709	133	0	0	15	0.00	0.80	0.85	774	787.7	804.4	788.2	853.2	690.3
710	133	0	0	15	0.00	0.80	0.99	736	699.2	769.2	754.0	826.5	594.6
711	133	0	0	15	0.00	0.60	0.00	793	798.1	803.9	798.9	813.1	690.8
712	133	0	0	15	0.00	0.60	0.40	773	781.2	786.5	780.1	804.7	683.7
713	133	0	0	15	0.00	0.60	0.70	729	743.2	751.7	740.1	788.0	657.0
714	133	0	0	15	0.00	0.60	0.85	696	707.7	727.1	711.5	774.2	614.3
715	133	0	0	15	0.00	0.60	0.99	670	634.2	700.4	686.7	752.1	540.1
716	133	0	0	15	0.00	0.40	0.00	686	700.0	706.2	697.0	734.8	605.7
717	133	0	0	15	0.00	0.40	0.40	673	687.9	695.9	685.2	729.4	603.1
718	133	0	0	15	0.00	0.40	0.70	647	659.9	675.8	661.7	717.9	566.2
719	133	0	0	15	0.00	0.40	0.85	631	633.6	661.6	646.6	708.5	553.0
720	133	0	0	15	0.00	0.40	0.99	618	579.9	646.3	633.9	693.7	491.5
721	133	0	0	15	0.00	0.20	0.00	599	604.5	629.2	615.1	672.9	530.4
722	133	0	0	15	0.00	0.20	0.40	597	598.0	626.1	611.9	670.6	523.9
723	133	0	0	15	0.00	0.20	0.70	591	582.5	620.0	606.4	665.7	511.9
724	133	0	0	15	0.00	0.20	0.85	588	568.1	615.8	603.1	661.6	501.7
725	133	0	0	15	0.00	0.20	0.99	584	539.5	611.2	599.7	655.6	432.2
726	133	0	0	15	0.25	1.00	0.00	1016	1012.8	1024.1	1019.1	1011.6	830.6
727	133	0	0	15	0.25	1.00	0.40	990	988.6	997.9	992.7	999.4	812.0
728	133	0	0	15	0.25	1.00	0.70	929	937.5	947.1	936.7	978.0	782.1
729	133	0	0	15	0.25	1.00	0.85	880	891.2	911.4	803.8	961.7	757.9
730	133	0	0	15	0.25	1.00	0.99	833	794.7	873.9	853.5	940.1	757.3
731	133	0	0	15	0.25	0.80	0.00	911	912.5	920.3	915.5	914.2	729.8
732	133	0	0	15	0.25	0.80	0.40	888	891.8	897.9	892.6	903.9	737.9
733	133	0	0	15	0.25	0.80	0.70	834	846.8	864.0	843.5	885.0	704.5
734	133	0	0	15	0.25	0.80	0.85	792	805.4	822.9	806.4	870.1	698.2

735	133	0	0	15	0.25	0.60	0.99	753	719.5	789.9	771.9	849.1	655.9
736	133	0	0	15	0.25	0.60	0.00	803	812.4	815.9	810.3	824.3	660.5
737	133	0	0	15	0.25	0.60	0.40	784	795.9	799.0	792.1	816.4	666.4
738	133	0	0	15	0.25	0.60	0.70	742	758.6	765.8	753.7	801.0	626.5
739	133	0	0	15	0.25	0.60	0.85	710	724.2	742.4	726.0	788.4	629.7
740	133	0	0	15	0.25	0.60	0.99	683	652.6	717.3	701.6	770.3	569.3
741	133	0	0	15	0.25	0.40	0.00	695	714.1	717.2	707.1	745.2	597.3
742	133	0	0	15	0.25	0.40	0.40	683	702.2	707.3	695.6	740.1	593.2
743	133	0	0	15	0.25	0.40	0.70	658	674.9	688.0	673.1	729.5	568.6
744	133	0	0	15	0.25	0.40	0.85	642	649.4	674.6	658.7	720.8	552.4
745	133	0	0	15	0.25	0.40	0.99	629	597.3	660.2	646.5	708.2	512.4
746	133	0	0	15	0.25	0.20	0.00	608	619.4	640.2	625.2	683.1	524.0
747	133	0	0	15	0.25	0.20	0.40	606	613.0	637.2	622.3	680.9	517.5
748	133	0	0	15	0.25	0.20	0.70	601	597.9	631.3	616.9	676.3	506.3
749	133	0	0	15	0.25	0.20	0.85	597	584.0	627.2	613.8	672.6	495.4
750	133	0	0	15	0.25	0.20	0.99	594	556.3	623.0	610.6	667.3	464.1
751	133	0	0	15	0.50	1.00	0.00	1063	1063.5	1074.4	1069.4	1056.6	851.2
752	133	0	0	15	0.50	1.00	0.40	1041	1040.5	1050.9	1045.7	1046.1	866.7
753	133	0	0	15	0.50	1.00	0.70	989	992.7	1006.8	996.5	1029.1	852.2
754	133	0	0	15	0.50	1.00	0.85	944	949.6	976.1	957.5	1018.0	835.2
755	133	0	0	15	0.50	1.00	0.99	891	861.4	944.7	914.7	1009.5	883.7
756	133	0	0	15	0.50	0.80	0.00	949	958.5	962.3	956.8	953.3	793.2
757	133	0	0	15	0.50	0.80	0.40	929	938.9	942.2	936.0	944.4	795.8
758	133	0	0	15	0.50	0.80	0.70	882	896.6	903.9	892.6	929.0	738.4
759	133	0	0	15	0.50	0.80	0.85	844	858.1	877.1	858.9	918.0	742.2
760	133	0	0	15	0.50	0.80	0.99	801	779.6	849.2	823.8	907.7	781.1
761	133	0	0	15	0.50	0.60	0.00	834	856.[illegible]	852.2	844.9	858.8	722.6
762	133	0	0	15	0.50	0.60	0.40	817	839.7	837.0	828.3	851.9	715.1
763	133	0	0	15	0.50	0.60	0.70	78[illegible]	804.7	807.9	794.0	839.0	664.6
764	133	0	0	15	0.50	0.60	0.85	751	772.6	787.6	769.1	829.4	664.4
765	133	0	0	15	0.50	0.60	0.99	724	707.1	766.3	745.3	819.1	682.0
766	133	0	0	15	0.50	0.40	0.00	722	755.6	750.5	737.9	776.6	636.4
767	133	0	0	15	0.50	0.40	0.40	711	744.6	741.6	727.6	772.1	[illegible]
768	133	0	0	15	0.50	0.40	0.70	689	719.1	724.6	707.7	763.2	[illegible]
769	133	0	0	15	0.50	0.40	0.85	675	695.4	713.0	694.8	756.2	587.0
770	133	0	0	15	0.50	0.40	0.99	663	647.5	700.6	683.5	748.2	604.6
771	133	0	0	15	0.50	0.20	0.00	636	662.5	672.9	656.1	713.0	563.0
772	133	0	0	15	0.50	0.20	0.40	633	656.6	670.1	653.5	711.2	552.1
773	133	0	0	15	0.50	0.20	0.70	629	642.7	665.1	649.0	707.3	535.2
774	133	0	0	15	0.50	0.20	0.85	626	629.8	661.5	646.0	704.2	523.3
775	133	0	0	15	0.50	0.20	0.99	623	604.5	657.8	643.4	700.6	532.8
776	133	0	0	15	0.75	1.00	0.00	1142	1146.8	1156.4	1151.7	1129.8	906.3
777	133	0	0	15	0.75	1.00	0.40	1125	1125.9	1136.4	1131.5	1121.4	876.0
778	133	0	0	15	0.75	1.00	0.70	1082	1082.8	1100.7	1090.0	1110.2	922.8
779	133	0	0	15	0.75	1.00	0.85	1041	1044.5	1076.5	1064.8	1105.2	912.7
780	133	0	1	15	0.75	1.00	0.99	982	967.6	1052.6	1009.3	1107.3	1014.3
781	133	0	0	15	0.75	0.80	0.00	1013	1034.1	1031.9	1025.5	1016.8	827.0
782	133	0	0	15	0.75	0.80	0.40	997	1016.2	1014.8	1007.6	1009.5	807.8
783	133	0	0	15	0.75	0.80	0.70	959	978.0	983.6	970.9	998.9	809.0
784	133	0	0	15	0.75	0.80	0.85	924	943.8	962.2	940.9	992.9	801.7
785	133	0	1	15	0.75	0.80	0.99	879	874.9	940.7	905.3	992.2	893.7
786	133	0	0	15	0.75	0.60	0.00	887	925.4	912.9	903.1	914.7	724.5
787	133	0	0	15	0.75	0.60	0.40	874	911.2	900.0	888.7	909.0	733.0
788	133	0	0	15	0.75	0.60	0.70	843	879.7	876.1	859.8	899.7	708.4
789	133	0	0	15	0.75	0.60	0.85	817	861.1	859.8	838.0	894.0	710.9
790	133	0	2	15	0.75	0.60	0.99	789	793.7	843.1	815.0	891.1	782.9
791	133	0	0	15	0.75	0.40	0.00	769	823.3	806.2	790.3	827.4	663.4
792	133	0	0	15	0.75	0.40	0.40	760	813.3	798.6	781.6	823.8	643.0
793	133	0	0	15	0.75	0.40	0.70	742	790.4	784.8	765.1	817.0	628.8
794	133	0	0	15	0.75	0.40	0.85	730	769.4	775.3	754.0	812.6	646.2
795	133	0	4	15	0.75	0.40	0.99	719	724.6	765.6	743.6	809.2	682.1
796	133	0	0	15	0.75	0.20	0.00	683	731.7	727.1	708.3	761.4	600.6
797	133	0	0	15	0.75	0.20	0.40	681	726.5	724.8	708.1	760.1	577.6
798	133	0	1	15	0.75	0.20	0.70	676	713.8	720.6	702.4	757.1	561.7
799	133	0	1	15	0.75	0.20	0.85	675	702.5	717.7	699.9	755.1	577.5
800	133	0	4	15	0.75	0.20	0.99	673	677.6	714.9	697.7	753.1	584.4
801	133	0	0	15	1.00	1.00	0.00	1253	1259.2	1266.4	1263.2	1229.4	1022.9
802	133	0	0	15	1.00	1.00	0.40	1239	1240.8	1250.1	1245.9	1223.0	1042.3
803	133	0	0	15	1.00	1.00	0.70	1202	1203.3	1222.7	1210.5	1217.3	1035.5
804	133	0	1	15	1.00	1.00	0.85	1162	1169.9	1204.8	1177.6	1217.5	1082.9
805	133	0	6	15	1.00	1.00	0.99	1099	1100.4	1187.8	1130.4	1226.3	1163.8
806	133	0	0	15	1.00	0.80	0.00	1106	1136.1	1127.0	1120.2	1103.5	923.6
807	133	0	0	15	1.00	0.80	0.40	1093	1120.2	1112.9	1105.0	1097.9	910.0
808	133	0	0	15	1.00	0.80	0.70	1061	1086.9	1088.8	1074.1	1092.0	924.2
809	133	0	1	15	1.00	0.80	0.85	1027	1056.9	1072.8	1046.8	1090.9	942.6
810	133	0	6	15	1.00	0.80	0.99	980	993.8	1057.4	1011.0	1096.2	1022.8
811	133	0	0	15	1.00	0.60	0.00	965	1019.6	996.8	984.9	990.8	807.9
812	133	0	0	15	1.00	0.60	0.40	955	1007.2	986.2	972.9	986.6	800.4
813	133	0	0	15	1.00	0.60	0.70	929	979.7	967.8	948.8	981.1	824.5
814	133	0	1	15	1.00	0.60	0.85	905	954.6	955.5	929.4	979.1	819.2
815	133	0	6	15	1.00	0.60	0.99	877	900.7	943.3	907.3	981.6	893.3
816	133	0	0	15	1.00	0.40	0.00	839	913.7	883.5	865.1	896.2	716.3
817	133	0	0	15	1.00	0.40	0.40	832	905.0	877.4	857.8	893.3	707.4
818	133	0	1	15	1.00	0.40	0.70	818	884.6	866.7	844.4	889.2	727.7
819	133	0	4	15	1.00	0.40	0.85	807	863.3	859.5	835.0	887.4	715.3
820	133	0	7	15	1.00	0.40	0.99	797	821.8	852.3	825.5	887.7	777.9
821	133	0	4	15	1.00	0.20	0.00	753	819.3	802.0	781.9	826.2	625.8
822	133	0	4	15	1.00	0.20	0.40	752	814.8	800.2	780.1	825.1	608.2
823	133	0	5	15	1.00	0.20	0.70	749	802.5	796.9	777.0	823.3	625.7
824	133	0	6	15	1.00	0.20	0.85	747	792.4	794.7	775.1	822.3	610.9
825	133	0	8	15	1.00	0.20	0.99	745	768.5	792.5	773.0	821.9	669.9
826	133	0	0	15	1.50	1.00	0.00	1560	1553.0	1552.5	1554.8	1489.6	1274.5

827	133	0	1	15	1.50	1.00	0.40	1538	1538.5	1542.0	1540.6	1486.7	1305.2
828	133	0	7	15	1.50	1.00	0.70	1500	1503.0	1527.3	1509.6	1490.0	1371.9
829	133	0	8	15	1.50	1.00	0.85	1459	1476.2	1518.5	1478.2	1496.5	1410.3
830	133	0	24	15	1.50	1.00	0.99	1393	1403.3	1511.6	1429.8	1509.6	1499.2
831	133	0	1	15	1.50	0.80	0.00	1366	1401.3	1379.5	1376.2	1332.8	1151.2
832	133	0	2	15	1.50	0.80	0.40	1355	1388.0	1370.5	1364.0	1330.5	1164.8
833	133	0	7	15	1.50	0.80	0.70	1323	1356.9	1357.5	1338.0	1332.3	1169.1
834	133	0	12	15	1.50	0.80	0.85	1289	1326.8	1349.4	1312.9	1337.3	1221.1
835	133	0	27	15	1.50	0.80	0.99	1243	1254.7	1342.7	1278.1	1348.1	1316.1
836	133	0	4	15	1.50	0.60	0.00	1196	1258.6	1223.5	1213.2	1194.8	1008.7
837	133	0	6	15	1.50	0.60	0.40	1187	1248.4	1216.7	1203.8	1193.1	1024.5
838	133	0	9	15	1.50	0.60	0.70	1163	1222.2	1206.6	1184.5	1193.7	1038.8
839	133	0	14	15	1.50	0.60	0.85	1140	1192.5	1200.4	1167.7	1197.1	1070.4
840	133	0	27	15	1.50	0.60	0.99	1115	1127.4	194.9	1147.9	1205.0	1139.3
841	133	0	8	15	1.50	0.40	0.00	1054	1136.1	1093.6	1077.3	1081.5	879.8
842	133	0	10	15	1.50	0.40	0.40	1049	1125.3	1089.8	1072.0	1080.5	883.7
843	133	0	15	15	1.50	0.40	0.70	1036	1097.2	1083.8	1061.8	1080.5	902.5
844	133	0	19	15	1.50	0.40	0.85	1027	1079.6	1080.1	1054.4	1082.4	947.0
845	133	0	30	15	1.50	0.40	0.99	1017	1026.4	1076.8	1047.1	1087.1	991.1
846	133	0	19	15	1.50	0.20	0.00	964	1020.6	1004.2	988.7	1001.3	780.2
847	133	0	20	15	1.50	0.20	0.40	962	1015.5	1003.0	987.4	1001.0	781.3
848	133	0	23	15	1.50	0.20	0.70	960	1000.5	1001.2	985.0	1001.0	793.4
849	133	0	26	15	1.50	0.20	0.85	957	982.8	1000.1	983.9	1001.5	809.0
850	133	0	38	15	1.50	0.20	0.99	952	950.6	999.2	982.3	1003.1	851.5
851	133	0	19	15	2.00	1.00	0.00	1907	1880.8	1896.3	1905.1	1807.7	1621.3
852	133	0	24	15	2.00	1.00	0.40	1892	1863.5	1889.5	1891.1	1806.7	1655.3
853	133	0	34	15	2.00	1.00	0.70	1850	1821.3	1881.9	1859.0	1813.6	1699.4
854	133	0	53	15	2.00	1.00	0.85	1807	1781.2	1878.0	1827.6	1821.4	1777.2
855	133	0	90	15	2.00	1.00	0.99	1746	1713.9	1876.2	1781.9	1833.7	1855.2
856	133	0	19	15	2.00	0.80	0.00	1691	1696.0	1688.5	1692.8	1616.8	1395.4
857	133	0	25	15	2.00	0.80	0.40	1677	1672.4	1682.8	1681.0	1615.9	1418.6
858	133	0	34	15	2.00	0.80	0.70	1641	1640.4	1676.0	1654.5	1622.0	1476.9
859	133	0	55	15	2.00	0.80	0.85	1608	1592.7	1672.2	1630.2	1628.7	1556.1
860	133	0	90	15	2.00	0.80	0.99	1568	1520.7	1670.1	1598.9	1639.5	1622.1
861	133	0	24	15	2.00	0.60	0.00	1497	1520.4	1504.5	1503.4	1449.8	1226.0
862	133	0	27	15	2.00	0.60	0.40	1480	1502.7	1500.3	1494.6	1449.1	1262.6
863	133	0	44	15	2.00	0.60	0.70	1460	1462.4	1494.9	1475.8	1453.9	1316.1
864	133	0	57	15	2.00	0.60	0.85	1440	1424.7	1491.9	1460.4	1459.2	1326.8
865	133	0	92	15	2.00	0.60	0.99	1418	1337.0	1489.9	1443.5	1468.0	1423.3
866	133	0	34	15	2.00	0.40	0.00	1342	1358.6	1355.0	1350.9	1314.7	1046.5
867	133	0	38	15	2.00	0.40	0.40	1335	1341.9	1352.6	1346.1	1314.5	1078.5
868	133	0	56	15	2.00	0.40	0.70	1322	1307.3	1349.5	1336.6	1317.7	1133.1
869	133	0	67	15	2.00	0.40	0.85	1313	1274.2	1347.7	1330.1	1321.3	1149.0
870	133	0	94	15	2.00	0.40	0.99	1303	1201.2	1346.5	1322.6	1327.3	1248.4
871	133	0	66	15	2.00	0.20	0.00	1241	1197.2	1255.0	1252.8	1221.9	961.5
872	133	0	69	15	2.00	0.20	0.40	1239	1190.2	1254.4	1251.6	1222.0	954.8
873	133	0	76	15	2.00	0.20	0.70	1236	1179.6	1253.4	1249.7	1223.5	994.0
874	133	0	82	15	2.00	0.20	0.85	1233	1169.5	1252.9	1249.0	1225.1	1005.4
875	133	0	95	15	2.00	0.20	0.99	1226	1111.3	1252.5	1250.3	1227.6	1068.0

Appendix H. SAS Commands for generating Eigenvalues, Scree plots, and Factor Plots

This Appendix contains the SAS commands used to generate the eigenvalue tables, scree plots, and factor plots in chapter four.

```
options ls=75;
TITLE 'Factor Analysis of Mean Squared Erred';
FILENAME NEW 'MSE';
DATA EXAMPLE;
 INFILE NEW;
INPUT  TP SS BIAS ELLIP CORR R234  GRUBBS  CBN RAYLEIGH  ETHRIDGE;
DROP TP;
proc factor data=EXAMPLE scree priors=smc n=2 rotate=varimax out = two
            outstat = three preplot plot score ;
```

The data for which this particular set of commands is set up to analyze is the MSE(RE) data displayed in Appendix M. By changing the filename to 'RE' or 'VARIN', we performed the same analysis on the other two MOEs.

Appendix I. Mean Relative Error Data

This Appendix lists the $\overline{RE}^i$ for each technique at each of the 875 test design points. Where R234 has a $\overline{RE}^i$ of 1.00, that was its assigned value at the points for which it was not allowed to compete. The names of the four factors and the names of the CEP estimation methods for this experiment are abbreviated in the table headings as follows:

<u>Index</u>

Design Point - DP

<u>Factors</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
1	3	0.00	1.00	0.00	0.0028	0.0526	0.0312	-0.0021	-0.0306
2	3	0.00	1.00	0.40	0.0101	0.0642	0.0425	0.0122	-0.0223
3	3	0.00	1.00	0.70	0.0432	0.1036	0.0801	0.0586	0.0018
4	3	0.00	1.00	0.85	0.0702	0.1380	0.1134	0.0998	0.0195
5	3	0.00	1.00	0.99	0.0557	0.1551	0.1364	0.1217	-0.0157
6	3	0.00	0.80	0.00	0.0087	0.0588	0.0372	0.0046	-0.0262
7	3	0.00	0.80	0.40	0.0148	0.0712	0.0491	0.0198	-0.0179
8	3	0.00	0.80	0.70	0.0472	0.1085	0.0849	0.0644	0.0051
9	3	0.00	0.80	0.85	0.0704	0.1410	0.1163	0.1031	0.0207
10	3	0.00	0.80	0.99	0.0562	0.1578	0.1375	0.1238	-0.0139
11	3	0.00	0.60	0.00	0.0238	0.0770	0.0547	0.0259	-0.0144
12	3	0.00	0.60	0.40	0.0337	0.0900	0.0673	0.0417	-0.0057
13	3	0.00	0.60	0.70	0.0584	0.1235	0.0996	0.0817	0.0136
14	3	0.00	0.60	0.85	0.0742	0.1498	0.1257	0.1131	0.0229
15	3	0.00	0.60	0.99	0.0567	0.1580	0.1382	0.1234	-0.0165
16	3	0.00	0.40	0.00	0.0479	0.1164	0.0925	0.0718	0.0094
17	3	0.00	0.40	0.40	0.0575	0.1268	0.1025	0.0845	0.0153
18	3	0.00	0.40	0.70	0.0695	0.1481	0.1237	0.1104	0.0230
19	3	0.00	0.40	0.85	0.0714	0.1583	0.1349	0.1236	0.0180
20	3	0.00	0.40	0.99	0.0543	0.1561	0.1369	0.1210	-0.0245

21	3	0.00	0.20	0.00	0.0723	0.1598	0.1361	0.1241	0.0205
22	3	0.00	0.20	0.40	0.0710	0.1589	0.1354	0.1241	0.0163
23	3	0.00	0.20	0.70	0.0648	0.1609	0.1385	0.1270	0.0080
24	3	0.00	0.20	0.85	0.0578	0.1596	0.1386	0.1259	-0.0034
25	3	0.00	0.20	0.99	0.0450	0.1581	0.1401	0.1224	-0.0302
26	3	0.25	1.00	0.00	0.0019	0.0537	0.0329	-0.0040	-0.0328
27	3	0.25	1.00	0.40	0.0088	0.0651	0.0433	0.0100	-0.0253
28	3	0.25	1.00	0.70	0.0369	0.1014	0.0776	0.0531	-0.0028
29	3	0.25	1.00	0.85	0.0636	0.1343	0.1090	0.0933	0.0169
30	3	0.25	1.00	0.99	0.0641	0.1611	0.1381	0.1287	0.0182
31	3	0.25	0.80	0.00	0.0076	0.0609	0.0400	0.0038	-0.0279
32	3	0.25	0.80	0.40	0.0178	0.0728	0.0511	0.0184	-0.0199
33	3	0.25	0.80	0.70	0.0439	0.1089	0.0852	0.0615	0.0022
34	3	0.25	0.80	0.85	0.0703	0.1396	0.1143	0.0990	0.0190
35	3	0.25	0.80	0.99	0.0626	0.1593	0.1381	0.1258	0.0098
36	3	0.25	0.60	0.00	0.0229	0.0809	0.0598	0.0268	-0.0146
37	3	0.25	0.60	0.40	0.0327	0.0931	0.0702	0.0418	-0.0064
38	3	0.25	0.60	0.70	0.0606	0.1247	0.1005	0.0799	0.0111
39	3	0.25	0.60	0.85	0.0831	0.1504	0.1259	0.1109	0.0221
40	3	0.25	0.60	0.99	0.0571	0.1629	0.1420	0.1278	0.0046
41	3	0.25	0.40	0.00	0.0578	0.1201	0.0969	0.0726	0.0089
42	3	0.25	0.40	0.40	0.0652	0.1291	0.1050	0.0840	0.0139
43	3	0.25	0.40	0.70	0.0799	0.1497	0.1254	0.1090	0.0213
44	3	0.25	0.40	0.85	0.0736	0.1607	0.1375	0.1232	0.0192
45	3	0.25	0.40	0.99	0.0510	0.1600	0.1392	0.1235	-0.0100
46	3	0.25	0.20	0.00	0.0707	0.1624	0.1395	0.1234	0.0191
47	3	0.25	0.20	0.40	0.0695	0.1621	0.1391	0.1241	0.0159
48	3	0.25	0.20	0.70	0.0615	0.1628	0.1422	0.1257	0.0075
49	3	0.25	0.20	0.85	0.0570	0.1640	0.1451	0.1270	-0.0007
50	3	0.25	0.20	0.99	0.0447	0.1565	0.1398	0.1186	-0.0278
51	3	0.50	1.00	0.00	1.0000	0.0567	0.0358	-0.0059	-0.0351
52	3	0.50	1.00	0.40	1.0000	0.0653	0.0435	0.0051	-0.0291
53	3	0.50	1.00	0.70	1.0000	0.0942	0.0695	0.0407	-0.0093
54	3	0.50	1.00	0.85	1.0000	0.1246	0.0974	0.0785	0.0149
55	3	0.50	1.00	0.99	1.0000	0.1664	0.1377	0.1326	0.0592
56	3	0.50	0.80	0.00	1.0000	0.0657	0.0453	0.0041	-0.0292
57	3	0.50	0.80	0.40	1.0000	0.0758	0.0538	0.0167	-0.0225
58	3	0.50	0.80	0.70	1.0000	0.1057	0.0810	0.0533	-0.0024
59	3	0.50	0.80	0.85	1.0000	0.1335	0.1070	0.0877	0.0171
60	3	0.50	0.80	0.99	1.0000	0.1685	0.1401	0.1335	0.0509
61	3	0.50	0.60	0.00	1.0000	0.0882	0.0660	0.0297	-0.0151
62	3	0.50	0.60	0.40	1.0000	0.0967	0.0762	0.0428	-0.0075
63	3	0.50	0.60	0.70	1.0000	0.1255	0.1008	0.0757	0.0087
64	3	0.50	0.60	0.85	1.0000	0.1482	0.1224	0.1038	0.0209
65	3	0.50	0.60	0.99	1.0000	0.1657	0.1423	0.1296	0.0339
66	3	0.50	0.40	0.00	1.0000	0.1277	0.1051	0.0755	0.0074
67	3	0.50	0.40	0.40	1.0000	0.1360	0.1124	0.0860	0.0129
68	3	0.50	0.40	0.70	1.0000	0.1534	0.1290	0.1076	0.0194
69	3	0.50	0.40	0.85	1.0000	0.1630	0.1399	0.1204	0.0201
70	3	0.50	0.40	0.99	1.0000	0.1658	0.1444	0.1273	0.0140
71	3	0.50	0.20	0.00	1.0000	0.1656	0.1434	0.1209	0.0126
72	3	0.50	0.20	0.40	1.0000	0.1672	0.1472	0.1235	0.0125
73	3	0.50	0.20	0.70	1.0000	0.1663	0.1453	0.1237	0.0045
74	3	0.50	0.20	0.85	1.0000	0.1654	0.1462	0.1231	-0.0033
75	3	0.50	0.20	0.99	1.0000	0.1637	0.1476	0.1214	-0.0131
76	3	0.75	1.00	0.00	1.0000	0.0576	0.0388	-0.0104	-0.0388
77	3	0.75	1.00	0.40	1.0000	0.0623	0.0403	-0.0033	-0.0349
78	3	0.75	1.00	0.70	1.0000	0.0851	0.0597	0.0259	-0.0157
79	3	0.75	1.00	0.85	1.0000	0.1139	0.0846	0.0614	0.0135
80	3	0.75	1.00	0.99	1.0000	0.1678	0.1379	0.1275	0.0816
81	3	0.75	0.80	0.00	1.0000	0.0706	0.0495	0.0036	-0.0326
82	3	0.75	0.80	0.40	1.0000	0.0770	0.0549	0.0124	-0.0277
83	3	0.75	0.80	0.70	1.0000	0.0994	0.0743	0.0414	-0.0089
84	3	0.75	0.80	0.85	1.0000	0.1255	0.0976	0.0737	0.0152
85	3	0.75	0.80	0.99	1.0000	0.1675	0.1359	0.1273	0.0698
86	3	0.75	0.60	0.00	1.0000	0.0945	0.0728	0.0308	-0.0176
87	3	0.75	0.60	0.40	1.0000	0.1012	0.0800	0.0398	-0.0132
88	3	0.75	0.60	0.70	1.0000	0.1226	0.0985	0.0670	0.0027
89	3	0.75	0.60	0.85	1.0000	0.1443	0.1184	0.0939	0.0217
90	3	0.75	0.60	0.99	1.0000	0.1666	0.1385	0.1260	0.0521
91	3	0.75	0.40	0.00	1.0000	0.1335	0.1106	0.0756	0.0037
92	3	0.75	0.40	0.40	1.0000	0.1394	0.1168	0.0835	0.0075
93	3	0.75	0.40	0.70	1.0000	0.1519	0.1284	0.1000	0.0133
94	3	0.75	0.40	0.85	1.0000	0.1598	0.1363	0.1113	0.0177
95	3	0.75	0.40	0.99	1.0000	0.1617	0.1423	0.1193	0.0228
96	3	0.75	0.20	0.00	1.0000	0.1648	0.1445	0.1138	0.0045
97	3	0.75	0.20	0.40	1.0000	0.1646	0.1466	0.1143	0.0027
98	3	0.75	0.20	0.70	1.0000	0.1654	0.1465	0.1161	-0.0007
99	3	0.75	0.20	0.85	1.0000	0.1658	0.1474	0.1173	-0.0036
100	3	0.75	0.20	0.99	1.0000	0.1604	0.1434	0.1134	-0.0118
101	3	1.00	1.00	0.00	1.0000	0.0527	0.0313	-0.0188	-0.0428
102	3	1.00	1.00	0.40	1.0000	0.0559	0.0339	-0.0132	-0.0389
103	3	1.00	1.00	0.70	1.0000	0.0759	0.0500	0.0124	-0.0184
104	3	1.00	1.00	0.85	1.0000	0.1045	0.0741	0.0469	0.0145
105	3	1.00	1.00	0.99	1.0000	0.1612	0.1225	0.1132	0.0874
106	3	1.00	0.80	0.00	1.0000	0.0677	0.0472	-0.0029	-0.0361
107	3	1.00	0.80	0.40	1.0000	0.0724	0.0505	0.0042	-0.0315
108	3	1.00	0.80	0.70	1.0000	0.0911	0.0663	0.0288	-0.0126
109	3	1.00	0.80	0.85	1.0000	0.1185	0.0899	0.0617	0.0175
110	3	1.00	0.80	0.99	1.0000	0.1630	0.1271	0.1162	0.0779
111	3	1.00	0.60	0.00	1.0000	0.0945	0.0748	0.0264	-0.0225
112	3	1.00	0.60	0.40	1.0000	0.0983	0.0760	0.0326	-0.0184

113	3	1.00	0.60	0.70	1.0000	0.1159	0.0918	0.0555	-0.0020
114	3	1.00	0.60	0.85	1.0000	0.1356	0.1094	0.0803	0.0193
115	3	1.00	0.60	0.99	1.0000	0.1611	0.1311	0.1149	0.0591
116	3	1.00	0.40	0.00	1.0000	0.1306	0.1082	0.0675	-0.0056
117	3	1.00	0.40	0.40	1.0000	0.1345	0.1131	0.0731	-0.0023
118	3	1.00	0.40	0.70	1.0000	0.1431	0.1212	0.0856	0.0038
119	3	1.00	0.40	0.85	1.0000	0.1512	0.1299	0.0973	0.0131
120	3	1.00	0.40	0.99	1.0000	0.1549	0.1344	0.1075	0.0268
121	3	1.00	0.20	0.00	1.0000	0.1520	0.1345	0.0943	-0.0143
122	3	1.00	0.20	0.40	1.0000	0.1536	0.1380	0.0964	-0.0132
123	3	1.00	0.20	0.70	1.0000	0.1519	0.1364	0.0962	-0.0168
124	3	1.00	0.20	0.85	1.0000	0.1515	0.1367	0.0968	-0.0179
125	3	1.00	0.20	0.99	1.0000	0.1455	0.1314	0.0933	-0.0220
126	3	1.50	1.00	0.00	1.0000	0.0329	0.0141	-0.0404	-0.0519
127	3	1.50	1.00	0.40	1.0000	0.0372	0.0163	-0.0341	-0.0443
128	3	1.50	1.00	0.70	1.0000	0.0599	0.0350	-0.0071	-0.0152
129	3	1.50	1.00	0.85	1.0000	0.0872	0.0570	0.0237	0.0182
130	3	1.50	1.00	0.99	1.0000	0.1409	0.0961	0.0817	0.0822
131	3	1.50	0.80	0.00	1.0000	0.0459	0.0279	-0.0265	-0.0500
132	3	1.50	0.80	0.40	1.0000	0.0516	0.0332	-0.0186	-0.0402
133	3	1.50	0.80	0.70	1.0000	0.0725	0.0489	0.0065	-0.0143
134	3	1.50	0.80	0.85	1.0000	0.0984	0.0709	0.0362	0.0181
135	3	1.50	0.80	0.99	1.0000	0.1384	0.1004	0.0817	0.0710
136	3	1.50	0.60	0.00	1.0000	0.0687	0.0502	-0.0017	-0.0408
137	3	1.50	0.60	0.40	1.0000	0.0727	0.0544	0.0045	-0.0332
138	3	1.50	0.60	0.70	1.0000	0.0893	0.0682	0.0250	-0.0134
139	3	1.50	0.60	0.85	1.0000	0.1078	0.0860	0.0474	0.0121
140	3	1.50	0.60	0.99	1.0000	0.1318	0.1035	0.0774	0.0502
141	3	1.50	0.40	0.00	1.0000	0.0900	0.0736	0.0232	-0.0374
142	3	1.50	0.40	0.40	1.0000	0.0945	0.0804	0.0292	-0.0304
143	3	1.50	0.40	0.70	1.0000	0.1036	0.0864	0.0414	-0.0189
144	3	1.50	0.40	0.85	1.0000	0.1093	0.0912	0.0503	-0.0076
145	3	1.50	0.40	0.99	1.0000	0.1150	0.0958	0.0613	0.0102
146	3	1.50	0.20	0.00	1.0000	0.0974	0.0891	0.0338	-0.0555
147	3	1.50	0.20	0.40	1.0000	0.1031	0.0939	0.0397	-0.0484
148	3	1.50	0.20	0.70	1.0000	0.1039	0.0946	0.0419	-0.0462
149	3	1.50	0.20	0.85	1.0000	0.0985	0.0897	0.0382	-0.0498
150	3	1.50	0.30	0.99	1.0000	0.0940	0.0841	0.0363	-0.0499
151	3	2.00	1.00	0.00	1.0000	0.0158	0.0012	-0.0544	-0.0492
152	3	2.00	1.00	0.40	1.0000	0.0236	0.0073	-0.0455	-0.0379
153	3	2.00	1.00	0.70	1.0000	0.0464	0.0238	-0.0201	-0.0088
154	3	2.00	1.00	0.85	1.0000	0.0712	0.0428	0.0063	0.0202
155	3	2.00	1.00	0.99	1.0000	0.1116	0.0709	0.0477	0.0643
156	3	2.00	0.80	0.00	1.0000	0.0250	0.0099	-0.0442	-0.0496
157	3	2.00	0.80	0.40	1.0000	0.0311	0.0160	-0.0368	-0.0410
158	3	2.00	0.80	0.70	1.0000	0.0510	0.0317	-0.0131	-0.0133
159	3	2.00	0.80	0.85	1.0000	0.0732	0.0482	0.0104	0.0133
160	3	2.00	0.80	0.99	1.0000	0.1033	0.0693	0.0429	0.0502
161	3	2.00	0.60	0.00	1.0000	0.0341	0.0201	-0.0332	-0.0538
162	3	2.00	0.60	0.40	1.0000	0.0399	0.0267	-0.0262	-0.0460
163	3	2.00	0.60	0.70	1.0000	0.0579	0.0419	-0.0052	-0.0206
164	3	2.00	0.60	0.85	1.0000	0.0714	0.0515	0.0109	-0.0011
165	3	2.00	0.60	0.99	1.0000	0.0863	0.0601	0.0295	0.0232
166	3	2.00	0.40	0.00	1.0000	0.0413	0.0333	-0.0232	-0.0630
167	3	2.00	0.40	0.40	1.0000	0.0460	0.0385	-0.0178	-0.0566
168	3	2.00	0.40	0.70	1.0000	0.0567	0.0463	-0.0045	-0.0399
169	3	2.00	0.40	0.85	1.0000	0.0617	0.0512	0.0030	-0.0281
170	3	2.00	0.40	0.99	1.0000	0.0654	0.0506	0.0104	-0.0156
171	3	2.00	0.20	0.00	1.0000	0.0430	0.0448	-0.0198	-0.0832
172	3	2.00	0.20	0.40	1.0000	0.0461	0.0444	-0.0165	-0.0789
173	3	2.00	0.20	0.70	1.0000	0.0459	0.0419	-0.0152	-0.0753
174	3	2.00	0.20	0.85	1.0000	0.0445	0.0402	-0.0151	-0.0732
175	3	2.00	0.20	0.99	1.0000	0.0495	0.0508	-0.0083	-0.0627
176	5	0.00	1.00	0.00	0.0087	0.0262	0.0194	-0.0025	-0.0587
177	5	0.00	1.00	0.40	0.0159	0.0351	0.0241	0.0119	-0.0521
178	5	0.00	1.00	0.70	0.0435	0.0626	0.0447	0.0584	[illegible]
179	5	0.00	1.00	0.85	0.0623	0.0877	0.0643	0.0997	[illegible]
180	5	0.00	1.00	0.99	0.0256	0.0982	0.0758	0.1234	[illegible]
181	5	0.00	0.80	0.00	0.0133	0.0324	0.0228	0.0044	[illegible]
182	5	0.00	0.80	0.40	0.0215	0.0402	[illegible]	0.0196	-0.0479
183	5	0.00	0.80	0.70	0.0472	0.0662	0.0474	0.0642	-0.0291
184	5	0.00	0.80	0.85	0.0640	0.0899	0.0661	0.1030	-0.0195
185	5	0.00	0.80	0.99	0.0261	0.0989	0.0764	0.1237	-0.0672
186	5	0.00	0.60	0.00	0.0270	0.0445	0.0316	0.0257	-0.0444
187	5	0.00	0.60	0.40	0.0357	0.0534	0.0381	0.0415	-0.0371
188	5	0.00	0.60	0.70	0.0569	0.0773	0.0562	0.0815	-0.0219
189	5	0.00	0.60	0.85	0.0674	0.0964	0.0718	0.1131	-0.0175
190	5	0.00	0.60	0.99	0.0249	0.0992	0.0768	0.1234	-0.0711
191	5	0.00	0.40	0.00	0.0541	0.0724	0.0530	0.0717	-0.0247
192	5	0.00	0.40	0.40	0.0604	0.0800	0.0589	0.0843	-0.0200
193	5	0.00	0.40	0.70	0.0683	0.0955	0.0712	0.1104	-0.0163
194	5	0.00	0.40	0.85	0.0592	0.1018	0.0765	0.1235	-0.0252
195	5	0.00	0.40	0.99	0.0192	0.0996	0.0789	0.1232	-0.0780
196	5	0.00	0.20	0.00	0.0629	0.1036	0.0784	0.1241	-0.0221
197	5	0.00	0.20	0.40	0.0567	0.1021	0.0770	0.1241	-0.0274
198	5	0.00	0.20	0.70	0.0479	0.1029	0.0783	0.1270	-0.0386
199	5	0.00	0.20	0.85	0.0364	0.1011	0.0775	0.1259	-0.0533
200	5	0.00	0.20	0.99	0.0094	0.1003	0.0792	0.1235	-0.0887
201	5	0.25	1.00	0.00	0.0104	0.0295	0.0205	-0.0043	-0.0638
202	5	0.25	1.00	0.40	0.0168	0.0364	0.0254	0.0096	-0.0574
203	5	0.25	1.00	0.70	0.0397	0.0612	0.0437	0.0529	-0.0375
204	5	0.25	1.00	0.85	0.0586	0.0853	0.0620	0.0932	-0.0205

205	5	0.25	1.00	0.99	0.0279	0.1031	0.0773	0.1291	-0.0237
206	5	0.25	0.80	0.00	0.0166	0.0345	0.0246	0.0036	-0.0590
207	5	0.25	0.80	0.40	0.0238	0.0418	0.0298	0.0181	-0.0526
208	5	0.25	0.80	0.70	0.0471	0.0670	0.0485	0.0613	-0.0333
209	5	0.25	0.80	0.85	0.0642	0.0894	0.0656	0.0989	-0.0196
210	5	0.25	0.80	0.99	0.0293	0.1031	0.0782	0.1280	-0.0314
211	5	0.25	0.60	0.00	0.0313	0.0482	0.0352	0.0266	-0.0472
212	5	0.25	0.60	0.40	0.0397	0.0564	0.0411	0.0415	-0.0408
213	5	0.25	0.60	0.70	0.0591	0.0788	0.0579	0.0797	-0.0260
214	5	0.25	0.60	0.85	0.0666	0.0977	0.0729	0.1109	-0.0182
215	5	0.25	0.60	0.99	0.0309	0.1047	0.0808	0.1282	-0.0408
216	5	0.25	0.40	0.00	0.0593	0.0763	0.0569	0.0724	-0.0280
217	5	0.25	0.40	0.40	0.0637	0.0827	0.0616	0.0838	-0.0239
218	5	0.25	0.40	0.70	0.0701	0.0974	0.0731	0.1089	-0.0191
219	5	0.25	0.40	0.85	0.0662	0.1048	0.0795	0.1231	-0.0236
220	5	0.25	0.40	0.99	0.0251	0.1042	0.0811	0.1263	-0.0558
221	5	0.25	0.20	0.00	0.0708	0.1071	0.0820	0.1238	-0.0245
222	5	0.25	0.20	0.40	0.0660	0.1058	0.0810	0.1240	-0.0285
223	5	0.25	0.20	0.70	0.0553	0.1052	0.0811	0.1256	-0.0387
224	5	0.25	0.20	0.85	0.0434	0.1057	0.0824	0.1270	-0.0488
225	5	0.25	0.20	0.99	0.0134	0.1039	0.0826	0.1243	-0.0747
226	5	0.50	1.00	0.00	0.0151	0.0330	0.0241	-0.0063	-0.0676
227	5	0.50	1.00	0.40	0.0178	0.0377	0.0269	0.0047	-0.0615
228	5	0.50	1.00	0.70	0.0327	0.0572	0.0401	0.0405	-0.0429
229	5	0.50	1.00	0.85	0.0427	0.0803	0.0565	0.0783	-0.0186
230	5	0.50	1.00	0.99	0.0248	0.1123	0.0798	0.1330	0.0296
231	5	0.50	0.80	0.00	0.0243	0.0401	0.0300	0.0043	-0.0618
232	5	0.50	0.80	0.40	0.0296	0.0457	0.0336	0.0164	-0.0552
233	5	0.50	0.80	0.70	0.0451	0.0665	0.0482	0.0531	-0.0366
234	5	0.50	0.80	0.85	0.0523	0.0871	0.0631	0.0875	-0.0176
235	5	0.50	0.80	0.99	0.0289	0.1129	0.0826	0.1333	0.0178
236	5	0.50	0.60	0.00	0.0439	0.0560	0.0426	0.0295	-0.0480
237	5	0.50	0.60	0.40	0.0499	0.0629	0.0475	0.0426	-0.0411
238	5	0.50	0.60	0.70	0.0612	0.0819	0.0612	0.0755	-0.0269
239	5	0.50	0.60	0.85	0.0656	0.0995	0.0746	0.1043	-0.0155
240	5	0.50	0.60	0.99	0.0311	0.1107	0.0830	0.1303	-0.0019
241	5	0.50	0.40	0.00	0.0704	0.0852	0.0656	0.0754	-0.0280
242	5	0.50	0.40	0.40	0.0742	0.0910	0.0699	0.0858	-0.0234
243	5	0.50	0.40	0.70	0.0779	0.1035	0.0796	0.1075	-0.0198
244	5	0.50	0.40	0.85	0.0725	0.1099	0.0849	0.1202	-0.0209
245	5	0.50	0.40	0.99	0.0308	0.1111	0.0874	0.1285	-0.0254
246	5	0.50	0.20	0.00	0.0808	0.1122	0.0881	0.1208	-0.0301
247	5	0.50	0.20	0.40	0.0780	0.1133	0.0896	0.1234	-0.0307
248	5	0.50	0.20	0.70	0.0666	0.1121	0.0889	0.1242	-0.0398
249	5	0.[illegible]	0.20	0.85	0.0511	0.1115	0.0889	0.1248	-0.0481
250	5	0.50	0.20	0.99	0.0208	0.1109	0.0896	0.1249	-0.0587
251	5	0.75	1.00	0.00	0.0170	0.0350	0.0262	-0.0111	-0.0705
252	5	0.75	1.00	0.40	0.0170	0.0371	0.0265	-0.0037	-0.0669
253	5	0.75	1.00	0.70	0.0223	0.0529	0.0357	0.0256	-0.0470
254	5	0.75	1.00	0.85	0.0291	0.0756	0.0508	0.0612	-0.0158
255	5	0.75	1.00	0.99	0.0221	0.1196	0.0790	0.1273	0.0600
256	5	0.75	0.80	0.00	0.0327	0.0456	0.0353	0.0033	-0.0649
257	5	0.75	0.80	0.40	0.0333	0.0489	0.0367	0.0121	-0.0611
258	5	0.75	0.80	0.70	0.0392	0.0645	0.0463	0.0411	-0.0415
259	5	0.75	0.80	0.85	0.0453	0.0855	0.0608	0.0742	-0.0161
260	5	0.75	0.80	0.99	0.0263	0.1195	0.0834	0.1283	0.0468
261	5	0.75	0.60	0.00	0.0549	0.0640	0.0503	0.0307	-0.0516
262	5	0.75	0.60	0.40	0.0544	0.0678	0.0521	0.0395	-0.0473
263	5	0.75	0.60	0.70	0.0617	0.0832	0.0625	0.0668	-0.0324
264	5	0.75	0.60	0.85	0.0606	0.1000	0.0749	0.0938	-0.0139
265	5	0.75	0.60	0.99	0.0268	0.1196	0.0881	0.1289	0.0274
266	5	0.75	0.40	0.00	0.0830	0.0936	0.0741	0.0754	-0.0324
267	5	0.75	0.40	0.40	0.0853	0.0976	0.0770	0.0833	-0.0297
268	5	0.75	0.40	0.70	0.0804	0.1072	0.0839	0.1005	-0.0253
269	5	0.75	0.40	0.85	0.0701	0.1131	0.0887	0.1126	-0.0207
270	5	0.75	0.40	0.99	0.0224	0.1168	0.0943	0.1249	-0.0042
271	5	0.75	0.20	0.00	0.0798	0.1166	0.0942	0.1142	-0.0371
272	5	0.75	0.20	0.40	0.0753	0.1166	0.0949	0.1153	-0.0397
273	5	0.75	0.20	0.70	0.0595	0.1152	0.0939	0.1160	-0.0462
274	5	0.75	0.20	0.85	0.0455	0.1157	0.0945	0.1179	-0.0487
275	5	0.75	0.20	0.99	0.0131	0.1146	0.0945	0.1183	-0.0475
276	5	1.00	1.00	0.00	1.0000	0.0321	0.0238	-0.0195	-0.0699
277	5	1.00	1.00	0.40	1.0000	0.0337	0.0234	-0.0136	-0.0669
278	5	1.00	1.00	0.70	1.0000	0.0486	0.0314	0.0121	-0.0456
279	5	1.00	1.00	0.85	1.0000	0.0730	0.0468	0.0473	-0.0078
280	5	1.00	1.00	0.99	1.0000	0.1228	0.0779	0.1152	0.0745
281	5	1.00	0.80	0.00	1.0000	0.0448	0.0349	-0.0029	-0.0646
282	5	1.00	0.80	0.40	1.0000	0.0472	0.0353	0.0038	-0.0616
283	5	1.00	0.80	0.70	1.0000	0.0611	0.0429	0.0285	-0.0420
284	5	1.00	0.80	0.85	1.0000	0.0838	0.0582	0.0615	-0.0086
285	5	1.00	0.80	0.99	1.0000	0.1230	0.0822	0.1180	0.0623
286	5	1.00	0.60	0.00	1.0000	0.0660	0.0527	0.0261	-0.0542
287	5	1.00	0.60	0.40	1.0000	0.0680	0.0529	0.0323	-0.0515
288	5	1.00	0.60	0.70	1.0000	0.0814	0.0613	0.0552	-0.0352
289	5	1.00	0.60	0.85	1.0000	0.0985	0.0732	0.0811	-0.0099
290	5	1.00	0.60	0.99	1.0000	0.1216	0.0877	0.1184	0.0411
291	5	1.00	0.40	0.00	1.0000	0.0947	0.0765	0.0672	-0.0416
292	5	1.00	0.40	0.40	1.0000	0.0972	0.0780	0.0727	-0.0399
293	5	1.00	0.40	0.70	1.0000	0.1041	0.0822	0.0862	-0.0334
294	5	1.00	0.40	0.85	1.0000	0.1109	0.0879	0.0986	-0.0214
295	5	1.00	0.40	0.99	1.0000	0.1164	0.0913	0.1129	0.0046
296	5	1.00	0.20	0.00	1.0000	0.1116	0.0919	0.0962	-0.0552

297	5	1.00	0.20	0.40	1.0000	0.1105	0.0919	0.0961	-0.0584
298	5	1.00	0.20	0.70	1.0000	0.1106	0.0924	0.0982	-0.0601
299	5	1.00	0.20	0.85	1.0000	0.1107	0.0921	0.0998	-0.0593
300	5	1.00	0.20	0.99	1.0000	0.1090	0.0910	0.1007	-0.0523
301	5	1.50	1.00	0.00	1.0000	0.0182	0.0122	-0.0398	-0.0733
302	5	1.50	1.00	0.40	1.0000	0.0214	0.0125	-0.0341	-0.0652
303	5	1.50	1.00	0.70	1.0000	0.0411	0.0245	-0.0074	-0.0329
304	5	1.50	1.00	0.85	1.0000	0.0668	0.0391	0.0250	0.0057
305	5	1.50	1.00	0.99	1.0000	0.1148	0.0651	0.0830	0.0770
306	5	1.50	0.80	0.00	1.0000	0.0297	0.0219	-0.0252	-0.0716
307	5	1.50	0.80	0.40	1.0000	0.0332	0.0231	-0.0190	-0.0628
308	5	1.50	0.80	0.70	1.0000	0.0514	0.0345	0.0062	-0.0349
309	5	1.50	0.80	0.85	1.0000	0.0750	0.0490	0.0366	0.0021
310	5	1.50	0.80	0.99	1.0000	0.1117	0.0690	0.0838	0.0642
311	5	1.50	0.60	0.00	1.0000	0.0472	0.0366	-0.0020	-0.0669
312	5	1.50	0.60	0.40	1.0000	0.0506	0.0384	0.0042	-0.0586
313	5	1.50	0.60	0.70	1.0000	0.0657	0.0479	0.0256	-0.0372
314	5	1.50	0.60	0.85	1.0000	0.0832	0.0597	0.0491	-0.0064
315	5	1.50	0.60	0.99	1.0000	0.1042	0.0713	0.0798	0.0403
316	5	1.50	0.40	0.00	1.0000	0.0661	0.0531	0.0250	-0.0653
317	5	1.50	0.40	0.40	1.0000	0.0680	0.0543	0.0289	-0.0606
318	5	1.50	0.40	0.70	1.0000	0.0767	0.0607	0.0419	-0.0470
319	5	1.50	0.40	0.85	1.0000	0.0822	0.0626	0 0519	-0.0316
320	5	1.50	0.40	0.99	1.0000	0.0913	0.0709	0.0677	-0.0007
321	5	1.50	0.20	0.00	1.0000	0.0722	0.0606	0.0373	-0.0875
322	5	1.50	0.20	0.40	1.0000	0.0733	0.0617	0.0391	-0.0856
323	5	1.50	0.20	0.70	1.0000	0.0739	0.0636	0.0413	-0.0826
324	5	1.50	0.20	0.85	1.0000	0.0761	0.0662	0.0452	-0.0750
325	5	1.50	0.20	0.99	1.0000	0.0792	0.0659	0.0508	-0.0611
326	5	2.00	1.00	0.00	1.0000	0.0062	0.0028	-0.0528	-0.0639
327	5	2.00	1.00	0.40	1.0000	0.0120	0.0050	-0.0458	-0.0533
328	5	2.00	1.00	0.70	1.0000	0.0332	0.0168	-0.0203	-0.0211
329	5	2.00	1.00	0.85	1.0000	0.0572	0.0307	0.0073	0.0130
330	5	2.00	1.00	0.99	1.0000	0.0947	0.0493	0.0496	0.0635
331	5	2.00	0.80	0.00	1.0000	0.0118	0.0071	-0.0447	-0.0691
332	5	2.00	0.80	0.40	1.0000	0.0180	0.0109	-0.0372	-0.0594
333	5	2.00	0.80	0.70	1.0000	0.0383	0.0230	-0.0124	-0.0276
334	5	2.00	0.80	0.85	1.0000	0.0587	0.0350	0.0121	0.0038
335	5	2.00	0.80	0.99	1.0000	0.0859	0.0481	0.0448	0.0471
336	5	2.00	0.60	0.00	1.0000	0.0202	0.0140	-0.0326	-0.0759
337	5	2.00	0.60	0.40	1.0000	0.0258	0.0182	-0.0257	-0.0675
338	5	2.00	0.60	0.70	1.0000	0.0419	0.0287	-0.0050	-0.0397
339	5	2.00	0.60	0.85	1.0000	0.0554	0.0370	0.0125	-0.0149
340	5	2.00	0.60	0.99	1.0000	0.0715	0.0442	0.0344	0.0196
341	5	2.00	0.40	0.00	1.0000	0.0266	0.0203	-0.0215	-0.0886
342	5	2.00	0.40	0.40	1.0000	0.0306	0.0237	-0.0165	-0.0825
343	5	2.00	0.40	0.70	1.0000	0.0392	0.0790	-0.0044	-0.0645
344	5	2.00	0.40	0.85	1.0000	0.0455	0.0318	0.0053	-0.0469
345	5	2.00	0.40	0.99	1.0000	0.0531	0.0393	0.0176	-0.0221
346	5	2.00	0.20	0.00	1.0000	0.0287	0.0253	-0.0166	-0.1125
347	5	2.00	0.20	0.40	1.0000	0.0298	0.0267	-0.0149	-0.1110
348	5	2.00	0.20	0.70	1.0000	0.0318	0.0308	-0.0113	-0.1020
349	5	2.00	0.20	0.85	1.0000	0.0340	0.0344	-0.0077	-0.0935
350	5	2.00	0.20	0.99	1.0000	0.0392	0.0355	-0.0004	-0.0776
351	7	0.00	1.00	0.00	0.0012	0.0154	0.0089	-0.0028	-0.0795
352	7	0.00	1.00	0.40	0.0058	0.0193	0.0109	0.0115	-0.0733
353	7	0.00	1.00	0.70	0.0272	0.0410	0.0256	0.0579	-0.0523
354	7	0.00	1.00	0.85	0.0404	0.0632	0.0410	0.0991	-0.0419
355	7	0.00	1.00	0.99	-0.0087	0.0742	0.0521	0.1227	-0.1057
356	7	0.00	0.80	0.00	0.0051	0.0187	0.0116	0.0041	-0.0793
357	7	0.00	0.80	0.40	0.0108	0.0237	0.0145	0.0191	-0.0711
358	7	0.00	0.80	0.70	0.0305	0.0447	0.0285	0.0637	-0.0513
359	7	0.00	0.80	0.85	0.0418	0.0657	0.0432	0.1024	-0.0439
360	7	0.00	0.80	0.99	-0.0083	0.0751	0.0530	0.1230	-0.1071
361	7	0.00	0.60	0.00	0.0160	0.0281	0.0183	0.0253	-0.0702
362	7	0.00	0.60	0.40	0.0226	0.0350	0.0226	0.0411	-0.0619
363	7	0.00	0.60	0.70	0.0385	0.0551	0.0361	0.0809	-0.0477
364	7	0.00	0.60	0.85	0.0439	0.0724	0.0487	0.1124	-0.0464
365	7	0.00	0.60	0.99	-0.0111	0.0754	0.0536	0.1227	-0.1117
366	7	0.00	0.40	0.00	0.0363	0.0521	0.0351	0.0712	-0.0517
367	7	0.00	0.40	0.40	0.0418	0.0584	0.0393	0.0838	-0.0477
368	7	0.00	0.40	0.70	0.0442	0.0721	0.0489	0.1097	-0.0459
369	7	0.00	0.40	0.85	0.0348	0.0778	0.0532	0.1228	-0.0563
370	7	0.00	0.40	0.99	-0.0173	0.0760	0.0546	0.1224	-0.1215
371	7	0.00	0.20	0.00	0.0390	0.0802	0.0556	0.1235	-0.0523
372	7	0.00	0.20	0.40	0.0330	0.0785	0.0540	0.1234	-0.0582
373	7	0.00	0.20	0.70	0.0197	0.0792	0.0552	0.1263	-0.0714
374	7	0.00	0.20	0.85	0.0041	0.0775	0.0542	0.1252	-0.0888
375	7	0.00	0.20	0.99	-0.0281	0.0762	0.0550	0.1222	-0.1390
376	7	0.25	1.00	0.00	0.0035	0.0182	0.0118	-0.0044	-0.0865
377	7	0.25	1.00	0.40	0.0075	0.0214	0.0132	0.0096	-0.0750
378	7	0.25	1.00	0.70	0.0253	0.0408	0.0256	0.0527	-0.0533
379	7	0.25	1.00	0.85	0.0370	0.0622	0.0401	0.0929	-0.0421
380	7	0.25	1.00	0.99	-0.0060	0.0802	0.0550	0.1286	-0.0468
381	7	0.25	0.80	0.00	0.0091	0.0221	0.0148	0.0034	-0.0819
382	7	0.25	0.80	0.40	0.0140	0.0263	0.0170	0.0180	-0.0699
383	7	0.25	0.80	0.70	0.0322	0.0466	0.0304	0.0611	-0.0510
384	7	0.25	0.80	0.85	0.0400	0.0666	0.0439	0.0986	-0.0430
385	7	0.25	0.80	0.99	-0.0045	0.0805	0.0559	0.1276	-0.0566
386	7	0.25	0.60	0.00	0.0210	0.0330	0.0228	0.0264	-0.0708
387	7	0.25	0.60	0.40	0.0285	0.0389	0.0262	0.0414	-0.0597
388	7	0.25	0.60	0.70	0.0407	0.0578	0.0386	0.0794	-0.0464

389	7	0.25	0.60	0.85	0.0453	0.0750	0.0510	0.1106	-0.0449
390	7	0.25	0.60	0.99	-0.0040	0.0821	0.0586	0.1279	-0.0688
391	7	0.25	0.40	0.00	0.0436	0.0571	0.0396	0.0723	-0.0508
392	7	0.25	0.40	0.40	0.0467	0.0622	0.0427	0.0836	-0.0466
393	7	0.25	0.40	0.70	0.0498	0.0752	0.0519	0.1086	-0.0437
394	7	0.25	0.40	0.85	0.0397	0.0820	0.0572	0.1228	-0.0512
395	7	0.25	0.40	0.99	-0.0089	0.0819	0.0593	0.1259	-0.0886
396	7	0.25	0.20	0.00	0.0461	0.0849	0.0601	0.1236	-0.0538
397	7	0.25	0.20	0.40	0.0403	0.0835	0.0589	0.1237	-0.0585
398	7	0.25	0.20	0.70	0.0279	0.0828	0.0590	0.1253	-0.0707
399	7	0.25	0.20	0.85	0.0152	0.0833	0.0601	0.1266	-0.0828
400	7	0.25	0.20	0.99	-0.0200	0.0816	0.0604	0.1235	-0.1151
401	7	0.50	1.00	0.00	0.0075	0.0232	0.0167	-0.0061	-0.0949
402	7	0.50	1.00	0.40	0.0102	0.0242	0.0159	0.0049	-0.0808
403	7	0.50	1.00	0.70	0.0206	0.0388	0.0239	0.0406	-0.0559
404	7	0.50	1.00	0.85	0.0275	0.0595	0.0370	0.0783	-0.0450
405	7	0.50	1.00	0.99	0.0006	0.0913	0.0580	0.1330	0.0146
406	7	0.50	0.80	0.00	0.0175	0.0289	0.0211	0.0045	-0.0906
407	7	0.50	0.80	0.40	0.0204	0.0313	0.0216	0.0166	-0.0758
408	7	0.50	0.80	0.70	0.0321	0.0478	0.0314	0.0531	-0.0538
409	7	0.50	0.80	0.85	0.0368	0.0664	0.0432	0.0877	-0.0449
410	7	0.50	0.80	0.99	0.0011	0.0920	0.0611	0.1332	0.0006
411	7	0.50	0.60	0.00	0.0357	0.0418	0.0306	0.0297	-0.0758
412	7	0.50	0.60	0.40	0.0401	0.0465	0.0329	0.0427	-0.0620
413	7	0.50	0.60	0.70	0.0494	0.0624	0.0426	0.0757	-0.0505
414	7	0.50	0.60	0.85	0.0504	0.0785	0.0537	0.1043	-0.0492
415	7	0.50	0.60	0.99	0.0035	0.0911	0.0630	0.1314	-0.0214
416	7	0.50	0.40	0.00	0.0625	0.0673	0.0486	0.0755	-0.0562
417	7	0.50	0.40	0.40	0.0649	0.0719	0.0513	0.0860	-0.0463
418	7	0.50	0.40	0.70	0.0640	0.0829	0.0588	0.1077	-0.0487
419	7	0.50	0.40	0.85	0.0540	0.0888	0.0629	0.1204	-0.0535
420	7	0.50	0.40	0.99	0.0027	0.0906	0.0659	0.1286	-0.0519
421	7	0.50	0.20	0.00	0.0659	0.0919	0.0669	0.1210	-0.0616
422	7	0.50	0.20	0.40	0.0609	0.0926	0.0680	0.1235	-0.0627
423	7	0.50	0.20	0.70	0.0431	0.0915	0.0676	0.1244	-0.0741
424	7	0.50	0.20	0.85	0.0264	0.0911	0.0676	0.1249	-0.0846
425	7	0.50	0.20	0.99	-0.0066	0.0904	0.0670	0.1245	-0.0936
426	7	0.75	1.00	0.00	0.0122	0.0262	0.0200	-0.0106	-0.1006
427	7	0.75	1.00	0.40	0.0106	0.0251	0.0169	-0.0032	-0.0862
428	7	0.75	1.00	0.70	0.0150	0.0368	0.0221	0.0261	-0.0624
429	7	0.75	1.00	0.85	0.0206	0.0574	0.0338	0.0616	-0.0307
430	7	0.75	1.00	0.99	0.0021	0.1008	0.0590	0.1275	0.0562
431	7	0.75	0.80	0.00	0.0290	0.0353	0.0271	0.0037	-0.0991
432	7	0.75	0.80	0.40	0.0287	0.0358	0.0255	0.0125	-0.0864
433	7	0.75	0.80	0.70	0.0340	0.0478	0.0311	0.0416	-0.0593
434	7	0.75	0.80	0.85	0.0355	0.0669	0.0426	0.0746	-0.0351
435	7	0.75	0.80	0.99	0.0076	0.100[illegible]	0.0628	0.1287	0.0415
436	7	0.75	0.60	0.00	0.0528	0.051[illegible]	0.0387	0.0312	-0.0812
437	7	0.75	0.60	0.40	0.0536	0.052[illegible]	0.0380	0.0401	-0.0725
438	7	0.75	0.60	0.70	0.0568	0.0654	0.0451	0.0673	-0.0523
439	7	0.75	0.60	0.85	0.0514	0.0810	0.0552	0.0942	-0.0362
440	7	0.75	0.60	0.99	0.0121	0.1005	0.0673	0.1293	0.0124
441	7	0.75	0.40	0.00	0.0812	0.0771	0.0575	0.0759	-0.0595
442	7	0.75	0.40	0.40	0.0786	0.0801	0.0588	0.0838	-0.0550
443	7	0.75	0.40	0.70	0.0730	0.0884	0.0639	0.1011	-0.0482
444	7	0.75	0.40	0.85	0.0620	0.0939	0.0673	0.1131	-0.0493
445	7	0.75	0.40	0.99	0.0158	0.0981	0.0717	0.1255	-0.0239
446	7	0.75	0.20	0.00	0.0721	0.0984	0.0741	0.1148	-0.0677
447	7	0.75	0.20	0.40	0.0680	0.0981	0.0742	0.1160	-0.0685
448	7	0.75	0.20	0.70	0.0537	0.0966	0.0737	0.1167	-0.0759
449	7	0.75	0.20	0.85	0.0399	0.0973	0.0743	0.1186	-0.0814
450	7	0.75	0.20	0.99	0.0112	0.0963	0.0749	0.1190	-0.0753
451	7	1.00	1.00	0.00	0.0126	0.0242	0.0186	-0.0189	-0.0931
452	7	1.00	1.00	0.40	0.0103	0.0232	0.0155	-0.0129	-0.0796
453	7	1.00	1.00	0.70	0.0111	0.0349	0.0200	0.0127	-0.0681
454	7	1.00	1.00	0.85	0.0127	0.0575	0.0322	0.0479	-0.0215
455	7	1.00	1.00	0.99	0.0038	0.1066	0.0582	0.1157	0.0705
456	7	1.00	0.80	0.00	0.0335	0.0355	0.0274	-0.0022	-0.0910
457	7	1.00	0.80	0.40	0.0334	0.0355	0.0253	0.0045	-0.0774
458	7	1.00	0.80	0.70	0.0292	0.0465	0.0297	0.0293	-0.0568
459	7	1.00	0.80	0.85	0.0310	0.0677	0.0420	0.0622	-0.0247
460	7	1.00	0.80	0.99	0.0123	0.1063	0.0629	0.1186	0.0511
461	7	1.00	0.60	0.00	0.0594	0.0543	0.0417	0.0268	-0.0848
462	7	1.00	0.60	0.40	0.0578	0.0546	0.0398	0.0330	-0.0719
463	7	1.00	0.60	0.70	0.0546	0.0658	0.0465	0.0560	-0.0539
464	7	1.00	0.60	0.85	0.0506	0.0818	0.0551	0.0819	-0.0293
465	7	1.00	0.60	0.99	0.0195	0.1046	0.0680	0.1192	0.0267
466	7	1.00	0.40	0.00	0.0880	0.0802	0.0609	0.0680	-0.0744
467	7	1.00	0.40	0.40	0.0852	0.0818	0.0610	0.0737	-0.0660
468	7	1.00	0.40	0.70	0.0730	0.0877	0.0640	0.0871	-0.0614
469	7	1.00	0.40	0.85	0.0546	0.0941	0.0678	0.0995	-0.0472
470	7	1.00	0.40	0.99	0.0240	0.0998	0.0719	0.1138	-0.0155
471	7	1.00	0.20	0.00	0.0719	0.0958	0.0737	0.0972	-0.0913
472	7	1.00	0.20	0.40	0.0654	0.0947	0.0732	0.0972	-0.0951
473	7	1.00	0.20	0.70	0.0564	0.0946	0.0739	0.0993	-0.0975
474	7	1.00	0.20	0.85	0.0441	0.0947	0.0736	0.1009	-0.0947
475	7	1.00	0.20	0.99	0.0107	0.0949	0.0753	0.1033	-0.0805
476	7	1.50	1.00	0.00	1.0000	0.0121	0.0089	-0.0390	-0.0937
477	7	1.50	1.00	0.40	1.0000	0.0136	0.0080	-0.0334	-0.0836
478	7	1.50	1.00	0.70	1.0000	0.0313	0.0163	-0.0067	-0.0457
479	7	1.50	1.00	0.85	1.0000	0.0560	0.0284	0.0256	-0.0093
480	7	1.50	1.00	0.99	1.0000	0.1036	0.0505	0.0838	0.0720

481	7	1.50	0.80	0.00	1.0000	0.0226	0.0169	-0.0243	-0.0925
482	7	1.50	0.80	0.40	1.0000	0.0246	0.0168	-0.0181	-0.0788
483	7	1.50	0.80	0.70	1.0000	0.0411	0.0251	0.0071	-0.0512
484	7	1.50	0.80	0.85	1.0000	0.0638	0.0371	0.0374	-0.0111
485	7	1.50	0.80	0.99	1.0000	0.0999	0.0535	0.0846	0.0571
486	7	1.50	0.60	0.00	1.0000	0.0386	0.0290	-0.0010	-0.0872
487	7	1.50	0.60	0.40	1.0000	0.0410	0.0296	0.0052	-0.0728
488	7	1.50	0.60	0.70	1.0000	0.0549	0.0371	0.0264	-0.0539
489	7	1.50	0.60	0.85	1.0000	0.0716	0.0465	0.0501	-0.0193
490	7	1.50	0.60	0.99	1.0000	0.0922	0.0559	0.0807	0.0318
491	7	1.50	0.40	0.00	1.0000	0.0562	0.0425	0.0262	-0.0852
492	7	1.50	0.40	0.40	1.0000	0.0575	0.0429	0.0301	-0.0758
493	7	1.50	0.40	0.70	1.0000	0.0656	0.0478	0.0431	-0.0630
494	7	1.50	0.40	0.85	1.0000	0.0717	0.0504	0.0540	-0.0439
495	7	1.50	0.40	0.99	1.0000	0.0797	0.0541	0.0689	-0.0116
496	7	1.50	0.20	0.00	1.0000	0.0619	0.0488	0.0387	-0.1112
497	7	1.50	0.20	0.40	1.0000	0.0629	0.0497	0.0405	-0.1063
498	7	1.50	0.20	0.70	1.0000	0.0633	0.0502	0.0427	-0.1054
499	7	1.50	0.20	0.85	1.0000	0.0655	0.0525	0.0466	-0.0936
500	7	1.50	0.20	0.99	1.0000	0.0702	0.0554	0.0537	-0.0752
501	7	2.00	1.00	0.00	1.0000	0.0018	0.0012	-0.0520	-0.0853
502	7	2.00	1.00	0.40	1.0000	0.0065	0.0030	-0.0451	-0.0726
503	7	2.00	1.00	0.70	1.0000	0.0265	0.0122	-0.0197	-0.0304
504	7	2.00	1.00	0.85	1.0000	0.0499	0.0232	0.0080	0.0061
505	7	2.00	1.00	0.99	1.0000	0.0872	0.0383	0.0502	0.0610
506	7	2.00	0.80	0.00	1.0000	0.0069	0.0051	-0.0438	-0.0886
507	7	2.00	0.80	0.40	1.0000	0.0122	0.0078	-0.0364	-0.0784
508	7	2.00	0.80	0.70	1.0000	0.0314	0.0175	-0.0116	-0.0391
509	7	2.00	0.80	0.85	1.0000	0.0513	0.0270	0.0129	-0.0044
510	7	2.00	0.80	0.99	1.0000	0.0781	0.0373	0.0456	0.0416
511	7	2.00	0.60	0.00	1.0000	0.0146	0.0107	-0.0316	-0.0954
512	7	2.00	0.60	0.40	1.0000	0.0196	0.0136	-0.0248	-0.0894
513	7	2.00	0.60	0.70	1.0000	0.0349	0.0220	-0.0042	-0.0528
514	7	2.00	0.60	0.85	1.0000	0.0480	0.0279	0.0134	-0.0252
515	7	2.00	0.60	0.99	1.0000	0.0638	0.0341	0.0353	0.0127
516	7	2.00	0.40	0.00	1.0000	0.0205	0.0154	-0.0204	-0.1072
517	7	2.00	0.40	0.40	1.0000	0.0242	0.0182	-0.0154	-0.1004
518	7	2.00	0.40	0.70	1.0000	0.0323	0.0230	-0.0033	-0.0833
519	7	2.00	0.40	0.85	1.0000	0.0384	0.0261	0.0064	-0.0606
520	7	2.00	0.40	0.99	1.0000	0.0459	0.0292	0.0186	-0.0312
521	7	2.00	0.20	0.00	1.0000	0.0225	0.0197	-0.0153	-0.1337
522	7	2.00	0.20	0.40	1.0000	0.0236	0.0207	-0.0137	-0.1330
523	7	2.00	0.20	0.70	1.0000	0.0255	0.0233	-0.0100	-0.1227
524	7	2.00	0.20	0.85	1.0000	0.0276	0.0261	-0.0064	-0.1129
525	7	2.00	0.20	0.99	1.0000	0.0333	0.0290	0.0013	-0.0895
526	10	0.00	1.00	0.00	-0.0020	0.0095	0.0045	-0.0025	-0.1415
527	10	0.00	1.00	0.40	0.0012	0.0119	0.0055	0.0119	-0.1312
528	10	0.00	1.00	0.70	0.0178	0.0290	0.0157	0.0585	-0.0959
529	10	0.00	1.00	0.85	0.0254	0.0476	0.0265	0.0998	-0.0751
530	10	0.00	1.00	0.99	-0.0339	0.0554	0.0338	0.1235	-0.1388
531	10	0.00	0.80	0.00	0.0013	0.0119	0.0065	0.0044	-0.1368
532	10	0.00	0.80	0.40	0.0055	0.0153	0.0082	0.0196	-0.1234
533	10	0.00	0.80	0.70	0.0202	0.0317	0.0175	0.0643	-0.0925
534	10	0.00	0.80	0.85	0.0262	0.0496	0.0279	0.1031	-0.0771
535	10	0.00	0.80	0.99	-0.0336	0.0561	0.0345	0.1238	-0.1411
536	10	0.00	0.60	0.00	0.0099	0.0185	0.0109	0.0258	-0.1172
537	10	0.00	0.60	0.40	0.0149	0.0239	0.0138	0.0415	-0.1086
538	10	0.00	0.60	0.70	0.0261	0.0404	0.0230	0.0816	-0.0884
539	10	0.00	0.60	0.85	0.0264	0.0552	0.0322	0.1131	-0.0787
540	10	0.00	0.60	0.99	-0.0366	0.0565	0.0351	0.1235	-0.1509
541	10	0.00	0.40	0.00	0.0267	0.0378	0.0227	0.0718	-0.0960
542	10	0.00	0.40	0.40	0.0291	0.0432	0.0258	0.0844	-0.0918
543	10	0.00	0.40	0.70	0.0291	0.0550	0.0325	0.1103	-0.0794
544	10	0.00	0.40	0.85	0.0160	0.0596	0.0354	0.1236	-0.0917
545	10	0.00	0.40	0.99	-0.0443	0.0569	0.0359	0.1233	-0.1709
546	10	0.00	0.20	0.00	0.0208	0.0617	0.0375	0.1242	-0.0850
547	10	0.00	0.20	0.40	0.0139	0.0600	0.0358	0.1241	-0.0928
548	10	0.00	0.20	0.70	-0.0008	0.0602	0.0366	0.1271	-0.1044
549	10	0.00	0.20	0.85	-0.0188	0.0583	0.0359	0.1259	-0.1214
550	10	0.00	0.20	0.99	-0.0576	0.0575	0.0371	0.1235	-0.2081
551	10	0.25	1.00	0.00	-0.0008	0.0109	0.0062	-0.0042	-0.1576
552	10	0.25	1.00	0.40	0.0019	0.0134	0.0071	0.0097	-0.1564
553	10	0.25	1.00	0.70	0.0151	0.0286	0.0157	0.0530	-0.1233
554	10	0.25	1.00	0.85	0.0213	0.0465	0.0258	0.0933	-0.0818
555	10	0.25	1.00	0.99	-0.0296	0.0610	0.0358	0.1291	-0.0785
556	10	0.25	0.80	0.00	0.0042	0.0138	0.0082	0.0036	-0.1515
557	10	0.25	0.80	0.40	0.0078	0.0170	0.0097	0.0182	-0.1567
558	10	0.25	0.80	0.70	0.0212	0.0331	0.0189	0.0614	-0.1169
559	10	0.25	0.80	0.85	0.0258	0.0501	0.0285	0.0[illegible]39	-0.0847
560	10	0.25	0.80	0.99	-0.0279	0.0609	0.0364	0.1[illegible]81	-0.0913
561	10	0.25	0.60	0.00	0.0156	0.0220	0.0137	0.0267	-0.1431
562	10	0.25	0.60	0.40	0.0198	0.0267	0.0161	0.0416	-0.1362
563	10	0.25	0.60	0.70	0.0296	0.0423	0.0246	0.0798	-0.1050
564	10	0.25	0.60	0.85	0.0298	0.0572	0.0337	0.1109	-0.0808
565	10	0.25	0.60	0.99	-0.0271	0.0624	0.0387	0.1283	-0.1101
566	10	0.25	0.40	0.00	0.0340	0.0414	0.0254	0.0724	-0.1105
567	10	0.25	0.40	0.40	0.0355	0.0459	0.0275	0.0840	-0.1075
568	10	0.25	0.40	0.70	0.0352	0.0572	0.0341	0.1089	-0.0812
569	10	0.25	0.40	0.85	0.0236	0.0630	0.0378	0.1232	-0.0939
570	10	0.25	0.40	0.99	-0.0328	0.0617	0.0393	0.1263	-0.1400
571	10	0.25	0.20	0.00	0.0304	0.0651	0.0402	0.1239	-0.1078
572	10	0.25	0.20	0.40	0.0240	0.0638	0.0388	0.1241	-0.1088

573	10	0.25	0.20	0.70	0.0086	0.0627	0.0385	0.1257	-0.1166
574	10	0.25	0.20	0.85	-0.0065	0.0631	0.0398	0.1270	-0.1353
575	10	0.25	0.20	0.99	-0.0447	0.0611	0.0397	0.1238	-0.1834
576	10	0.50	1.00	0.00	0.0039	0.0148	0.0102	-0.0062	-0.1587
577	10	0.50	1.00	0.40	0.0038	0.0157	0.0097	0.0047	-0.1524
578	10	0.50	1.00	0.70	0.0100	0.0272	0.0151	0.0405	-0.1051
579	10	0.50	1.00	0.85	0.0148	0.0449	0.0242	0.0783	-0.0781
580	10	0.50	1.00	0.99	-0.0176	0.0727	0.0388	0.1332	0.0018
581	10	0.50	0.80	0.00	0.0136	0.0192	0.0131	0.0043	-0.1543
582	10	0.50	0.80	0.40	0.0150	0.0213	0.0135	0.0165	-0.1461
583	10	0.50	0.80	0.70	0.0230	0.0345	0.0203	0.0531	-0.0961
584	10	0.50	0.80	0.85	0.0259	0.0506	0.0285	0.0876	-0.0868
585	10	0.50	0.80	0.99	-0.0113	0.0727	0.0411	0.1333	-0.0130
586	10	0.50	0.60	0.00	0.0301	0.0294	0.0198	0.0296	-0.1411
587	10	0.50	0.60	0.40	0.0331	0.0334	0.0216	0.0426	-0.1183
588	10	0.50	0.60	0.70	0.0392	0.0468	0.0283	0.0755	-0.0837
589	10	0.50	0.60	0.85	0.0387	0.0609	0.0364	0.1043	-0.0850
590	10	0.50	0.60	0.99	-0.0076	0.0713	0.0425	0.1314	-0.0420
591	10	0.50	0.40	0.00	0.0537	0.0505	0.0324	0.0754	-0.0980
592	10	0.50	0.40	0.40	0.0549	0.0547	0.0346	0.0859	-0.0849
593	10	0.50	0.40	0.70	0.0533	0.0645	0.0401	0.1076	-0.0854
594	10	0.50	0.40	0.85	0.0420	0.0695	0.0430	0.1203	-0.0952
595	10	0.50	0.40	0.99	-0.0064	0.0701	0.0444	0.1286	-0.0852
596	10	0.50	0.20	0.00	0.0532	0.0716	0.0457	0.1209	-0.0987
597	10	0.50	0.20	0.40	0.0494	0.0724	0.0465	0.1234	-0.1058
598	10	0.50	0.20	0.70	0.0343	0.0709	0.0458	0.1243	-0.1135
599	10	0.50	0.20	0.85	0.0198	0.0705	0.0461	0.1250	-0.1275
600	10	0.50	0.20	0.99	-0.0123	0.0696	0.0465	0.1245	-0.1389
601	10	0.75	1.00	0.00	0.0081	0.0172	0.0130	-0.0111	0.1587
602	10	0.75	1.00	0.40	0.0053	0.0164	0.0110	-0.0036	-0.1372
603	10	0.75	1.00	0.70	0.0068	0.0261	0.0143	0.0257	-0.1203
604	10	0.75	1.00	0.85	0.0114	0.0443	0.0224	0.0612	-0.0968
605	10	0.75	1.00	0.99	0.0013	0.0836	0.0404	0.1273	0.0536
606	10	0.75	0.80	0.00	0.0249	0.0248	0.0183	0.0033	-0.1512
607	10	0.75	0.80	0.40	0.0239	0.0254	0.0174	0.0121	-0.1498
608	10	0.75	0.80	0.70	0.0261	0.0352	0.0208	0.0411	-0.1089
609	10	0.75	0.80	0.85	0.0293	0.0525	0.0291	0.0742	-0.0902
610	10	0.75	0.80	0.99	0.0060	0.0826	0.0432	0.1284	0.0189
611	10	0.75	0.60	0.00	0.0481	0.0377	0.0266	0.0308	-0.1449
612	10	0.75	0.60	0.40	0.0479	0.0393	0.0261	0.0396	-0.1391
613	10	0.75	0.60	0.70	0.0505	0.0505	0.0312	0.0668	-0.1036
614	10	0.75	0.60	0.85	0.0499	0.0646	0.0385	0.0938	-0.0834
615	10	0.75	0.60	0.99	0.0139	0.0817	0.0471	0.1290	-0.0062
616	10	0.75	0.40	0.00	0.0774	0.0602	0.0402	0.0754	-0.1102
617	10	0.75	0.40	0.40	0.0766	0.0631	0.0416	0.0834	-0.1010
618	10	0.75	0.40	0.70	0.0731	0.0707	0.0455	0.1006	-0.0897
619	10	0.75	0.40	0.85	0.0633	0.0755	0.0480	0.1127	-0.0943
620	10	0.75	0.40	0.99	0.0199	0.0785	0.0495	0.1249	-0.0469
621	10	0.75	0.20	0.00	0.0804	0.0786	0.0528	0.1144	-0.1041
622	10	0.75	0.20	0.40	0.0765	0.0784	0.0527	0.1154	-0.1067
623	10	0.75	0.20	0.70	0.0609	0.0770	0.0518	0.1160	-0.1161
624	10	0.75	0.20	0.85	0.0463	0.0776	0.0529	0.1179	-0.1221
625	10	0.75	0.20	0.99	0.0132	0.0763	0.0527	0.1184	-0.1077
626	10	1.00	1.00	0.00	0.0091	0.0154	0.0120	-0.0195	-0.1611
627	10	1.00	1.00	0.40	0.0046	0.0148	0.0100	-0.0136	-0.1257
628	10	1.00	1.00	0.70	0.0045	0.0251	0.0131	0.0122	-0.1004
629	10	1.00	1.00	0.85	0.0126	0.0458	0.0219	0.0473	-0.0470
630	10	1.00	1.00	0.99	0.0060	0.0915	0.0409	0.1153	0.0731
631	10	1.00	0.80	0.00	0.0312	0.0251	0.0187	-0.0029	-0.1518
632	10	1.00	0.80	0.40	0.0279	0.0255	0.0174	0.0038	-0.1138
633	10	1.00	0.80	0.70	0.0275	0.0351	0.0203	0.0285	-0.0983
634	10	1.00	0.80	0.85	0.0346	0.0546	0.0295	0.0616	-0.0610
635	10	1.00	0.80	0.99	0.0147	0.0903	0.0448	0.1181	0.0525
636	10	1.00	0.60	0.00	0.0603	0.0415	0.0295	0.0261	-0.1420
637	10	1.00	0.60	0.40	0.0570	0.0419	0.0252	0.0323	-0.1167
638	10	1.00	0.60	0.70	0.0584	0.0521	0.0323	0.0553	-0.1009
639	10	1.00	0.60	0.85	0.0570	0.0669	0.0396	0.0811	-0.0776
640	10	1.00	0.60	0.99	0.0237	0.0877	0.0489	0.1185	0.0187
641	10	1.00	0.40	0.00	0.0919	0.0644	0.0441	0.0673	-0.1198
642	10	1.00	0.40	0.40	0.0912	0.0661	0.0445	0.0729	-0.1032
643	10	1.00	0.40	0.70	0.0827	0.0716	0.0466	0.0861	-0.1035
644	10	1.00	0.40	0.85	0.0682	0.0774	0.0497	0.0987	-0.0848
645	10	1.00	0.40	0.99	0.0226	0.0821	0.0518	0.1130	-0.0280
646	10	1.00	0.20	0.00	0.0857	0.0781	0.0541	0.0963	-0.1458
647	10	1.00	0.20	0.40	0.0812	0.0771	0.0532	0.0962	-0.1525
648	10	1.00	0.20	0.70	0.0713	0.0770	0.0534	0.0983	-0.1491
649	10	1.00	0.20	0.85	0.0528	0.0770	0.0536	0.0999	-0.1413
650	10	1.00	0.20	0.99	0.0139	0.0769	0.0537	0.1024	-0.1197
651	10	1.50	1.00	0.00	1.0000	0.0051	0.0045	-0.0397	-0.1603
652	10	1.50	1.00	0.40	1.0000	0.0067	0.0034	-0.0341	-0.1336
653	10	1.50	1.00	0.70	1.0000	0.0236	0.0102	-0.0074	-0.0861
654	10	1.50	1.00	0.85	1.0000	0.0470	0.0196	0.0250	-0.0184
655	10	1.50	1.00	0.99	1.0000	0.0926	0.0367	0.0831	0.0848
656	10	1.50	0.80	0.00	1.0000	0.0144	0.0106	-0.0252	-0.1499
657	10	1.50	0.80	0.40	1.0000	0.0165	0.0102	-0.0189	-0.1253
658	10	1.50	0.80	0.70	1.0000	0.0321	0.0167	0.0062	-0.0950
659	10	1.50	0.80	0.85	1.0000	0.0538	0.0264	0.0366	-0.0333
660	10	1.50	0.80	0.99	1.0000	0.0882	0.0393	0.0838	0.0633
661	10	1.50	0.60	0.00	1.0000	0.0289	0.0199	-0.0020	-0.1489
662	10	1.50	0.60	0.40	1.0000	0.0314	0.0201	0.0042	-0.1192
663	10	1.50	0.60	0.70	1.0000	0.0445	0.0262	0.0254	-0.0967
664	10	1.50	0.60	0.85	1.0000	0.0605	0.0339	0.0491	-0.0492

665	10	1.50	0.60	0.99	1.0000	0.0799	0.0411	0.0799	0.0259
666	10	1.50	0.40	0.00	1.0000	0.0449	0.0306	0.0250	-0.1469
667	10	1.50	0.40	0.40	1.0000	0.0462	0.0306	0.0290	-0.1261
668	10	1.50	0.40	0.70	1.0000	0.0539	0.0344	0.0419	-0.1060
669	10	1.50	0.40	0.85	1.0000	0.0597	0.0361	0.0528	-0.0795
670	10	1.50	0.40	0.99	1.0000	0.0672	0.0411	0.0677	-0.0269
671	10	1.50	0.20	0.00	1.0000	0.0498	0.0354	0.0374	-0.1746
672	10	1.50	0.20	0.40	1.0000	0.0508	0.0363	0.0391	-0.1615
673	10	1.50	0.20	0.70	1.0000	0.0511	0.0365	0.0413	-0.1474
674	10	1.50	0.20	0.85	1.0000	0.0533	0.0387	0.0452	-0.1329
675	10	1.50	0.20	0.99	1.0000	0.0578	0.0410	0.0524	-0.1118
676	10	2.00	1.00	0.00	1.0000	-0.0032	-0.0010	-0.0528	-0.1436
677	10	2.00	1.00	0.40	1.0000	0.0013	-0.0004	-0.0457	-0.1080
678	10	2.00	1.00	0.70	1.0000	0.0206	0.0070	-0.0202	-0.0641
679	10	2.00	1.00	0.85	1.0000	0.0433	0.0158	0.0073	-0.0128
680	10	2.00	1.00	0.99	1.0000	0.0795	0.0281	0.0496	0.0666
681	10	2.00	0.80	0.00	1.0000	0.0013	0.0017	-0.0447	-0.1505
682	10	2.00	0.80	0.40	1.0000	0.0064	0.0032	-0.0372	-0.1249
683	10	2.00	0.80	0.70	1.0000	0.0249	0.0110	-0.0123	-0.0759
684	10	2.00	0.80	0.85	1.0000	0.0441	0.0186	0.0121	-0.0294
685	10	2.00	0.80	0.99	1.0000	0.0700	0.0270	0.0449	0.0444
686	10	2.00	0.60	0.00	1.0000	0.0082	0.0059	-0.0325	-0.1491
687	10	2.00	0.60	0.40	1.0000	0.0130	0.0077	-0.0258	-0.1383
688	10	2.00	0.60	0.70	1.0000	0.0277	0.0142	-0.0051	-0.0996
689	10	2.00	0.60	0.85	1.0000	0.0403	0.0186	0.0125	-0.0581
690	10	2.00	0.60	0.99	1.0000	0.0556	0.0246	0.0344	0.0060
691	10	2.00	0.40	0.00	1.0000	0.0134	0.0092	-0.0215	-0.1682
692	10	2.00	0.40	0.40	1.0000	0.0170	0.0110	-0.0164	-0.1485
693	10	2.00	0.40	0.70	1.0000	0.0248	0.0146	-0.0043	-0.1322
694	10	2.00	0.40	0.85	1.0000	0.0306	0.0165	0.0053	-0.0909
695	10	2.00	0.40	0.99	1.0000	0.0379	0.0192	0.0176	-0.0490
696	10	2.00	0.20	0.00	1.0000	0.0152	0.0123	-0.0166	-0.2030
697	10	2.00	0.20	0.40	1.0000	0.0163	0.0135	-0.0149	-0.1980
698	10	2.00	0.20	0.70	1.0000	0.0180	0.0152	-0.0113	-0.1792
699	10	2.00	0.20	0.85	1.0000	0.0201	0.0176	-0.0076	-0.1603
700	10	2.00	0.20	0.99	1.0000	0.0257	0.0236	0.0001	-0.1226
701	15	0.00	1.00	0.00	-0.0039	0.0072	0.0022	-0.0027	-0.1659
702	15	0.00	1.00	0.40	-0.0016	0.0072	0.0019	0.0115	-0.1691
703	15	0.00	1.00	0.70	0.0124	0.0205	0.0090	0.0579	-0.1157
704	15	0.00	1.00	0.85	0.0172	0.0372	0.0170	0.0991	-0.1000
705	15	0.00	1.00	0.99	-0.0502	0.0443	0.0236	0.1227	-0.1908
706	15	0.00	0.80	0.00	-0.0009	0.0092	0.0042	0.0041	-0.1671
707	15	0.00	0.80	0.40	0.0025	0.0104	0.0046	0.0191	-0.1518
708	15	0.00	0.80	0.70	0.0148	0.0233	0.0107	0.0636	-0.1169
709	15	0.00	0.80	0.85	0.0177	0.0392	0.0183	0.1024	-0.1081
710	15	0.00	0.80	0.99	-0.0500	0.0451	0.0245	0.1230	-0.1921
711	15	0.00	0.60	0.00	0.0064	0.0138	0.0075	0.0253	-0.1289
712	15	0.00	0.60	0.40	0.0106	0.0174	0.0092	0.0410	-0.1155
713	15	0.00	0.60	0.70	0.0195	0.0311	0.0152	0.0810	-0.0988
714	15	0.00	0.60	0.85	0.0169	0.0447	0.0222	0.1123	-0.1174
715	15	0.00	0.60	0.99	-0.0535	0.0454	0.0250	0.1226	-0.1939
716	15	0.00	0.40	0.00	0.0204	0.0294	0.0160	0.0711	-0.1170
717	15	0.00	0.40	0.40	0.0222	0.0340	0.0181	0.0838	-0.1038
718	15	0.00	0.40	0.70	0.0199	0.0444	0.0227	0.1096	-0.1249
719	15	0.00	0.40	0.85	0.0042	0.0485	0.0248	0.1228	-0.1236
720	15	0.00	0.40	0.99	-0.0616	0.0459	0.0257	0.1226	-0.2046
721	15	0.00	0.20	0.00	0.0092	0.0505	0.0268	0.1235	-0.1146
722	15	0.00	0.20	0.40	0.0017	0.0488	0.0250	0.1233	-0.1225
723	15	0.00	0.20	0.70	-0.0144	0.0490	0.0261	0.1234	-0.1338
724	15	0.00	0.20	0.85	-0.0339	0.0472	0.0256	0.1251	-0.1468
725	15	0.00	0.20	0.99	-0.0761	0.0465	0.0269	0.1226	-0.2600
726	15	0.25	1.00	0.00	-0.0032	0.0080	0.0031	-0.0044	-0.1825
727	15	0.25	1.00	0.40	-0.0014	0.0080	0.0027	0.0095	-0.1798
728	15	0.25	1.00	0.70	0.0092	0.0195	0.0083	0.0527	-0.1581
729	15	0.25	1.00	0.85	0.0127	0.0357	0.0157	0.0928	-0.1388
730	15	0.25	1.00	0.99	-0.0460	0.0492	0.0247	0.1286	-0.0908
731	15	0.25	0.80	0.00	0.0017	0.0102	0.0050	0.0035	-0.1989
732	15	0.25	0.80	0.40	0.0042	0.0112	0.0051	0.0180	-0.1690
733	15	0.25	0.80	0.70	0.0153	0.0240	0.0114	0.0611	-0.1553
734	15	0.25	0.80	0.85	0.0169	0.0390	0.0181	0.0986	-0.1185
735	15	0.25	0.80	0.99	-0.0445	0.0490	0.0252	0.1276	-0.1289
736	15	0.25	0.60	0.00	0.0117	0.0160	0.0091	0.0265	-0.1775
737	15	0.25	0.60	0.40	0.0152	0.0192	0.0103	0.0413	-0.1500
738	15	0.25	0.60	0.70	0.0224	0.0321	0.0157	0.0795	-0.1556
739	15	0.25	0.60	0.85	0.0200	0.0457	0.0225	0.1105	-0.1131
740	15	0.25	0.60	0.99	-0.0445	0.0502	0.0272	0.1279	-0.1665
741	15	0.25	0.40	0.00	0.0274	0.0319	0.0174	0.0722	-0.1406
742	15	0.25	0.40	0.40	0.0281	0.0356	0.0185	0.0836	-0.1314
743	15	0.25	0.40	0.70	0.0257	0.0456	0.0230	0.1086	-0.1359
744	15	0.25	0.40	0.85	0.0115	0.0507	0.0260	0.1227	-0.1396
745	15	0.25	0.40	0.99	-0.0504	0.0496	0.0277	0.1260	-0.1854
746	15	0.25	0.20	0.00	0.0187	0.0529	0.0283	0.1236	-0.1382
747	15	0.25	0.20	0.40	0.0115	0.0515	0.0268	0.1237	-0.1460
748	15	0.25	0.20	0.70	-0.0051	0.0505	0.0265	0.1254	-0.1576
749	15	0.25	0.20	0.85	-0.0218	0.0506	0.0281	0.1266	-0.1702
750	15	0.25	0.20	0.99	-0.0634	0.0488	0.0280	0.1234	-0.2187
751	15	0.50	1.00	0.00	0.0004	0.0108	0.0060	-0.0060	-0.1992
752	15	0.50	1.00	0.40	-0.0005	0.0095	0.0045	0.0049	-0.1675
753	15	0.50	1.00	0.70	0.0037	0.0180	0.0076	0.0406	-0.1383
754	15	0.50	1.00	0.85	0.0059	0.0340	0.0143	0.0784	-0.1152
755	15	0.50	1.00	0.99	-0.0332	0.0603	0.0266	0.1330	-0.0082
756	15	0.50	0.80	0.00	0.0100	0.0141	0.0082	0.0045	-0.1641

757	15	0.50	0.80	0.40	0.0107	0.0142	0.0076	0.0166	-0.1434
758	15	0.50	0.80	0.70	0.0166	0.0248	0.0120	0.0532	-0.1628
759	15	0.50	0.80	0.85	0.0167	0.0392	0.0177	0.0877	-0.1206
760	15	0.50	0.80	0.99	-0.0267	0.0601	0.0285	0.1333	-0.0248
761	15	0.50	0.60	0.00	0.0256	0.0218	0.0131	0.0297	-0.1336
762	15	0.50	0.60	0.40	0.0278	0.0245	0.0139	0.0427	-0.1247
763	15	0.50	0.60	0.70	0.0317	0.0358	0.0180	0.0756	-0.1479
764	15	0.50	0.60	0.85	0.0288	0.0487	0.0241	0.1044	-0.1153
765	15	0.50	0.60	0.99	-0.0233	0.0584	0.0294	0.1314	-0.0581
766	15	0.50	0.40	0.00	0.0466	0.0395	0.0220	0.0756	-0.1186
767	15	0.50	0.40	0.40	0.0472	0.0430	0.0233	0.0860	-0.1038
768	15	0.50	0.40	0.70	0.0436	0.0517	0.0271	0.1076	-0.1199
769	15	0.50	0.40	0.85	0.0302	0.0563	0.0293	0.1204	-0.1303
770	15	0.50	0.40	0.99	-0.0233	0.0567	0.0309	0.1285	-0.0881
771	15	0.50	0.20	0.00	0.0416	0.0580	0.0316	0.1210	-0.1147
772	15	0.50	0.20	0.40	0.0372	0.0587	0.0323	0.1235	-0.1278
773	15	0.50	0.20	0.70	0.0218	0.0574	0.0317	0.1244	-0.1492
774	15	0.50	0.20	0.85	0.0060	0.0567	0.0320	0.1249	-0.1641
775	15	0.50	0.20	0.99	-0.0297	0.0559	0.0327	0.1245	-0.1447
776	15	0.75	1.00	0.00	0.0042	0.0126	0.0085	-0.0107	-0.2064
777	15	0.75	1.00	0.40	0.0008	0.0101	0.0057	-0.0032	-0.2213
778	15	0.75	1.00	0.70	0.0007	0.0173	0.0074	0.0260	-0.1472
779	15	0.75	1.00	0.85	0.0034	0.0341	0.0132	0.0616	-0.1233
780	15	0.75	1.00	0.99	-0.0147	0.0719	0.0278	0.1276	0.0329
781	15	0.75	0.80	0.00	0.0208	0.0187	0.0123	0.0038	-0.1836
782	15	0.75	0.80	0.40	0.0193	0.0179	0.0106	0.0125	-0.1898
783	15	0.75	0.80	0.70	0.0198	0.0256	0.0124	0.0416	-0.1564
784	15	0.75	0.80	0.85	0.0214	0.0413	0.0183	0.0746	-0.1323
785	15	0.75	0.80	0.99	-0.0047	0.0701	0.0299	0.1287	0.0167
786	15	0.75	0.60	0.00	0.0433	0.0292	0.0182	0.0312	-0.1832
787	15	0.75	0.60	0.40	0.0425	0.0297	0.0169	0.0400	-0.1613
788	15	0.75	0.60	0.70	0.0435	0.0393	0.0200	0.0673	-0.1596
789	15	0.75	0.60	0.85	0.0418	0.0524	0.0256	0.0942	-0.1299
790	15	0.75	0.60	0.99	0.0060	0.0686	0.0330	0.1293	-0.0077
791	15	0.75	0.40	0.00	0.0706	0.0484	0.0277	0.0760	-0.1373
792	15	0.75	0.40	0.40	0.0702	0.0509	0.0284	0.0839	-0.1540
793	15	0.75	0.40	0.70	0.0652	0.0577	0.0311	0.1011	-0.1525
794	15	0.75	0.40	0.85	0.0540	0.0621	0.0329	0.1132	-0.1149
795	15	0.75	0.40	0.99	0.0078	0.0648	0.0342	0.1254	-0.0513
796	15	0.75	0.20	0.00	0.0713	0.0646	0.0370	0.1148	-0.1206
797	15	0.75	0.20	0.40	0.0669	0.0643	0.0368	0.1161	-0.1519
798	15	0.75	0.20	0.70	0.0527	0.0629	0.0359	0.1166	-0.1715
799	15	0.75	0.20	0.85	0.0407	0.0633	0.0369	0.1186	-0.1445
800	15	0.75	0.20	0.99	0.0068	0.0622	0.0367	0.1190	-0.1316
801	15	1.00	1.00	0.00	0.0050	0.0107	0.0081	-0.0188	-0.1836
802	15	1.00	1.00	0.40	0.0015	0.0089	0.0056	-0.0129	-0.1588
803	15	1.00	1.00	0.70	0.0011	0.0172	0.0070	0.0127	-0.1385
804	15	1.00	1.00	0.85	0.0068	0.0368	0.0135	0.0478	-0.0681
805	15	1.00	1.00	0.99	0.0013	0.0808	0.0286	0.1158	0.0590
806	15	1.00	0.80	0.00	0.0272	0.0190	0.0128	-0.0023	-0.1649
807	15	1.00	0.80	0.40	0.0249	0.0182	0.0110	0.0045	-0.1674
808	15	1.00	0.80	0.70	0.0244	0.0262	0.0123	0.0292	-0.1290
809	15	1.00	0.80	0.85	0.0291	0.0446	0.0193	0.0622	-0.0821
810	15	1.00	0.80	0.99	0.0141	0.0789	0.0316	0.1186	0.0437
811	15	1.00	0.60	0.00	0.0566	0.0330	0.0206	0.0268	-0.1628
812	15	1.00	0.60	0.40	0.0546	0.0327	0.0187	0.0330	-0.1619
813	15	1.00	0.60	0.70	0.0546	0.0417	0.0214	0.0560	-0.1125
814	15	1.00	0.60	0.85	0.0548	0.0558	0.0270	0.0819	-0.0949
815	15	1.00	0.60	0.99	0.0270	0.0756	0.0346	0.1193	0.0186
816	15	1.00	0.40	0.00	0.0891	0.0530	0.0311	0.0681	-0.1463
817	15	1.00	0.40	0.40	0.0877	0.0545	0.0311	0.0736	-0.1498
818	15	1.00	0.40	0.70	0.0814	0.0595	0.0323	0.0870	-0.1104
819	15	1.00	0.40	0.85	0.0697	0.0650	0.0347	0.0996	-0.1136
820	15	1.00	0.40	0.99	0.0312	0.0694	0.0358	0.1138	-0.0240
821	15	1.00	0.20	0.00	0.0881	0.0651	0.0383	0.0972	-0.1689
822	15	1.00	0.20	0.40	0.0835	0.0640	0.0373	0.0972	-0.1913
823	15	1.00	0.20	0.70	0.0715	0.0639	0.0374	0.0992	-0.1646
824	15	1.00	0.20	0.85	0.0608	0.0638	0.0376	0.1008	-0.1821
825	15	1.00	0.20	0.99	0.0316	0.0638	0.0376	0.1033	-0.1008
826	15	1.50	1.00	0.00	0.0020	0.0016	0.0031	-0.0390	-0.1777
827	15	1.50	1.00	0.40	0.0003	0.0026	0.0017	-0.0334	-0.1514
828	15	1.50	1.00	0.70	0.0020	0.0182	0.0064	-0.0067	-0.0854
829	15	1.50	1.00	0.85	0.0118	0.0408	0.0132	0.0257	-0.0334
830	15	1.50	1.00	0.99	0.0074	0.0851	0.0264	0.0837	0.0762
831	15	1.50	0.80	0.00	0.0259	0.0099	0.0075	-0.0243	-0.1572
832	15	1.50	0.80	0.40	0.0243	0.0115	0.0067	-0.0181	-0.1404
833	15	1.50	0.80	0.70	0.0257	0.0260	0.0113	0.0071	-0.1163
834	15	1.50	0.80	0.85	0.0293	0.0468	0.0185	0.0375	-0.0526
835	15	1.50	0.80	0.99	0.0094	0.0802	0.0282	0.0846	0.0588
836	15	1.50	0.60	0.00	0.0524	0.0230	0.0143	-0.0010	-0.1566
837	15	1.50	0.60	0.40	0.0517	0.0250	0.0142	0.0052	-0.1369
838	15	1.50	0.60	0.70	0.0509	0.0375	0.0185	0.0264	-0.1068
839	15	1.50	0.60	0.85	0.0460	0.0530	0.0243	0.0501	-0.0610
840	15	1.50	0.60	0.99	0.0111	0.0717	0.0295	0.0807	0.0218
841	15	1.50	0.40	0.00	0.0779	0.0376	0.0221	0.0261	-0.1652
842	15	1.50	0.40	0.40	0.0727	0.0389	0.0219	0.0301	-0.1576
843	15	1.50	0.40	0.70	0.0591	0.0461	0.0249	0.0430	-0.1289
844	15	1.50	0.40	0.85	0.0512	0.0517	0.0267	0.0539	-0.0779
845	15	1.50	0.40	0.99	0.0093	0.0588	0.0206	0.0689	-0.0254
846	15	1.50	0.20	0.00	0.0587	0.0417	0.0257	0.0387	-0.1907
847	15	1.50	0.20	0.40	0.0556	0.0427	0.0264	0.0405	-0.1878
848	15	1.50	0.20	0.70	0.0422	0.0430	0.0261	0.0427	-0.1735

849	15	1.50	0.20	0.85	0.0270	0.0451	0.0281	0.0465	-0.1547
850	15	1.50	0.20	0.99	-0.0015	0.0495	0.0318	0.0537	-0.1056
851	15	2.00	1.00	0.00	1.0000	-0.0056	-0.0010	-0.0521	-0.1498
852	15	2.00	1.00	0.40	1.0000	-0.0013	-0.0005	-0.0451	-0.1251
853	15	2.00	1.00	0.70	1.0000	0.0173	0.0048	-0.0197	-0.0814
854	15	2.00	1.00	0.85	1.0000	0.0393	0.0114	0.0079	-0.0165
855	15	2.00	1.00	0.99	1.0000	0.0746	0.0206	0.0502	0.0625
856	15	2.00	0.80	0.00	1.0000	-0.0015	0.0011	-0.0439	-0.1748
857	15	2.00	0.80	0.40	1.0000	0.0035	0.0024	-0.0364	-0.1541
858	15	2.00	0.80	0.70	1.0000	0.0213	0.0082	-0.0116	-0.1000
859	15	2.00	0.80	0.85	1.0000	0.0399	0.0138	0.0129	-0.0323
860	15	2.00	0.80	0.99	1.0000	0.0651	0.0197	0.0456	0.0345
861	15	2.00	0.60	0.00	1.0000	0.0050	0.0043	-0.0315	-0.1810
862	15	2.00	0.60	0.40	1.0000	0.0096	0.0058	-0.0248	-0.1504
863	15	2.00	0.60	0.70	1.0000	0.0239	0.0108	-0.0042	-0.0985
864	15	2.00	0.60	0.85	1.0000	0.0360	0.0141	0.0134	-0.0786
865	15	2.00	0.60	0.99	1.0000	0.0507	0.0180	0.0353	0.0037
866	15	2.00	0.40	0.00	1.0000	0.0097	0.0067	-0.0204	-0.2202
867	15	2.00	0.40	0.40	1.0000	0.0132	0.0083	-0.0154	-0.1921
868	15	2.00	0.40	0.70	1.0000	0.0208	0.0110	-0.0033	-0.1429
869	15	2.00	0.40	0.85	1.0000	0.0264	0.0130	0.0063	-0.1249
870	15	2.00	0.40	0.99	1.0000	0.0334	0.0151	0.0187	-0.0419
871	15	2.00	0.20	0.00	1.0000	0.0113	0.0095	-0.0154	-0.2252
872	15	2.00	0.20	0.40	1.0000	0.0124	0.0102	-0.0137	-0.2293
873	15	2.00	0.20	0.70	1.0000	0.0140	0.0111	-0.0101	-0.1958
874	15	2.00	0.20	0.85	1.0000	0.0161	0.0130	-0.0064	-0.1846
875	15	2.00	0.20	0.99	1.0000	0.0216	0.0198	0.0013	-0.1288

Appendix J. Rank of Mean Relative Error Data

This Appendix lists the rank at each design point for the $\overline{RE}^i$ for each technique. Since $\overline{RE}^i$ can assume negative as well as positive values, these rankings are based on the absolute values of $\overline{RE}^i$ for each technique. The closest $\overline{RE}^i$ to zero is ranked first, the furthest is ranked fifth.

<u>Index</u>

Design Point - DP

<u>Factors</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
1	3	0.00	1.00	0.00	2.0000	5.0000	4.0000	1.0000	3.0000
2	3	0.00	1.00	0.40	1.0000	5.0000	4.0000	2.0000	3.0000
3	3	0.00	1.00	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
4	3	0.00	1.00	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
5	3	0.00	1.00	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
6	3	0.00	0.80	0.00	2.0000	5.0000	4.0000	1.0000	3.0000
7	3	0.00	0.80	0.40	1.0000	5.0000	4.0000	3.0000	2.0000
8	3	0.00	0.80	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
9	3	0.00	0.80	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
10	3	0.00	0.80	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
11	3	0.00	0.60	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
12	3	0.00	0.60	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
13	3	0.00	0.60	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
14	3	0.00	0.60	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
15	3	0.00	0.60	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
16	3	0.00	0.40	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
17	3	0.00	0.40	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
18	3	0.00	0.40	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
19	3	0.00	0.40	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
20	3	0.00	0.40	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
21	3	0.00	0.20	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
22	3	0.00	0.20	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
23	3	0.00	0.20	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
24	3	0.00	0.20	0.85	2.0000	5.0000	4.0000	3.0000	1.0000

25	3	0.00	0.20	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
26	3	0.25	1.00	0.00	1.0000	5.0000	4.0000	2.0000	3.0000
27	3	0.25	1.00	0.40	1.0000	5.0000	4.0000	2.0000	3.0000
28	3	0.25	1.00	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
29	3	0.25	1.00	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
30	3	0.25	1.00	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
31	3	0.25	0.80	0.00	2.0000	5.0000	4.0000	1.0000	3.0000
32	3	0.25	0.80	0.40	1.0000	5.0000	4.0000	2.0000	3.0000
33	3	0.25	0.80	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
34	3	0.25	0.80	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
35	3	0.25	0.80	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
36	3	0.25	0.60	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
37	3	0.25	0.60	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
38	3	0.25	0.60	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
39	3	0.25	0.60	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
40	3	0.25	0.60	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
41	3	0.25	0.40	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
42	3	0.25	0.40	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
43	3	0.25	0.40	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
44	3	0.25	0.40	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
45	3	0.25	0.40	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
46	3	0.25	0.20	0.00	2.0000	5.0000	4.0000	3.0000	1.0000
47	3	0.25	0.20	0.40	2.0000	5.0000	4.0000	3.0000	1.0000
48	3	0.25	0.20	0.70	2.0000	5.0000	4.0000	3.0000	1.0000
49	3	0.25	0.20	0.85	2.0000	5.0000	4.0000	3.0000	1.0000
50	3	0.25	0.20	0.99	2.0000	5.0000	4.0000	3.0000	1.0000
51	3	0.50	1.00	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
52	3	0.50	1.00	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
53	3	0.50	1.00	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
54	3	0.50	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
55	3	0.50	1.00	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
56	3	0.50	0.80	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
57	3	0.50	0.80	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
58	3	0.50	0.80	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
59	3	0.50	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
60	3	0.50	0.80	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
61	3	0.50	0.60	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
62	3	0.50	0.60	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
63	3	0.50	0.60	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
64	3	0.50	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
65	3	0.50	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
66	3	0.50	0.40	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
67	3	0.50	0.40	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
68	3	0.50	0.40	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
69	3	0.50	0.40	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
70	3	0.50	0.40	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
71	3	0.50	0.20	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
72	3	0.50	0.20	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
73	3	0.50	0.20	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
74	3	0.50	0.20	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
75	3	0.50	0.20	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
76	3	0.75	1.00	0.00	5.0000	4.0000	2.0000	1.0000	2.0000
77	3	0.75	1.00	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
78	3	0.75	1.00	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
79	3	0.75	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
80	3	0.75	1.00	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
81	3	0.75	0.80	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
82	3	0.75	0.80	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
83	3	0.75	0.80	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
84	3	0.75	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
85	3	0.75	0.80	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
86	3	0.75	0.60	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
87	3	0.75	0.60	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
88	3	0.75	0.60	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
89	3	0.75	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
90	3	0.75	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
91	3	0.75	0.40	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
92	3	0.75	0.40	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
93	3	0.75	0.40	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
94	3	0.75	0.40	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
95	3	0.75	0.40	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
96	3	0.75	0.20	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
97	3	0.75	0.20	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
98	3	0.75	0.20	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
99	3	0.75	0.20	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
100	3	0.75	0.20	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
101	3	1.00	1.00	0.00	5.0000	4.0000	2.0000	1.0000	3.0000
102	3	1.00	1.00	0.40	5.0000	4.0000	2.0000	1.0000	3.0000
103	3	1.00	1.00	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
104	3	1.00	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
105	3	1.00	1.00	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
106	3	1.00	0.80	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
107	3	1.00	0.80	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
108	3	1.00	0.80	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
109	3	1.00	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
110	3	1.00	0.80	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
111	3	1.00	0.60	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
112	3	1.00	0.60	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
113	3	1.00	0.60	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
114	3	1.00	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
115	3	1.00	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
116	3	1.00	0.40	0.00	5.0000	4.0000	3.0000	2.0000	1.0000

117	3	1.00	0.40	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
118	3	1.00	0.40	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
119	3	1.00	0.40	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
120	3	1.00	0.40	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
121	3	1.00	0.20	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
122	3	1.00	0.20	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
123	3	1.00	0.20	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
124	3	1.00	0.20	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
125	3	1.00	0.20	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
126	3	1.50	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
127	3	1.50	1.00	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
128	3	1.50	1.00	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
129	3	1.50	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
130	3	1.50	1.00	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
131	3	1.50	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
132	3	1.50	0.80	0.40	5.0000	4.0000	2.0000	1.0000	3.0000
133	3	1.50	0.80	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
134	3	1.50	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
135	3	1.50	0.80	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
136	3	1.50	0.60	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
137	3	1.50	0.60	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
138	3	1.50	0.60	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
139	3	1.50	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
140	3	1.50	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
141	3	1.50	0.40	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
142	3	1.50	0.40	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
143	3	1.50	0.40	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
144	3	1.50	0.40	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
145	3	1.50	0.40	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
146	3	1.50	0.20	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
147	3	1.50	0.20	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
148	3	1.50	0.20	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
149	3	1.50	0.20	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
150	3	1.50	0.20	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
151	3	2.00	1.00	0.00	5.0000	2.0000	1.0000	4.0000	3.0000
152	3	2.00	1.00	0.40	5.0000	2.0000	1.0000	4.0000	3.0000
153	3	2.00	1.00	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
154	3	2.00	1.00	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
155	3	2.00	1.00	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
156	3	2.00	0.80	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
157	3	2.00	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
158	3	2.00	0.80	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
159	3	2.00	0.80	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
160	3	2.00	0.80	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
161	3	2.00	0.60	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
162	3	2.00	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
163	3	2.00	0.60	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
164	3	2.00	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
165	3	2.00	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
166	3	2.00	0.40	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
167	3	2.00	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
168	3	2.00	0.40	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
169	3	2.00	0.40	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
170	3	2.00	0.40	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
171	3	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
172	3	2.00	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
173	3	2.00	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
174	3	2.00	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
175	3	2.00	0.20	0.99	5.0000	2.0000	3.0000	1.0000	4.0000
176	5	0.00	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
177	5	0.00	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
178	5	0.00	1.00	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
179	5	0.00	1.00	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
180	5	0.00	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
181	5	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
182	5	0.00	0.80	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
183	5	0.00	0.80	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
184	5	0.00	0.80	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
185	5	0.00	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
186	5	0.00	0.60	0.00	2.0000	5.0000	3.0000	1.0000	4.0000
187	5	0.00	0.60	0.40	1.0000	5.0000	3.0000	4.0000	2.0000
188	5	0.00	0.60	0.70	3.0000	4.0000	2.0000	5.0000	1.0000
189	5	0.00	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
190	5	0.00	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
191	5	0.00	0.40	0.00	3.0000	5.0000	2.0000	4.0000	1.0000
192	5	0.00	0.40	0.40	3.0000	4.0000	2.0000	5.0000	1.0000
193	5	0.00	0.40	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
194	5	0.00	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
195	5	0.00	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
196	5	0.00	0.20	0.00	2.0000	4.0000	3.0000	5.0000	1.0000
197	5	0.00	0.20	0.40	2.0000	4.0000	3.0000	5.0000	1.0000
198	5	0.00	0.20	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
199	5	0.00	0.20	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
200	5	0.00	0.20	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
201	5	0.25	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
202	5	0.25	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
203	5	0.25	1.00	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
204	5	0.25	1.00	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
205	5	0.25	1.00	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
206	5	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
207	5	0.25	0.80	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
208	5	0.25	0.80	0.70	2.0000	5.0000	3.0000	4.0000	1.0000

209	5	0.25	0.80	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
210	5	0.25	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
211	5	0.25	0.60	0.00	2.0000	5.0000	3.0000	1.0000	4.0000
212	5	0.25	0.60	0.40	1.0000	5.0000	3.0000	4.0000	2.0000
213	5	0.25	0.60	0.70	3.0000	4.0000	2.0000	5.0000	1.0000
214	5	0.25	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
215	5	0.25	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
216	5	0.25	0.40	0.00	3.0000	5.0000	2.0000	4.0000	1.0000
217	5	0.25	0.40	0.40	3.0000	4.0000	2.0000	5.0000	1.0000
218	5	0.25	0.40	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
219	5	0.25	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
220	5	0.25	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
221	5	0.25	0.20	0.00	2.0000	4.0000	3.0000	5.0000	1.0000
222	5	0.25	0.20	0.40	2.0000	4.0000	3.0000	5.0000	1.0000
223	5	0.25	0.20	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
224	5	0.25	0.20	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
225	5	0.25	0.20	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
226	5	0.50	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
227	5	0.50	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
228	5	0.50	1.00	0.70	1.0000	5.0000	2.0000	3.0000	4.0000
229	5	0.50	1.00	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
230	5	0.50	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
231	5	0.50	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
232	5	0.50	0.80	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
233	5	0.50	0.80	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
234	5	0.50	0.80	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
235	5	0.50	0.80	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
236	5	0.50	0.60	0.00	3.0000	5.0000	2.0000	1.0000	4.0000
237	5	0.50	0.60	0.40	4.0000	5.0000	3.0000	2.0000	1.0000
238	5	0.50	0.60	0.70	2.0000	5.0000	2.0000	4.0000	1.0000
239	5	0.50	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
240	5	0.50	0.60	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
241	5	0.50	0.40	0.00	3.0000	5.0000	2.0000	4.0000	1.0000
242	5	0.50	0.40	0.40	3.0000	5.0000	2.0000	4.0000	1.0000
243	5	0.50	0.40	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
244	5	0.50	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
245	5	0.50	0.40	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
246	5	0.50	0.20	0.00	2.0000	4.0000	3.0000	5.0000	1.0000
247	5	0.50	0.20	0.40	2.0000	4.0000	3.0000	5.0000	1.0000
248	5	0.50	0.20	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
249	5	0.50	0.20	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
250	5	0.50	0.20	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
251	5	0.75	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
252	5	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
253	5	0.75	1.00	0.70	1.0000	5.0000	3.0000	2.0000	4.0000
254	5	0.75	1.00	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
255	5	0.75	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
256	5	0.75	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
257	5	0.75	0.80	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
258	5	0.75	0.80	0.70	1.0000	5.0000	4.0000	2.0000	3.0000
259	5	0.75	0.80	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
260	5	0.75	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
261	5	0.75	0.60	0.00	4.0000	5.0000	2.0000	1.0000	3.0000
262	5	0.75	0.60	0.40	4.0000	5.0000	3.0000	1.0000	2.0000
263	5	0.75	0.60	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
264	5	0.75	0.60	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
265	5	0.75	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
266	5	0.75	0.40	0.00	4.0000	5.0000	2.0000	3.0000	1.0000
267	5	0.75	0.40	0.40	4.0000	5.0000	2.0000	3.0000	1.0000
268	5	0.75	0.40	0.70	2.0000	5.0000	3.0000	4.0000	1.0000
269	5	0.75	0.40	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
270	5	0.75	0.40	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
271	5	0.75	0.20	0.00	2.0000	5.0000	3.0000	4.0000	1.0000
272	5	0.75	0.20	0.40	2.0000	5.0000	3.0000	4.0000	1.0000
273	5	0.75	0.20	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
274	5	0.75	0.20	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
275	5	0.75	0.20	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
276	5	1.00	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
277	5	1.00	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
278	5	1.00	1.00	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
279	5	1.00	1.00	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
280	5	1.00	1.00	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
281	5	1.00	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
282	5	1.00	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
283	5	1.00	0.80	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
284	5	1.00	0.80	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
285	5	1.00	0.80	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
286	5	1.00	0.60	0.00	5.0000	4.0000	2.0000	1.0000	3.0000
287	5	1.00	0.60	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
288	5	1.00	0.60	0.70	5.0000	4.0000	3.0000	2.0000	1.0000
289	5	1.00	0.60	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
290	5	1.00	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
291	5	1.00	0.40	0.00	5.0000	4.0000	3.0000	2.0000	1.0000
292	5	1.00	0.40	0.40	5.0000	4.0000	3.0000	2.0000	1.0000
293	5	1.00	0.40	0.70	5.0000	4.0000	2.0000	3.0000	1.0000
294	5	1.00	0.40	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
295	5	1.00	0.40	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
296	5	1.00	0.20	0.00	5.0000	4.0000	2.0000	3.0000	1.0000
297	5	1.00	0.20	0.40	5.0000	4.0000	2.0000	3.0000	1.0000
298	5	1.00	0.20	0.70	5.0000	4.0000	2.0000	3.0000	1.0000
299	5	1.00	0.20	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
300	5	1.00	0.20	0.99	5.0000	4.0000	2.0000	3.0000	1.0000

301	5	1.50	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
302	5	1.50	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
303	5	1.50	1.00	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
304	5	1.50	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
305	5	1.50	1.00	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
306	5	1.50	0.80	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
307	5	1.50	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
308	5	1.50	0.80	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
309	5	1.50	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
310	5	1.50	0.80	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
311	5	1.50	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
312	5	1.50	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
313	5	1.50	0.60	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
314	5	1.50	0.60	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
315	5	1.50	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
316	5	1.50	0.40	0.00	5.0000	4.0000	2.0000	1.0000	3.0000
317	5	1.50	0.40	0.40	5.0000	4.0000	2.0000	1.0000	3.0000
318	5	1.50	0.40	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
319	5	1.50	0.40	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
320	5	1.50	0.40	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
321	5	1.50	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
322	5	1.50	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
323	5	1.50	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
324	5	1.50	0.20	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
325	5	1.50	0.20	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
326	5	2.00	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
327	5	2.00	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
328	5	2.00	1.00	0.70	5.0000	4.0000	1.0000	2.0000	3.0000
329	5	2.00	1.00	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
330	5	2.00	1.00	0.99	5.0000	4.0000	1.0000	2.0000	3.0000
331	5	2.00	0.80	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
332	5	2.00	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
333	5	2.00	0.80	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
334	5	2.00	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
335	5	2.00	0.80	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
336	5	2.00	0.60	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
337	5	2.00	0.60	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
338	5	2.00	0.60	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
339	5	2.00	0.60	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
340	5	2.00	0.60	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
341	5	2.00	0.40	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
342	5	2.00	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
343	5	2.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
344	5	2.00	0.40	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
345	5	2.00	0.40	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
346	5	2.00	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
347	5	2.00	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
348	5	2.00	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
349	5	2.00	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
350	5	2.00	0.20	0.99	5.0000	3.0000	2.0000	1.0000	4.0000
351	7	0.00	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
352	7	0.00	1.00	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
353	7	0.00	1.00	0.70	2.0000	3.0000	1.0000	5.0000	4.0000
354	7	0.00	1.00	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
355	7	0.00	1.00	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
356	7	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
357	7	0.00	0.80	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
358	7	0.00	0.80	0.70	2.0000	3.0000	1.0000	5.0000	4.0000
359	7	0.00	0.80	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
360	7	0.00	0.80	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
361	7	0.00	0.60	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
362	7	0.00	0.60	0.40	1.0000	3.0000	1.0000	4.0000	5.0000
363	7	0.00	0.60	0.70	2.0000	4.0000	1.0000	5.0000	3.0000
364	7	0.00	0.60	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
365	7	0.00	0.60	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
366	7	0.00	0.40	0.00	2.0000	4.0000	1.0000	5.0000	3.0000
367	7	0.00	0.40	0.40	2.0000	4.0000	1.0000	5.0000	3.0000
368	7	0.00	0.40	0.70	1.0000	4.0000	3.0000	5.0000	2.0000
369	7	0.00	0.40	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
370	7	0.00	0.40	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
371	7	0.00	0.20	0.00	1.0000	4.0000	3.0000	5.0000	2.0000
372	7	0.00	0.20	0.40	1.0000	4.0000	2.0000	5.0000	3.0000
373	7	0.00	0.20	0.70	1.0000	4.0000	2.0000	5.0000	3.0000
374	7	0.00	0.20	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
375	7	0.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
376	7	0.25	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
377	7	0.25	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
378	7	0.25	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
379	7	0.25	1.00	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
380	7	0.25	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
381	7	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
382	7	0.25	0.80	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
383	7	0.25	0.80	0.70	2.0000	3.0000	1.0000	5.0000	4.0000
384	7	0.25	0.80	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
385	7	0.25	0.80	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
386	7	0.25	0.60	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
387	7	0.25	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
388	7	0.25	0.60	0.70	2.0000	4.0000	1.0000	5.0000	3.0000
389	7	0.25	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
390	7	0.25	0.60	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
391	7	0.25	0.40	0.00	2.0000	4.0000	1.0000	5.0000	3.0000
392	7	0.25	0.40	0.40	3.0000	4.0000	1.0000	5.0000	2.0000

393	7	0.25	0.40	0.70	2.0000	4.0000	3.0000	5.0000	1.0000
394	7	0.25	0.40	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
395	7	0.25	0.40	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
396	7	0.25	0.20	0.00	1.0000	4.0000	3.0000	5.0000	2.0000
397	7	0.25	0.20	0.40	1.0000	4.0000	3.0000	5.0000	2.0000
398	7	0.25	0.20	0.70	1.0000	4.0000	2.0000	5.0000	3.0000
399	7	0.25	0.20	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
400	7	0.25	0.20	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
401	7	0.50	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
402	7	0.50	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
403	7	0.50	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
404	7	0.50	1.00	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
405	7	0.50	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
406	7	0.50	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
407	7	0.50	0.80	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
408	7	0.50	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
409	7	0.50	0.80	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
410	7	0.50	0.80	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
411	7	0.50	0.60	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
412	7	0.50	0.60	0.40	2.0000	4.0000	1.0000	3.0000	5.0000
413	7	0.50	0.60	0.70	2.0000	4.0000	1.0000	5.0000	3.0000
414	7	0.50	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
415	7	0.50	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
416	7	0.50	0.40	0.00	3.0000	4.0000	1.0000	5.0000	2.0000
417	7	0.50	0.40	0.40	3.0000	4.0000	2.0000	5.0000	1.0000
418	7	0.50	0.40	0.70	3.0000	4.0000	2.0000	5.0000	1.0000
419	7	0.50	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
420	7	0.50	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
421	7	0.50	0.20	0.00	2.0000	4.0000	3.0000	5.0000	1.0000
422	7	0.50	0.20	0.40	1.0000	4.0000	3.0000	5.0000	2.0000
423	7	0.50	0.20	0.70	1.0000	4.0000	2.0000	5.0000	3.0000
424	7	0.50	0.20	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
425	7	0.50	0.20	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
426	7	0.75	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
427	7	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
428	7	0.75	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
429	7	0.75	1.00	0.85	1.0000	4.0000	3.0000	5.0000	2.0000
430	7	0.75	1.00	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
431	7	0.75	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
432	7	0.75	0.80	0.40	3.0000	4.0000	2.0000	1.0000	5.0000
433	7	0.75	0.80	0.70	2.0000	4.0000	1.0000	3.0000	5.0000
434	7	0.75	0.80	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
435	7	0.75	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
436	7	0.75	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
437	7	0.75	0.60	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
438	7	0.75	0.60	0.70	3.0000	4.0000	1.0000	5.0000	2.0000
439	7	0.75	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
440	7	0.75	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
441	7	0.75	0.40	0.00	5.0000	4.0000	1.0000	3.0000	2.0000
442	7	0.75	0.40	0.40	3.0000	4.0000	2.0000	5.0000	1.0000
443	7	0.75	0.40	0.70	3.0000	4.0000	2.0000	5.0000	1.0000
444	7	0.75	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
445	7	0.75	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
446	7	0.75	0.20	0.00	2.0000	4.0000	3.0000	5.0000	1.0000
447	7	0.75	0.20	0.40	1.0000	4.0000	3.0000	5.0000	2.0000
448	7	0.75	0.20	0.70	1.0000	4.0000	2.0000	5.0000	3.0000
449	7	0.75	0.20	0.85	1.0000	4.0000	2.0000	5.0000	3.0000
450	7	0.75	0.20	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
451	7	1.00	1.00	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
452	7	1.00	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
453	7	1.00	1.00	0.70	1.0000	4.0000	3.0000	2.0000	5.0000
454	7	1.00	1.00	0.85	1.0000	5.0000	3.0000	4.0000	2.0000
455	7	1.00	1.00	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
456	7	1.00	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
457	7	1.00	0.80	0.40	3.0000	4.0000	2.0000	1.0000	5.0000
458	7	1.00	0.80	0.70	1.0000	4.0000	3.0000	2.0000	5.0000
459	7	1.00	0.80	0.85	2.0000	5.0000	3.0000	4.0000	1.0000
460	7	1.00	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
461	7	1.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
462	7	1.00	0.60	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
463	7	1.00	0.60	0.70	3.0000	5.0000	1.0000	4.0000	2.0000
464	7	1.00	0.60	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
465	7	1.00	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
466	7	1.00	0.40	0.00	5.0000	4.0000	1.0000	2.0000	3.0000
467	7	1.00	0.40	0.40	5.0000	4.0000	1.0000	3.0000	2.0000
468	7	1.00	0.40	0.70	3.0000	5.0000	2.0000	4.0000	1.0000
469	7	1.00	0.40	0.85	2.0000	4.0000	3.0000	5.0000	1.0000
470	7	1.00	0.40	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
471	7	1.00	0.20	0.00	1.0000	4.0000	2.0000	5.0000	3.0000
472	7	1.00	0.20	0.40	1.0000	3.0000	2.0000	5.0000	4.0000
473	7	1.00	0.20	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
474	7	1.00	0.20	0.85	1.0000	3.0000	2.0000	5.0000	3.0000
475	7	1.00	0.20	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
476	7	1.50	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
477	7	1.50	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
478	7	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
479	7	1.50	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
480	7	1.50	1.00	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
481	7	1.50	0.80	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
482	7	1.50	0.80	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
483	7	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
484	7	1.50	0.80	0.85	5.0000	4.0000	2.0000	3.0000	1.0000

485	7	1.50	0.80	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
486	7	1.50	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
487	7	1.50	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
488	7	1.50	0.60	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
489	7	1.50	0.60	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
490	7	1.50	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
491	7	1.50	0.40	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
492	7	1.50	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
493	7	1.50	0.40	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
494	7	1.50	0.40	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
495	7	1.50	0.40	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
496	7	1.50	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
497	7	1.50	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
498	7	1.50	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
499	7	1.50	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
500	7	1.50	0.20	0.99	5.0000	3.0000	2.0000	1.0000	4.0000
501	7	2.00	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
502	7	2.00	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
503	7	2.00	1.00	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
504	7	2.00	1.00	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
505	7	2.00	1.00	0.99	5.0000	4.0000	1.0000	2.0000	3.0000
506	7	2.00	0.80	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
507	7	2.00	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
508	7	2.00	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
509	7	2.00	0.80	0.85	5.0000	4.0000	3.0000	2.0000	1.0000
510	7	2.00	0.80	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
511	7	2.00	0.60	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
512	7	2.00	0.60	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
513	7	2.00	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
514	7	2.00	0.60	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
515	7	2.00	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
516	7	2.00	0.40	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
517	7	2.00	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
518	7	2.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
519	7	2.00	0.40	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
520	7	2.00	0.40	0.99	5.0000	4.0000	2.0000	1.0000	3.0000
521	7	2.00	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
522	7	2.00	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
523	7	2.00	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
524	7	2.00	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
525	7	2.00	0.20	0.99	5.0000	3.0000	2.0000	1.0000	4.0000
526	10	0.00	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
527	10	0.00	1.00	0.40	1.0000	3.0000	2.0000	3.0000	5.0000
528	10	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
529	10	0.00	1.00	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
530	10	0.00	1.00	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
531	10	0.00	0.80	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
532	10	0.00	0.80	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
533	10	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
534	10	0.00	0.80	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
535	10	0.00	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
536	10	0.00	0.60	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
537	10	0.00	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
538	10	0.00	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
539	10	0.00	0.60	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
540	10	0.00	0.60	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
541	10	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
542	10	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
543	10	0.00	0.40	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
544	10	0.00	0.40	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
545	10	0.00	0.40	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
546	10	0.00	0.20	0.00	1.0000	3.0000	2.0000	5.0000	4.0000
547	10	0.00	0.20	0.40	1.0000	3.0000	2.0000	5.0000	4.0000
548	10	0.00	0.20	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
549	10	0.00	0.20	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
550	10	0.00	0.20	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
551	10	0.25	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
552	10	0.25	1.00	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
553	10	0.25	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
554	10	0.25	1.00	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
555	10	0.25	1.00	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
556	10	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
557	10	0.25	0.80	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
558	10	0.25	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
559	10	0.25	0.80	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
560	10	0.25	0.80	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
561	10	0.25	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
562	10	0.25	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
563	10	0.25	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
564	10	0.25	0.60	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
565	10	0.25	0.60	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
566	10	0.25	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
567	10	0.25	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
568	10	0.25	0.40	0.70	2.0000	3.0000	1.0000	5.0000	4.0000
569	10	0.25	0.40	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
570	10	0.25	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
571	10	0.25	0.20	0.00	1.0000	3.0000	2.0000	5.0000	4.0000
572	10	0.25	0.20	0.40	1.0000	3.0000	2.0000	5.0000	4.0000
573	10	0.25	0.20	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
574	10	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
575	10	0.25	0.20	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
576	10	0.50	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000

577	10	0.50	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
578	10	0.50	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
579	10	0.50	1.00	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
580	10	0.50	1.00	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
581	10	0.50	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
582	10	0.50	0.80	0.40	2.0000	4.0000	1.0000	3.0000	5.0000
583	10	0.50	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
584	10	0.50	0.80	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
585	10	0.50	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
586	10	0.50	0.60	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
587	10	0.50	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
588	10	0.50	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
589	10	0.50	0.60	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
590	10	0.50	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
591	10	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
592	10	0.50	0.40	0.40	3.0000	2.0000	1.0000	5.0000	4.0000
593	10	0.50	0.40	0.70	2.0000	3.0000	1.0000	5.0000	4.0000
594	10	0.50	0.40	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
595	10	0.50	0.40	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
596	10	0.50	0.20	0.00	2.0000	3.0000	1.0000	5.0000	4.0000
597	10	0.50	0.20	0.40	2.0000	3.0000	1.0000	5.0000	4.0000
598	10	0.50	0.20	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
599	10	0.50	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
600	10	0.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
601	10	0.75	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
602	10	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
603	10	0.75	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
604	10	0.75	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
605	10	0.75	1.00	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
606	10	0.75	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
607	10	0.75	0.80	0.40	3.0000	4.0000	2.0000	1.0000	5.0000
608	10	0.75	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
609	10	0.75	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
610	10	0.75	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
611	10	0.75	0.60	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
612	10	0.75	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
613	10	0.75	0.60	0.70	2.0000	2.0000	1.0000	4.0000	5.0000
614	10	0.75	0.60	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
615	10	0.75	0.60	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
616	10	0.75	0.40	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
617	10	0.75	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
618	10	0.75	0.40	0.70	3.0000	2.0000	1.0000	5.0000	4.0000
619	10	0.75	0.40	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
620	10	[illegible]	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
621	10	0.75	0.20	0.00	3.0000	2.0000	1.0000	5.0000	4.0000
622	10	0.75	0.20	0.40	2.0000	3.0000	1.0000	5.0000	4.0000
623	10	0.75	0.20	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
624	10	0.75	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
625	10	0.75	0.20	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
626	10	1.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
627	10	1.00	1.00	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
628	10	1.00	1.00	0.70	1.0000	4.0000	3.0000	2.0000	5.0000
629	10	1.00	1.00	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
630	10	1.00	1.00	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
631	10	1.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
632	10	1.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
633	10	1.00	0.80	0.70	2.0000	4.0000	1.0000	3.0000	5.0000
634	10	1.00	0.60	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
635	10	1.00	0.80	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
636	10	1.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
637	10	1.00	0.60	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
638	10	1.00	[illegible]	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
639	10	1.00	0.60	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
640	10	1.00	0.60	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
641	10	1.00	0.40	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
642	10	1.00	0.40	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
643	10	1.00	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
644	10	1.00	0.40	0.85	2.0000	3.0000	1.0000	5.0000	4.0000
645	10	1.00	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
646	10	1.00	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
647	10	1.00	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
648	10	1.00	0.20	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
649	10	1.00	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
650	10	1.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
651	10	1.50	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
652	10	1.50	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
653	10	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
654	10	1.50	1.00	0.85	5.0000	4.0000	2.0000	3.0000	1.0000
655	10	1.50	1.00	0.99	5.0000	4.0000	1.0000	2.0000	3.0000
656	10	1.50	0.80	0.00	5.0000	[illegible]	1.0000	3.0000	4.0000
657	10	1.50	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
658	10	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
659	10	1.50	0.80	0.85	5.0000	4.0000	1.0000	3.0000	2.0000
660	10	1.50	0.80	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
661	10	1.50	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
662	10	1.50	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
663	10	1.50	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
664	10	1.50	0.60	0.85	5.0000	4.0000	1.0000	2.0000	3.0000
665	10	1.50	0.60	0.99	5.0000	3.0000	2.0000	3.0000	1.0000
666	10	1.50	0.40	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
667	10	1.50	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
668	10	1.50	0.40	0.70	5.0000	3.0000	1.0000	2.0000	4.0000

669	10	1.50	0.40	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
670	10	1.50	0.40	0.99	5.0000	3.0000	2.0000	4.0000	1.0000
671	10	1.50	0.20	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
672	10	1.50	0.20	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
673	10	1.50	0.20	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
674	10	1.50	0.20	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
675	10	1.50	0.20	0.99	5.0000	3.0000	1.0000	2.0000	4.0000
676	10	2.00	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
677	10	2.00	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
678	10	2.00	1.00	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
679	10	2.00	1.00	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
680	10	2.00	1.00	0.99	5.0000	4.0000	1.0000	2.0000	3.0000
681	10	2.00	0.80	0.00	5.0000	1.0000	2.0000	3.0000	4.0000
682	10	2.00	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
683	10	2.00	0.80	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
684	10	2.00	0.80	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
685	10	2.00	0.80	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
686	10	2.00	0.60	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
687	10	2.00	0.60	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
688	10	2.00	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
689	10	2.00	0.60	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
690	10	2.00	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
691	10	2.00	0.40	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
692	10	2.00	0.40	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
693	10	2.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
694	10	2.00	0.40	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
695	10	2.00	0.40	0.99	5.0000	3.0000	2.0000	1.0000	4.0000
696	10	2.00	0.20	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
697	10	2.00	0.20	0.40	5.0000	3.0000	1.0000	2.0000	4.0000
698	10	2.00	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
699	10	2.00	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
700	10	2.00	0.20	0.99	5.0000	3.0000	2.0000	1.0000	4.0000
701	15	0.00	1.00	0.00	3.0000	4.0000	1.0000	2.0000	5.0000
702	15	0.00	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
703	15	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
704	15	0.00	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
705	15	0.00	1.00	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
706	15	0.00	0.80	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
707	15	0.00	0.80	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
708	15	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
709	15	0.00	0.80	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
710	15	0.00	0.80	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
711	15	0.00	0.60	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
712	15	0.00	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
713	15	0.00	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
714	15	0.00	0.60	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
715	15	0.00	0.60	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
716	15	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
717	15	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
718	15	0.00	0.40	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
719	15	0.00	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
720	15	0.00	0.40	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
721	15	0.00	0.20	0.00	1.0000	3.0000	2.0000	5.0000	4.0000
722	15	0.00	0.20	0.40	1.0000	3.0000	2.0000	5.0000	4.0000
723	15	0.00	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
724	15	0.00	0.20	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
725	15	0.00	0.20	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
726	15	0.25	1.00	0.00	2.0000	4.0000	1.0000	3.0000	5.0000
727	15	0.25	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
728	15	0.25	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
729	15	0.25	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
730	15	0.25	1.00	0.99	2.0000	3.0000	1.0000	5.0000	4.0000
731	15	0.25	0.80	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
732	15	0.25	0.80	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
733	15	0.25	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
734	15	0.25	0.80	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
735	15	0.25	0.80	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
736	15	0.25	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
737	15	0.25	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
738	15	0.25	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
739	15	0.25	0.60	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
740	15	0.25	0.60	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
741	15	0.25	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
742	15	0.25	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
743	15	0.25	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
744	15	0.25	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
745	15	0.25	0.40	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
746	15	0.25	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
747	15	0.25	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
748	15	0.25	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
749	15	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
750	15	0.25	0.20	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
751	15	0.50	1.00	0.00	1.0000	4.0000	2.0000	2.0000	5.0000
752	15	0.50	1.00	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
753	15	0.50	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
754	15	0.50	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
755	15	0.50	1.00	0.99	3.0000	4.0000	2.0000	5.0000	1.0000
756	15	0.50	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
757	15	0.50	0.80	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
758	15	0.50	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
759	15	0.50	0.80	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
760	15	0.50	0.80	0.99	2.0000	4.0000	3.0000	5.0000	1.0000

761	15	0.50	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
762	15	0.50	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
763	15	0.50	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
764	15	0.50	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
765	15	0.50	0.60	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
766	15	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
767	15	0.50	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
768	15	0.50	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
769	15	0.50	0.40	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
770	15	0.50	0.40	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
771	15	0.50	0.20	0.00	2.0000	3.0000	1.0000	5.0000	4.0000
772	15	0.50	0.20	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
773	15	0.50	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
774	15	0.50	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
775	15	0.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
776	15	0.75	1.00	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
777	15	0.75	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
778	15	0.75	1.00	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
779	15	0.75	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
780	15	0.75	1.00	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
781	15	0.75	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
782	15	0.75	0.80	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
783	15	0.75	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
784	15	0.75	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
785	15	0.75	0.80	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
786	15	0.75	0.60	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
787	15	0.75	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
788	15	0.75	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
789	15	0.75	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
790	15	0.75	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
791	15	0.75	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
792	15	0.75	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
793	15	0.75	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
794	15	0.75	0.40	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
795	15	0.75	0.40	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
796	15	0.75	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
797	15	0.75	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
798	15	0.75	0.20	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
799	15	0.75	0.20	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
800	15	0.75	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
801	15	1.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
802	15	1.00	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
803	15	1.00	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
804	15	1.00	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
805	15	1.00	1.00	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
806	15	1.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
807	15	1.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
808	15	1.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
809	15	1.00	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
810	15	1.00	0.80	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
811	15	1.00	0.60	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
812	15	1.00	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
813	15	1.00	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
814	15	1.00	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
815	15	1.00	0.60	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
816	15	1.00	0.40	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
817	15	1.00	0.40	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
818	15	1.00	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
819	15	1.00	0.40	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
820	15	1.00	0.40	0.99	2.0000	4.0000	3.0000	5.0000	1.0000
821	15	1.00	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
822	15	1.00	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
823	15	1.00	0.20	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
824	15	1.00	0.20	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
825	15	1.00	0.20	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
826	15	1.50	1.00	0.00	2.0000	1.0000	3.0000	4.0000	5.0000
827	15	1.50	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
828	15	1.50	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
829	15	1.50	1.00	0.85	1.0000	5.0000	2.0000	3.0000	4.0000
830	15	1.50	1.00	0.99	1.0000	5.0000	2.0000	4.0000	3.0000
831	15	1.50	0.80	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
832	15	1.50	0.80	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
833	15	1.50	0.80	0.70	3.0000	4.0000	2.0000	1.0000	5.0000
834	15	1.50	0.80	0.85	2.0000	4.0000	1.0000	3.0000	5.0000
835	15	1.50	0.80	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
836	15	1.50	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
837	15	1.50	0.60	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
838	15	1.50	0.60	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
839	15	1.50	0.60	0.85	2.0000	4.0000	1.0000	3.0000	5.0000
840	15	1.50	0.60	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
841	15	1.50	0.40	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
842	15	1.50	0.40	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
843	15	1.50	0.40	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
844	15	1.50	0.40	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
845	15	1.50	0.40	0.99	1.0000	4.0000	3.0000	5.0000	2.0000
846	15	1.50	0.20	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
847	15	1.50	0.20	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
848	15	1.50	0.20	0.70	2.0000	4.0000	1.0000	3.0000	5.0000
849	15	1.50	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
850	15	1.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
851	15	2.00	1.00	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
852	15	2.00	1.00	0.40	5.0000	2.0000	1.0000	3.0000	4.0000

853	15	2.00	1.00	0.70	5.0000	2.0000	1.0000	3.0000	4.0000
854	15	2.00	1.00	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
855	15	2.00	1.00	0.99	5.0000	4.0000	1.0000	2.0000	3.0000
856	15	2.00	0.80	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
857	15	2.00	0.80	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
858	15	2.00	0.80	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
859	15	2.00	0.80	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
860	15	2.00	0.80	0.99	5.0000	4.0000	1.0000	3.0000	2.0000
861	15	2.00	0.60	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
862	15	2.00	0.60	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
863	15	2.00	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
864	15	2.00	0.60	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
865	15	2.00	0.60	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
866	15	2.00	0.40	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
867	15	2.00	0.40	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
868	15	2.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
869	15	2.00	0.[illegible]	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
870	15	2.00	0.40	0.99	5.0000	3.0000	1.0000	2.0000	4.0000
871	15	2.00	0.20	0.00	5.0000	2.0000	1.0000	3.0000	4.0000
872	15	2.00	0.20	0.40	5.0000	2.0000	1.0000	3.0000	4.0000
873	15	2.00	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
874	15	2.00	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
875	15	2.00	0.20	0.99	5.0000	3.0000	2.0000	1.0000	4.0000

Appendix K. Variance of Relative Error Data

This Appendix lists the $VAR(RE^i)$ for each technique at each design point. Once again, R234 was assigned a value of 1.00 at those points for which it could not compete.

<u>Index</u>

Design Point - DP

<u>Factors</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
**	**	****	****	****	******	******	******	******	******
1	3	0.00	1.00	0.00	0.0990	0.1067	0.1034	0.0956	0.1115
2	3	0.00	1.00	0.40	0.1024	0.1121	0.1081	0.1041	0.1186
3	3	0.00	1.00	0.70	0.1262	0.1400	0.1342	0.1375	0.1472
4	3	0.00	1.00	0.85	0.1536	0.1735	0.1674	0.1730	0.1802
5	3	0.00	1.00	0.99	0.1852	0.2312	0.2266	0.2273	0.2435
6	3	0.00	0.80	0.00	0.1033	0.1102	0.1065	0.1000	0.1154
7	3	0.00	0.80	0.40	0.1065	0.1165	0.1122	0.1092	0.1228
8	3	0.00	0.80	0.70	0.1300	0.1444	0.1388	0.1419	0.1511
9	3	0.00	0.80	0.85	0.1565	0.1773	0.1714	0.1765	0.1836
10	3	0.00	0.80	0.99	0.1867	0.2335	0.2278	0.2292	0.2462
11	3	0.00	0.60	0.00	0.1140	0.1224	0.1178	0.1160	0.1277
12	3	0.00	0.60	0.40	0.1210	0.1300	0.1250	0.1243	0.1360
13	3	0.00	0.60	0.70	0.1423	0.1580	0.1522	0.1561	0.1640
14	3	0.00	0.60	0.85	0.1645	0.1886	0.1829	0.1871	0.1942
15	3	0.00	0.60	0.99	0.1887	0.2352	0.2298	0.2307	0.2484
16	3	0.00	0.40	0.00	0.1348	0.1527	0.1470	0.1492	0.1572
17	3	0.00	0.40	0.40	0.1442	0.1610	0.1553	0.1586	0.1660
18	3	0.00	0.40	0.70	0.1593	0.1857	0.1798	0.1840	0.1904
19	3	0.00	0.40	0.85	0.1712	0.2076	0.2026	0.2050	0.2124
20	3	0.00	0.40	0.99	0.1904	0.2367	0.2313	0.2326	0.2511
21	3	0.00	0.20	0.00	0.1710	0.2074	0.2022	0.2046	0.2108
22	3	0.00	0.20	0.40	0.1736	0.2110	0.2057	0.2079	0.2150
23	3	0.00	0.20	0.70	0.1794	0.2222	0.2176	0.2185	0.2277
24	3	0.00	0.20	0.85	0.1848	0.2302	0.2254	0.2259	0.2380
25	3	0.00	0.20	0.99	0.1927	0.2402	0.2356	0.2361	0.2590
26	3	0.25	1.00	0.00	0.0988	0.1075	0.1046	0.0959	0.1127
27	3	0.25	1.00	0.40	0.1007	0.1121	0.1082	0.1031	0.1182

28	3	0.25	1.00	0.70	0.1205	0.1355	0.1299	0.1322	0.1423
29	3	0.25	1.00	0.85	0.1439	0.1641	0.1583	0.1629	0.1697
30	3	0.25	1.00	0.99	0.1744	0.2135	0.2095	0.2102	0.2178
31	3	0.25	0.80	0.00	0.1030	0.1113	0.1083	0.1004	0.1161
32	3	0.25	0.80	0.40	0.1067	0.1167	0.1129	0.1084	0.1224
33	3	0.25	0.80	0.70	0.1259	0.1412	0.1360	0.1378	0.1477
34	3	0.25	0.80	0.85	0.1504	0.1698	0.1641	0.1680	0.1754
35	3	0.25	0.80	0.99	0.1785	0.2154	0.2120	0.2121	0.2207
36	3	0.25	0.60	0.00	0.1134	0.1237	0.1205	0.1153	0.1284
37	3	0.25	0.60	0.40	0.1190	0.1303	0.1255	0.1241	0.1357
38	3	0.25	0.60	0.70	0.1408	0.1553	0.1494	0.1522	0.1611
39	3	0.25	0.60	0.85	0.1634	0.1825	0.1773	0.1802	0.1883
40	3	0.25	0.60	0.99	0.1838	0.2231	0.2190	0.2190	0.2315
41	3	0.25	0.40	0.00	0.1420	0.1531	0.1480	0.1484	0.1574
42	3	0.25	0.40	0.40	0.1476	0.1604	0.1549	0.1567	0.1650
43	3	0.25	0.40	0.70	0.1654	0.1828	0.1779	0.1798	0.1876
44	3	0.25	0.40	0.85	0.1760	0.2026	0.1991	0.1993	0.2082
45	3	0.25	0.40	0.99	0.1885	0.2267	0.2210	0.2227	0.2380
46	3	0.25	0.20	0.00	0.1743	0.2055	0.2013	0.2016	0.2103
47	3	0.25	0.20	0.40	0.1772	0.2086	0.2037	0.2045	0.2140
48	3	0.25	0.20	0.70	0.1819	0.2178	0.2151	0.2134	0.2252
49	3	0.25	0.20	0.85	0.1875	0.2256	0.2253	0.2210	0.2358
50	3	0.25	0.20	0.99	0.1922	0.2306	0.2287	0.2270	0.2477
51	3	0.50	1.00	0.00	1.0000	0.1077	0.1046	0.0947	0.1129
52	3	0.50	1.00	0.40	1.0000	0.1104	0.1067	0.0996	0.1151
53	3	0.50	1.00	0.70	1.0000	0.1262	0.1211	0.1207	0.1310
54	3	0.50	1.00	0.85	1.0000	0.1456	0.1402	0.1426	0.1487
55	3	0.50	1.00	0.99	1.0000	0.1779	0.1787	0.1745	0.1704
56	3	0.50	0.80	0.00	1.0000	0.1134	0.1105	0.1006	0.1176
57	3	0.50	0.80	0.40	1.0000	0.1172	0.1132	0.1065	0.1206
58	3	0.50	0.80	0.70	1.0000	0.1351	0.1299	0.1290	0.1383
59	3	0.50	0.80	0.85	1.0000	0.1554	0.1501	0.1513	0.1578
60	3	0.50	0.80	0.99	1.0000	0.1885	0.1868	0.1834	0.1815
61	3	0.50	0.60	0.00	1.0000	0.1273	0.1230	0.1161	0.1298
62	3	0.50	0.60	0.40	1.0000	0.1325	0.1280	0.1231	0.1344
63	3	0.50	0.60	0.70	1.0000	0.1520	0.1469	0.1455	0.1536
64	3	0.50	0.60	0.85	1.0000	0.1723	0.1676	0.1669	0.1737
65	3	0.50	0.60	0.99	1.0000	0.1998	0.1999	0.1931	0.1933
66	3	0.50	0.40	0.00	1.0000	0.1573	0.1532	0.1485	0.1583
67	3	0.50	0.40	0.40	1.0000	0.1634	0.1588	0.1553	0.1633
68	3	0.50	0.40	0.70	1.0000	0.1813	0.1770	0.1739	0.1818
69	3	0.50	0.40	0.85	1.0000	0.1964	0.1932	0.1889	0.1966
70	3	0.50	0.40	0.99	1.0000	0.2163	0.2120	0.2075	0.2130
71	3	0.50	0.20	0.00	1.0000	0.2059	0.2024	0.1968	0.2070
72	3	0.50	0.20	0.40	1.0000	0.2093	0.2089	0.2001	0.2099
73	3	0.50	0.20	0.70	1.0000	0.2166	0.2131	0.2072	0.2185
74	3	0.50	0.20	0.85	1.0000	0.2213	0.2209	0.2118	0.2248
75	3	0.50	0.20	0.99	1.0000	0.2279	0.2322	0.2183	0.2333
76	3	0.75	1.00	0.00	1.0000	0.1050	0.1032	0.0913	0.1120
77	3	0.75	1.00	0.40	1.0000	0.1057	0.1019	0.0941	0.1120
78	3	0.75	1.00	0.70	1.0000	0.1139	0.1093	0.1070	0.1195
79	3	0.75	1.00	0.85	1.0000	0.1244	0.1195	0.1201	0.1272
80	3	0.75	1.00	0.99	1.0000	0.1424	0.1692	0.1391	0.1325
81	3	0.75	0.80	0.00	1.0000	0.1137	0.1106	0.0996	0.1195
82	3	0.75	0.80	0.40	1.0000	0.1156	0.1117	0.1035	0.1209
83	3	0.75	0.80	0.70	1.0000	0.1260	0.1214	0.1178	0.1295
84	3	0.75	0.80	0.85	1.0000	0.1380	0.1337	0.1321	0.1398
85	3	0.75	0.80	0.99	1.0000	0.1567	0.1578	0.1510	0.1453
86	3	0.75	0.60	0.00	1.0000	0.1300	0.1265	0.1167	0.1332
87	3	0.75	0.60	0.40	1.0000	0.1331	0.1322	0.1211	0.1365
88	3	0.75	0.60	0.70	1.0000	0.1458	0.1424	0.1364	0.1470
89	3	0.75	0.60	0.85	1.0000	0.1589	0.1559	0.1506	0.1580
90	3	0.75	0.60	0.99	1.0000	0.1737	0.1743	0.1649	0.1607
91	3	0.75	0.40	0.00	1.0000	0.1605	0.1568	0.1477	0.1596
92	3	0.75	0.40	0.40	1.0000	0.1648	0.1612	0.1526	0.1634
93	3	0.75	0.40	0.70	1.0000	0.1768	0.1740	0.1652	0.1748
94	3	0.75	0.40	0.85	1.0000	0.1867	0.1839	0.1752	0.1831
95	3	0.75	0.40	0.99	1.0000	0.1947	0.2003	0.1823	0.1814
96	3	0.75	0.20	0.00	1.0000	0.2049	0.2026	0.1901	0.2021
97	3	0.75	0.20	0.40	1.0000	0.2062	0.2076	0.1913	0.2035
98	3	0.75	0.20	0.70	1.0000	0.2116	0.2105	0.1964	0.2099
99	3	0.75	0.20	0.85	1.0000	0.2156	0.2142	0.2003	0.2139
100	3	0.75	0.20	0.99	1.0000	0.2199	0.2165	0.2040	0.2138
101	3	1.00	1.00	0.00	1.0000	0.0900	0.0952	0.0844	0.1060
102	3	1.00	1.00	0.40	1.0000	0.0975	0.0941	0.0858	0.1049
103	3	1.00	1.00	0.70	1.0000	0.1002	0.0962	0.0929	0.1066
104	3	1.00	1.00	0.85	1.0000	0.1046	0.1012	0.0997	0.1070
105	3	1.00	1.00	0.99	1.0000	0.1111	0.1158	0.1083	0.1018
106	3	1.00	0.80	0.00	1.0000	0.1092	0.1062	0.0950	0.1158
107	3	1.00	0.80	0.40	1.0000	0.1096	0.1062	0.0972	0.1158
108	3	1.00	0.80	0.70	1.0000	0.1143	0.1109	0.1054	0.1188
109	3	1.00	0.80	0.85	1.0000	0.1205	0.1183	0.1135	0.1216
110	3	1.00	0.80	0.99	1.0000	0.1296	0.1328	0.1238	0.1183
111	3	1.00	0.60	0.00	1.0000	0.1274	0.1258	0.1132	0.1330
112	3	1.00	0.60	0.40	1.0000	0.1289	0.1259	0.1160	0.1334
113	3	1.00	0.60	0.70	1.0000	0.1360	0.1336	0.1252	0.1388
114	3	1.00	0.60	0.85	1.0000	0.1432	0.1416	0.1334	0.1424
115	3	1.00	0.60	0.99	1.0000	0.1487	0.1520	0.1392	0.1352
116	3	1.00	0.40	0.00	1.0000	0.1578	0.1537	0.1431	0.1617
117	3	1.00	0.40	0.40	1.0000	0.1604	0.1584	0.1462	0.1633
118	3	1.00	0.40	0.70	1.0000	0.1670	0.1664	0.1533	0.1686
119	3	1.00	0.40	0.85	1.0000	0.1726	0.1744	0.1590	0.1707

120	3	1.00	0.40	0.99	1.0000	0.1757	0.1856	0.1613	0.1616
121	3	1.00	0.20	0.00	1.0000	0.1952	0.1950	0.1781	0.1986
122	3	1.00	0.20	0.40	1.0000	0.1975	0.1998	0.1801	0.2013
123	3	1.00	0.20	0.70	1.0000	0.1990	0.2025	0.1816	0.2017
124	3	1.00	0.20	0.85	1.0000	0.2006	0.2060	0.1829	0.2013
125	3	1.00	0.20	0.99	1.0000	0.2016	0.2095	0.1833	0.1934
126	3	1.50	1.00	0.00	1.0000	0.0774	0.0757	0.0671	0.0883
127	3	1.50	1.00	0.40	1.0000	0.0761	0.0744	0.0668	0.0856
128	3	1.50	1.00	0.70	1.0000	0.0742	0.0724	0.0677	0.0804
129	3	1.50	1.00	0.85	1.0000	0.0733	0.0716	0.0686	0.0764
130	3	1.50	1.00	0.99	1.0000	0.0737	0.0782	0.0711	0.0689
131	3	1.50	0.80	0.00	1.0000	0.0895	0.0886	0.0782	0.1008
132	3	1.50	0.80	0.40	1.0000	0.0889	0.0881	0.0786	0.0986
133	3	1.50	0.80	0.70	1.0000	0.0883	0.0871	0.0805	0.0957
134	3	1.50	0.80	0.85	1.0000	0.0865	0.0881	0.0821	0.0914
135	3	1.50	0.80	0.99	1.0000	0.0876	0.0917	0.0829	0.0820
136	3	1.50	0.60	0.00	1.0000	0.1072	0.1057	0.0950	0.1194
137	3	1.50	0.60	0.40	1.0000	0.1073	0.1073	0.0957	0.1172
138	3	1.50	0.60	0.70	1.0000	0.1080	0.1079	0.0983	0.1165
139	3	1.50	0.60	0.85	1.0000	0.1089	0.1120	0.1000	0.1120
140	3	1.50	0.60	0.99	1.0000	0.1092	0.1170	0.1008	0.1029
141	3	1.50	0.40	0.00	1.0000	0.1302	0.1309	0.1168	0.1418
142	3	1.50	0.40	0.40	1.0000	0.1319	0.1361	0.1186	0.1424
143	3	1.50	0.40	0.70	1.0000	0.1332	0.1343	0.1206	0.1417
144	3	1.50	0.40	0.85	1.0000	0.1329	0.1365	0.1205	0.1368
145	3	1.50	0.40	0.99	1.0000	0.1308	0.1398	0.1182	0.1249
146	3	1.50	0.20	0.00	1.0000	0.1553	0.1628	0.1398	0.1691
147	3	1.50	0.20	0.40	1.0000	0.1579	0.1644	0.1422	0.1720
148	3	1.50	0.20	0.70	1.0000	0.1583	0.1666	0.1426	0.1713
149	3	1.50	0.20	0.85	1.0000	0.1544	0.1606	0.1389	0.1623
150	3	1.50	0.20	0.99	1.0000	0.1504	0.1574	0.1346	0.1497
151	3	2.00	1.00	0.00	1.0000	0.0574	0.0569	0.0498	0.0654
152	3	2.00	1.00	0.40	1.0000	0.0565	0.0572	0.0496	0.0636
153	3	2.00	1.00	0.70	1.0000	0.0540	0.0533	0.0487	0.0579
154	3	2.00	1.00	0.85	1.0000	0.0523	0.0516	0.0483	0.0534
155	3	2.00	1.00	0.99	1.0000	0.0499	0.0526	0.0479	0.0484
156	3	2.00	0.80	0.00	1.0000	0.0682	0.0687	0.0602	0.0787
157	3	2.00	0.80	0.40	1.0000	0.0674	0.0675	0.0600	0.0774
158	3	2.00	0.80	0.70	1.0000	0.0654	0.0655	0.0593	0.0713
159	3	2.00	0.80	0.85	1.0000	0.0638	0.0641	0.0587	0.0664
160	3	2.00	0.80	0.99	1.0000	0.0620	0.0667	0.0583	0.0607
161	3	2.00	0.60	0.00	1.0000	0.0819	0.0824	0.0735	0.0962
162	3	2.00	0.60	0.40	1.0000	0.0816	0.0832	0.0736	0.0951
163	3	2.00	0.60	0.70	1.0000	0.0805	0.0821	0.0731	0.0893
164	3	2.00	0.60	0.85	1.0000	0.0790	0.0825	0.0722	0.0840
165	3	2.00	0.60	0.99	1.0000	0.0764	0.0817	0.0704	0.0753
166	3	2.00	0.40	0.00	1.0000	0.0986	0.1026	0.0894	0.1167
167	3	2.00	0.40	0.40	1.0000	0.0983	0.1030	0.0892	0.1153
168	3	2.00	0.40	0.70	1.0000	0.0984	0.1022	0.0893	0.1115
169	3	2.00	0.40	0.85	1.0000	0.0970	0.1045	0.0879	0.1051
170	3	2.00	0.40	0.99	1.0000	0.0938	0.1002	0.0848	0.0950
171	3	2.00	0.20	0.00	1.0000	0.1142	0.1312	0.1039	0.1381
172	3	2.00	0.20	0.40	1.0000	0.1154	0.1216	0.1049	0.1385
173	3	2.00	0.20	0.70	1.0000	0.1147	0.1203	0.1040	0.1338
174	3	2.00	0.20	0.85	1.0000	0.1119	0.1170	0.1012	0.1272
175	3	2.00	0.20	0.99	1.0000	0.1131	0.1308	0.1017	0.1234
176	5	0.00	1.00	0.00	0.0564	0.0581	0.0581	0.0559	0.0676
177	5	0.00	1.00	0.40	0.0567	0.0578	0.0570	0.0581	0.0694
178	5	0.00	1.00	0.70	0.0673	0.0677	0.0645	0.0769	0.0845
179	5	0.00	1.00	0.85	0.0809	0.0841	0.0792	0.0994	0.1034
180	5	0.00	1.00	0.99	0.1026	0.1189	0.1145	0.1383	0.1450
181	5	0.00	0.80	0.00	0.0577	0.0593	0.0589	0.0587	0.0701
182	5	0.00	0.80	0.40	0.0589	0.0598	0.0585	0.0620	0.0723
183	5	0.00	0.80	0.70	0.0701	0.0706	0.0670	0.0811	0.0875
184	5	0.00	0.80	0.85	0.0834	0.0870	0.0819	0.1030	0.1061
185	5	0.00	0.80	0.99	0.1034	0.1197	0.1152	0.1392	0.1461
186	5	0.00	0.60	0.00	0.0633	0.0639	0.0623	0.0681	0.0772
187	5	0.00	0.60	0.40	0.0655	0.0658	0.0633	0.0727	0.0804
188	5	0.00	0.60	0.70	0.0767	0.0780	0.0736	0.0914	0.0957
189	5	0.00	0.60	0.85	0.0887	0.0939	0.0887	0.1110	0.1130
190	5	0.00	0.60	0.99	0.1043	0.1209	0.1164	0.1405	0.1483
191	5	0.00	0.40	0.00	0.0765	0.0775	0.0734	0.0896	0.0941
192	5	0.00	0.40	0.40	0.0793	0.0808	0.0763	0.0946	0.0982
193	5	0.00	0.40	0.70	0.0886	0.0931	0.0880	0.1101	0.1119
194	5	0.00	0.40	0.85	0.0944	0.1051	0.1002	0.1235	0.1249
195	5	0.00	0.40	0.99	0.1058	0.1226	0.1195	0.1424	0.1523
196	5	0.00	0.20	0.00	0.0953	0.1059	0.1009	0.1245	0.1254
197	5	0.00	0.20	0.40	0.0963	0.1078	0.1030	0.1264	0.1276
198	5	0.00	0.20	0.70	0.0998	0.1137	0.1092	0.1328	0.1349
199	5	0.00	0.20	0.85	0.1022	0.1182	0.1137	0.1375	0.1415
200	5	0.00	0.20	0.99	0.1071	0.1247	0.1195	0.1451	0.1592
201	5	0.25	1.00	0.00	0.0560	0.0583	0.0582	0.0553	0.0684
202	5	0.25	1.00	0.40	0.0566	0.0581	0.0574	0.0569	0.0680
203	5	0.25	1.00	0.70	0.0614	0.0662	0.0632	0.0732	0.0817
204	5	0.25	1.00	0.85	0.0768	0.0798	0.0753	0.0928	0.0984
205	5	0.25	1.00	0.99	0.0967	0.1088	0.1052	0.1269	0.1307
206	5	0.25	0.80	0.00	0.0579	0.0595	0.0590	0.0581	0.0701
207	5	0.25	0.80	0.40	0.0593	0.0601	0.0588	0.0609	0.0715
208	5	0.25	0.80	0.70	0.0690	0.0695	0.0661	0.0779	0.0860
209	5	0.25	0.80	0.85	0.0807	0.0835	0.0789	0.0973	0.1032
210	5	0.25	0.80	0.99	0.0990	0.1111	0.1075	0.1293	0.1353
211	5	0.25	0.80	0.00	0.0633	0.0641	0.0624	0.0675	0.0773

212	5	0.25	0.60	0.40	0.0660	0.0660	0.0635	0.0714	0.0802
213	5	0.25	0.60	0.70	0.0763	0.0770	0.0728	0.0884	0.0951
214	5	0.25	0.60	0.85	0.0859	0.0910	0.0862	0.1062	0.1126
215	5	0.25	0.60	0.99	0.1023	0.1144	0.1105	0.1329	0.1418
216	5	0.25	0.40	0.00	0.0766	0.0773	0.0732	0.0883	0.0950
217	5	0.25	0.40	0.40	0.0791	0.0804	0.0760	0.0926	0.0987
218	5	0.25	0.40	0.70	0.0873	0.0918	0.0868	0.1069	0.1127
219	5	0.25	0.40	0.85	0.0948	0.1026	0.0980	0.1195	0.1261
220	5	0.25	0.40	0.99	0.1054	0.1179	0.1134	0.1368	0.1496
221	5	0.25	0.20	0.00	0.0973	0.1045	0.0987	0.1217	0.1288
222	5	0.25	0.20	0.40	0.0982	0.1063	0.1021	0.1236	0.1310
223	5	0.25	0.20	0.70	0.1008	0.1114	0.1076	0.1293	0.1383
224	5	0.25	0.20	0.85	0.1037	0.1158	0.1119	0.1342	0.1453
225	5	0.25	0.20	0.99	0.1065	0.1212	0.1178	0.1408	0.1599
226	5	0.50	1.00	0.00	0.0567	0.0593	0.0592	0.0545	0.0659
227	5	0.50	1.00	0.40	0.0574	0.0591	0.0583	0.0550	0.0620
228	5	0.50	1.00	0.70	0.0643	0.0639	0.0612	0.0665	0.0717
229	5	0.50	1.00	0.85	0.0718	0.0725	0.0683	0.0807	0.0842
230	5	0.50	1.00	0.99	0.0878	0.0916	0.0896	0.1046	0.1005
231	5	0.50	0.80	0.00	0.0603	0.0617	0.0610	0.0581	0.0684
232	5	0.50	0.80	0.40	0.0626	0.0623	0.0609	0.0598	0.0662
233	5	0.50	0.80	0.70	0.0703	0.0690	0.0657	0.0725	0.0767
234	5	0.50	0.80	0.85	0.0784	0.0786	0.0742	0.0870	0.0903
235	5	0.50	0.80	0.99	0.0949	0.0978	0.0959	0.1101	0.1071
236	5	0.50	0.60	0.00	0.0689	0.0677	0.0656	0.0678	0.0753
237	5	0.50	0.60	0.40	0.0714	0.0694	0.0668	0.0706	0.0754
238	5	0.50	0.60	0.70	0.0800	0.0781	0.0741	0.0839	0.0870
239	5	0.50	0.60	0.85	0.0890	0.0886	0.0842	0.0977	0.1009
240	5	0.50	0.60	0.99	0.1032	0.1050	0.1025	0.1167	0.1149
241	5	0.50	0.40	0.00	0.0847	0.0820	0.0779	0.0860	0.0924
242	5	0.50	0.40	0.40	0.0877	0.0850	0.0807	0.0914	0.0939
243	5	0.50	0.40	0.70	0.0961	0.0943	0.0898	0.1028	0.1055
244	5	0.50	0.40	0.85	0.1031	0.1027	0.0989	0.1126	0.1153
245	5	0.50	0.40	0.99	0.1122	0.1141	0.1115	0.1250	0.1266
246	5	0.50	0.20	0.00	0.1092	0.1085	0.1043	0.1185	0.1227
247	5	0.50	0.20	0.40	0.1107	0.1105	0.1073	0.1203	0.1238
248	5	0.50	0.20	0.70	0.1138	0.1145	0.1118	0.1246	0.1293
249	5	0.50	0.20	0.85	0.1151	0.1179	0.1148	0.1283	0.1347
250	5	0.50	0.20	0.99	0.1170	0.1223	0.1192	0.1333	0.1416
251	5	0.75	1.00	0.00	0.0567	0.0591	0.0589	0.0530	0.0649
252	5	0.75	1.00	0.40	0.0579	0.0587	0.0580	0.0527	0.0602
253	5	0.75	1.00	0.70	0.0613	0.0602	0.0577	0.0594	0.0643
254	5	0.75	1.00	0.85	0.0661	0.0641	0.0602	0.0680	0.0716
255	5	0.75	1.00	0.99	0.0753	0.0743	0.0738	0.0828	0.0761
256	5	0.75	0.80	0.00	0.0632	0.0636	0.0628	0.0578	0.0681
257	5	0.75	0.80	0.40	0.0650	0.0639	0.0627	0.0587	0.0660
258	5	0.75	0.80	0.70	0.0703	0.0672	0.0643	0.0666	0.0696
259	5	0.75	0.80	0.85	0.0772	0.0726	0.0687	0.0760	0.0790
260	5	0.75	0.80	0.99	0.0860	0.0834	0.0832	0.0903	0.0834
261	5	0.75	0.60	0.00	0.0748	0.0716	0.0696	0.0681	0.0750
262	5	0.75	0.60	0.40	0.0767	0.0729	0.0705	0.0698	0.0735
263	5	0.75	0.60	0.70	0.0845	0.0786	0.0751	0.0787	0.0796
264	5	0.75	0.60	0.85	0.0907	0.0852	0.0815	0.0881	0.0883
265	5	0.75	0.60	0.99	0.0957	0.0955	0.0950	0.1002	0.0934
266	5	0.75	0.40	0.00	0.0951	0.0877	0.0843	0.0873	0.0892
267	5	0.75	0.40	0.40	0.0982	0.0901	0.0867	0.0897	0.0891
268	5	0.75	0.40	0.70	0.1029	0.0967	0.0933	0.0976	0.0963
269	5	0.75	0.40	0.85	0.1082	0.1024	0.1002	0.1042	0.1028
270	5	0.75	0.40	0.99	0.1068	0.1095	0.1161	0.1117	0.1059
271	5	0.75	0.20	0.00	0.1160	0.1135	0.1106	0.1140	0.1138
272	5	0.75	0.20	0.40	0.1178	0.1148	0.1138	0.1150	0.1140
273	5	0.75	0.20	0.70	0.1195	0.1176	0.1169	0.1179	0.1174
274	5	0.75	0.20	0.85	0.1194	0.1201	0.1186	0.1205	0.1207
275	5	0.75	0.20	0.99	0.1181	0.1227	0.1212	0.1232	0.1220
276	5	1.00	1.00	0.00	1.0000	0.0563	0.0563	0.0497	0.0613
277	5	1.00	1.00	0.40	1.0000	0.0556	0.0552	0.0489	0.0570
278	5	1.00	1.00	0.70	1.0000	0.0547	0.0526	0.0522	0.0579
279	5	1.00	1.00	0.85	1.0000	0.0557	0.0525	0.0568	0.0593
280	5	1.00	1.00	0.99	1.0000	0.0603	0.0617	0.0653	0.0589
281	5	1.00	0.80	0.00	1.0000	0.0626	0.0621	0.0558	0.0657
282	5	1.00	0.80	0.40	1.0000	0.0626	0.0618	0.0559	0.0626
283	5	1.00	0.80	0.70	1.0000	0.0632	0.0610	0.0602	0.0641
284	5	1.00	0.80	0.85	1.0000	0.0656	0.0627	0.0655	0.0667
285	5	1.00	0.80	0.99	1.0000	0.0708	0.0718	0.0739	0.0667
286	5	1.00	0.60	0.00	1.0000	0.0727	0.0713	0.0668	0.0745
287	5	1.00	0.60	0.40	1.0000	0.0734	0.0719	0.0675	0.0714
288	5	1.00	0.60	0.70	1.0000	0.0763	0.0739	0.0728	0.0746
289	5	1.00	0.60	0.85	1.0000	0.0798	0.0777	0.0782	0.0779
290	5	1.00	0.60	0.99	1.0000	0.0851	0.0870	0.0850	0.0773
291	5	1.00	0.40	0.00	1.0000	0.0900	0.0880	0.0850	0.0887
292	5	1.00	0.40	0.40	1.0000	0.0917	0.0899	0.0862	0.0870
293	5	1.00	0.40	0.70	1.0000	0.0955	0.0939	0.0908	0.0909
294	5	1.00	0.40	0.85	1.0000	0.0987	0.0994	0.0946	0.0936
295	5	1.00	0.40	0.99	1.0000	0.1023	0.1054	0.0984	0.0907
296	5	1.00	0.20	0.00	1.0000	0.1136	0.1130	0.1074	0.1083
297	5	1.00	0.20	0.40	1.0000	0.1144	0.1162	0.1077	0.1078
298	5	1.00	0.20	0.70	1.0000	0.1162	0.1184	0.1094	0.1095
299	5	1.00	0.20	0.85	1.0000	0.1175	0.1184	0.1107	0.1110
300	5	1.00	0.20	0.99	1.0000	0.1179	0.1214	0.1113	0.1063
301	5	1.50	1.00	0.00	1.0000	0.0456	0.0461	0.0404	0.0551
302	5	1.50	1.00	0.40	1.0000	0.0444	0.0446	0.0390	0.0496
303	5	1.50	1.00	0.70	1.0000	0.0420	0.0410	0.0390	0.0450

304	5	1.50	1.00	0.85	1.0000	0.0409	0.0395	0.0397	0.0418
305	5	1.50	1.00	0.99	1.0000	0.0412	0.0426	0.0424	0.0386
306	5	1.50	0.80	0.00	1.0000	0.0532	0.0537	0.0472	0.0611
307	5	1.50	0.80	0.40	1.0000	0.0525	0.0528	0.0462	0.0557
308	5	1.50	0.80	0.70	1.0000	0.0510	0.0503	0.0468	0.0530
309	5	1.50	0.80	0.85	1.0000	0.0506	0.0499	0.0480	0.0503
310	5	1.50	0.80	0.99	1.0000	0.0509	0.0542	0.0502	0.0459
311	5	1.50	0.60	0.00	1.0000	0.0640	0.0647	0.0572	0.0698
312	5	1.50	0.60	0.40	1.0000	0.0640	0.0645	0.0567	0.0648
313	5	1.50	0.60	0.70	1.0000	0.0638	0.0639	0.0579	0.0639
314	5	1.50	0.60	0.85	1.0000	0.0641	0.0652	0.0593	0.0616
315	5	1.50	0.60	0.99	1.0000	0.0644	0.0702	0.0606	0.0561
316	5	1.50	0.40	0.00	1.0000	0.0793	0.0809	0.0710	0.0815
317	5	1.50	0.40	0.40	1.0000	0.0797	0.0814	0.0709	0.0780
318	5	1.50	0.40	0.70	1.0000	0.0804	0.0829	0.0720	0.0767
319	5	1.50	0.40	0.85	1.0000	0.0806	0.0837	0.0725	0.0749
320	5	1.50	0.40	0.99	1.0000	0.0810	0.0873	0.0731	0.0698
321	5	1.50	0.20	0.00	1.0000	0.0959	0.0996	0.0855	0.0968
322	5	1.50	0.20	0.40	1.0000	0.0963	0.0999	0.0856	0.0954
323	5	1.50	0.20	0.70	1.0000	0.0965	0.1017	0.0857	0.0941
324	5	1.50	0.20	0.85	1.0000	0.0969	0.1019	0.0860	0.0922
325	5	1.50	0.20	0.99	1.0000	0.0968	0.1006	0.0858	0.0873
326	5	2.00	1.00	0.00	1.0000	0.0344	0.0352	0.0302	0.0421
327	5	2.00	1.00	0.40	1.0000	0.0334	0.0337	0.0295	0.0386
328	5	2.00	1.00	0.70	1.0000	0.0313	0.0309	0.0285	0.0333
329	5	2.00	1.00	0.85	1.0000	0.0301	0.0299	0.0283	0.0298
330	5	2.00	1.00	0.99	1.0000	0.0293	0.0317	0.0290	0.0275
331	5	2.00	0.80	0.00	1.0000	0.0410	0.0420	0.0363	0.0496
332	5	2.00	0.80	0.40	1.0000	0.0403	0.0411	0.0358	0.0468
333	5	2.00	0.80	0.70	1.0000	0.0387	0.0391	0.0351	0.0413
334	5	2.00	0.80	0.85	1.0000	0.0378	0.0388	0.0349	0.0375
335	5	2.00	0.80	0.99	1.0000	0.0368	0.0412	0.0351	0.0340
336	5	2.00	0.60	0.00	1.0000	0.0498	0.0515	0.0445	0.0604
337	5	2.00	0.60	0.40	1.0000	0.0495	0.0512	0.0442	0.0571
338	5	2.00	0.60	0.70	1.0000	0.0488	0.0507	0.0438	0.0519
339	5	2.00	0.60	0.85	1.0000	0.0480	0.0519	0.0433	0.0477
340	5	2.00	0.60	0.99	1.0000	0.0471	0.0531	0.0431	0.0431
341	5	2.00	0.40	0.00	1.0000	0.0607	0.0636	0.0544	0.0724
342	5	2.00	0.40	0.40	1.0000	0.0608	0.0640	0.0541	0.0687
343	5	2.00	0.40	0.70	1.0000	0.0604	0.0639	0.0537	0.0649
344	5	2.00	0.40	0.85	1.0000	0.0601	0.0638	0.0532	0.0604
345	5	2.00	0.40	0.99	1.0000	0.0596	0.0699	0.0527	0.0556
346	5	2.00	0.20	0.00	1.0000	0.0715	0.0758	0.0640	0.0854
347	5	2.00	0.20	0.40	1.0000	0.0716	0.0761	0.0638	0.0830
348	5	2.00	0.20	0.70	1.0000	0.0716	0.0786	0.0634	0.0795
349	5	2.00	0.20	0.85	1.0000	0.0716	0.0791	0.0631	0.0772
350	5	2.00	0.20	0.99	1.0000	0.0720	0.0765	0.0633	0.0735
351	7	0.00	1.00	0.00	0.0387	0.0397	0.0394	0.0415	0.0555
352	7	0.00	1.00	0.40	0.0416	0.0415	0.0406	0.0465	0.0606
353	7	0.00	1.00	0.70	0.0502	0.0495	0.0468	0.0620	0.0740
354	7	0.00	1.00	0.85	0.0595	0.0608	0.0568	0.0776	0.0846
355	7	0.00	1.00	0.99	0.0722	0.0822	0.0790	0.0984	0.0998
356	7	0.00	0.80	0.00	0.0396	0.0403	0.0399	0.0429	0.0590
357	7	0.00	0.80	0.40	0.0425	0.0423	0.0412	0.0480	0.0637
358	7	0.00	0.80	0.70	0.0511	0.0504	0.0475	0.0630	0.0738
359	7	0.00	0.80	0.85	0.0602	0.0618	0.0578	0.0780	0.0842
360	7	0.00	0.80	0.99	0.0722	0.0824	0.0792	0.0983	0.0996
361	7	0.00	0.60	0.00	0.0430	0.0430	0.0419	0.0488	0.0632
362	7	0.00	0.60	0.40	0.0462	0.0455	0.0436	0.0540	0.0670
363	7	0.00	0.60	0.70	0.0545	0.0545	0.0510	0.0681	0.0765
364	7	0.00	0.60	0.85	0.0626	0.0655	0.0614	0.0814	0.0862
365	7	0.00	0.60	0.99	0.0724	0.0828	0.0797	0.0985	0.1002
366	7	0.00	0.40	0.00	0.0512	0.0517	0.0487	0.0630	0.0716
367	7	0.00	0.40	0.40	0.0546	0.0548	0.0514	0.0678	0.0756
368	7	0.00	0.40	0.70	0.0608	0.0639	0.0599	0.0790	0.0833
369	7	0.00	0.40	0.85	0.0659	0.0722	0.0686	0.0879	0.0883
370	7	0.00	0.40	0.99	0.0729	0.0836	0.0804	0.0991	0.1025
371	7	0.00	0.20	0.00	0.0650	0.0713	0.0676	0.0863	0.0858
372	7	0.00	0.20	0.40	0.0659	0.0729	0.0695	0.0882	0.0874
373	7	0.00	0.20	0.70	0.0684	0.0773	0.0741	0.0926	0.0914
374	7	0.00	0.20	0.85	0.0701	0.0804	0.0771	0.0957	0.0948
375	7	0.00	0.20	0.99	0.0732	0.0847	0.0813	0.1005	0.1088
376	7	0.25	1.00	0.00	0.0377	0.0389	0.0387	0.0404	0.0590
377	7	0.25	1.00	0.40	0.0404	0.0407	0.0399	0.0446	0.0610
378	7	0.25	1.00	0.70	0.0483	0.0475	0.0449	0.0581	0.0693
379	7	0.25	1.00	0.85	0.0568	0.0570	0.0531	0.0716	0.0815
380	7	0.25	1.00	0.99	0.0669	0.0747	0.0724	0.0896	0.0891
381	7	0.25	0.80	0.00	0.0390	0.0397	0.0393	0.0417	0.0591
382	7	0.25	0.80	0.40	0.0418	0.0416	0.0405	0.0462	0.0606
383	7	0.25	0.80	0.70	0.0500	0.0489	0.0461	0.0596	0.0705
384	7	0.25	0.80	0.85	0.0576	0.0587	0.0548	0.0728	0.0821
385	7	0.25	0.80	0.99	0.0679	0.0759	0.0735	0.0906	0.0922
386	7	0.25	0.60	0.00	0.0423	0.0425	0.0414	0.0474	0.0618
387	7	0.25	0.60	0.40	0.0461	0.0449	0.0431	0.0521	0.0639
388	7	0.25	0.60	0.70	0.0532	0.0531	0.0497	0.0648	0.0733
389	7	0.25	0.60	0.85	0.0607	0.0628	0.0590	0.0769	0.0867
390	7	0.25	0.60	0.99	0.0696	0.0778	0.0754	0.0924	0.0960
391	7	0.25	0.40	0.00	0.0511	0.0511	0.0483	0.0609	0.0715
392	7	0.25	0.40	0.40	0.0539	0.0540	0.0508	0.0651	0.0734
393	7	0.25	0.40	0.70	0.0605	0.0623	0.0586	0.0754	0.0813
394	7	0.25	0.40	0.85	0.0649	0.0698	0.0666	0.0838	0.0889
395	7	0.25	0.40	0.99	0.0713	0.0798	0.0771	0.0942	0.1012

396	7	0.25	0.20	0.00	0.0648	0.0699	0.0667	0.0832	0.0886
397	7	0.25	0.20	0.40	0.0658	0.0714	0.0685	0.0849	0.0902
398	7	0.25	0.20	0.70	0.0683	0.0752	0.0725	0.0889	0.0948
399	7	0.25	0.20	0.85	0.0704	0.0782	0.0753	0.0922	0.0988
400	7	0.25	0.20	0.99	0.0730	0.0816	0.0791	0.0961	0.1091
401	7	0.50	1.00	0.00	0.0369	0.0390	0.0388	0.0386	0.0594
402	7	0.50	1.00	0.40	0.0400	0.0405	0.0398	0.0415	0.0552
403	7	0.50	1.00	0.70	0.0466	0.0451	0.0427	0.0514	0.0573
404	7	0.50	1.00	0.85	0.0524	0.0513	0.0476	0.0611	0.0724
405	7	0.50	1.00	0.99	0.0613	0.0624	0.0612	0.0732	0.0664
406	7	0.50	0.80	0.00	0.0396	0.0405	0.0401	0.0405	0.0609
407	7	0.50	0.80	0.40	0.0425	0.0423	0.0412	0.0438	0.0568
408	7	0.50	0.80	0.70	0.0496	0.0478	0.0451	0.0541	0.0593
409	7	0.50	0.80	0.85	0.0555	0.0548	0.0510	0.0638	0.0720
410	7	0.50	0.80	0.99	0.0621	0.0664	0.0650	0.0764	0.0706
411	7	0.50	0.60	0.00	0.0454	0.0443	0.0430	0.0463	0.0636
412	7	0.50	0.60	0.40	0.0486	0.0466	0.0447	0.0500	0.0575
413	7	0.50	0.60	0.70	0.0560	0.0533	0.0501	0.0602	0.0672
414	7	0.50	0.60	0.85	0.0619	0.0608	0.0571	0.0695	0.0822
415	7	0.50	0.60	0.99	0.0668	0.0712	0.0697	0.0803	0.0766
416	7	0.50	0.40	0.00	0.0569	0.0538	0.0510	0.0594	0.0697
417	7	0.50	0.40	0.40	0.0599	0.0566	0.0535	0.0629	0.0686
418	7	0.50	0.40	0.70	0.0654	0.0636	0.0602	0.0712	0.0804
419	7	0.50	0.40	0.85	0.0703	0.0695	0.0665	0.0778	0.0848
420	7	0.50	0.40	0.99	0.0732	0.0767	0.0750	0.0851	0.0849
421	7	0.50	0.20	0.00	0.0737	0.0721	0.0692	0.0797	0.0865
422	7	0.50	0.20	0.40	0.0745	0.0737	0.0713	0.0814	0.0860
423	7	0.50	0.20	0.70	0.0734	0.0767	0.0752	0.0846	0.0902
424	7	0.50	0.20	0.85	0.0742	0.0791	0.0768	0.0871	0.0940
425	7	0.50	0.20	0.99	0.0767	0.0817	0.0779	0.0900	0.0958
426	7	0.75	1.00	0.00	0.0366	0.0388	0.0388	0.0368	0.0585
427	7	0.75	1.00	0.40	0.0388	0.0398	0.0393	0.0383	0.0488
428	7	0.75	1.00	0.70	0.0436	0.0420	0.0398	0.0443	0.0509
429	7	0.75	1.00	0.85	0.0478	0.0451	0.0416	0.0501	0.0682
430	7	0.75	1.00	0.99	0.0513	0.0505	0.0502	0.0571	0.0612
431	7	0.75	0.80	0.00	0.0414	0.0416	0.0412	0.0394	0.0621
432	7	0.75	0.80	0.40	0.0440	0.0430	0.0421	0.0415	0.0564
433	7	0.75	0.80	0.70	0.0496	0.0464	0.0439	0.0481	0.0527
434	7	0.75	0.80	0.85	0.0537	0.0504	0.0471	0.0545	0.0748
435	7	0.75	0.80	0.99	0.0578	0.0566	0.0564	0.0617	0.0668
436	7	0.75	0.60	0.00	0.0497	0.0469	0.0456	0.0456	0.0609
437	7	0.75	0.60	0.40	0.0525	0.0488	0.0471	0.0481	0.0600
438	7	0.75	0.60	0.70	0.0582	0.0536	0.0508	0.0549	0.0586
439	7	0.75	0.60	0.85	0.0605	0.0585	0.0556	0.0612	0.0685
440	7	0.75	0.60	0.99	0.0646	0.0646	0.0641	0.0677	0.0604
441	7	0.75	0.40	0.00	0.0629	0.0578	0.0554	0.0578	0.0650
442	7	0.75	0.40	0.40	0.0635	0.0603	0.0577	0.0603	0.0661
443	7	0.75	0.40	0.70	0.0679	0.0655	0.0629	0.0662	0.0662
444	7	0.75	0.40	0.85	0.0721	0.0695	0.0673	0.0706	0.0756
445	7	0.75	0.40	0.99	0.0748	0.0739	0.0750	0.0747	0.0686
446	7	0.75	0.20	0.00	0.0757	0.0757	0.0736	0.0752	0.0796
447	7	0.75	0.20	0.40	0.0768	0.0769	0.0756	0.0763	0.0777
448	7	0.75	0.20	0.70	0.0795	0.0791	0.0791	0.0785	0.0790
449	7	0.75	0.20	0.85	0.0794	0.0808	0.0798	0.0803	0.0825
450	7	0.75	0.20	0.99	0.0823	0.0823	0.0813	0.0818	0.0785
451	7	1.00	1.00	0.00	0.0354	0.0375	0.0376	0.0343	0.0506
452	7	1.00	1.00	0.40	0.0371	0.0379	0.0376	0.0348	0.0425
453	7	1.00	1.00	0.70	0.0392	0.0381	0.0361	0.0380	0.0451
454	7	1.00	1.00	0.85	0.0412	0.0391	0.0362	0.0411	0.0512
455	7	1.00	1.00	0.99	0.0421	0.0411	0.0417	0.0445	0.0412
456	7	1.00	0.80	0.00	0.0417	0.0416	0.0414	0.0380	0.0554
457	7	1.00	0.80	0.40	0.0439	0.0425	0.0419	0.0389	0.0468
458	7	1.00	0.80	0.70	0.0452	0.0437	0.0418	0.0426	0.0492
459	7	1.00	0.80	0.85	0.0486	0.0457	0.0432	0.0461	0.0509
460	7	1.00	0.80	0.99	0.0507	0.0484	0.0491	0.0499	0.0431
461	7	1.00	0.60	0.00	0.0494	0.0485	0.0476	0.0446	0.0631
462	7	1.00	0.60	0.40	0.0516	0.0497	0.0486	0.0459	0.0533
463	7	1.00	0.60	0.70	0.0554	0.0525	0.0506	0.0500	0.0553
464	7	1.00	0.60	0.85	0.0595	0.0552	0.0535	0.0536	0.0577
465	7	1.00	0.60	0.99	0.0618	0.0582	0.0594	0.0569	0.0504
466	7	1.00	0.40	0.00	0.0640	0.0604	0.0592	0.0561	0.0714
467	7	1.00	0.40	0.40	0.0658	0.0622	0.0610	0.0576	0.0637
468	7	1.00	0.40	0.70	0.0683	0.0653	0.0644	0.0609	0.0677
469	7	1.00	0.40	0.85	0.0668	0.0678	0.0672	0.0634	0.0697
470	7	1.00	0.40	0.99	0.0743	0.0700	0.0723	0.0652	0.0607
471	7	1.00	0.20	0.00	0.0760	0.0769	0.0766	0.0705	0.0777
472	7	1.00	0.20	0.40	0.0762	0.0777	0.0785	0.0709	0.0781
473	7	1.00	0.20	0.70	0.0787	0.0791	0.0815	0.0722	0.0802
474	7	1.00	0.20	0.85	0.0810	0.0801	0.0814	0.0730	0.0804
475	7	1.00	0.20	0.99	0.0817	0.0809	0.0833	0.0736	0.0734
476	7	1.50	1.00	0.00	1.0000	0.0316	0.0321	0.0280	0.0456
477	7	1.50	1.00	0.40	1.0000	0.0311	0.0311	0.0275	0.0416
478	7	1.50	1.00	0.70	1.0000	0.0296	0.0286	0.0278	0.0370
479	7	1.50	1.00	0.85	1.0000	0.0289	0.0277	0.0282	0.0384
480	7	1.50	1.00	0.99	1.0000	0.0285	0.0301	0.0288	0.0248
481	7	1.50	0.80	0.00	1.0000	0.0369	0.0376	0.0325	0.0488
482	7	1.50	0.80	0.40	1.0000	0.0367	0.0370	0.0323	0.0423
483	7	1.50	0.80	0.70	1.0000	0.0359	0.0353	0.0329	0.0450
484	7	1.50	0.80	0.85	1.0000	0.0358	0.0353	0.0335	0.0393
485	7	1.50	0.80	0.99	1.0000	0.0356	0.0384	0.0340	0.0302
486	7	1.50	0.60	0.00	1.0000	0.0446	0 0456	0.0392	0.0551
487	7	1.50	0.60	0.40	1.0000	0.0449	0.0456	0.0391	0.0477

488	7	1.50	0.60	0.70	1.0000	0.0450	0.0453	0.0401	0.0515
489	7	1.50	0.60	0.85	1.0000	0.0453	0.0463	0.0408	0.0457
490	7	1.50	0.60	0.99	1.0000	0.0453	0.0501	0.0409	0.0377
491	7	1.50	0.40	0.00	1.0000	0.0556	0.0575	0.0483	0.0634
492	7	1.50	0.40	0.40	1.0000	0.0560	0.0580	0.0484	0.0566
493	7	1.50	0.40	0.70	1.0000	0.0567	0.0591	0.0492	0.0561
494	7	1.50	0.40	0.85	1.0000	0.0571	0.0596	0.0495	0.0533
495	7	1.50	0.40	0.99	1.0000	0.0572	0.0608	0.0493	0.0477
496	7	1.50	0.20	0.00	1.0000	0.0674	0.0711	0.0579	0.0737
497	7	1.50	0.20	0.40	1.0000	0.0678	0.0714	0.0580	0.0694
498	7	1.50	0.20	0.70	1.0000	0.0680	0.0719	0.0581	0.0701
499	7	1.50	0.20	0.85	1.0000	0.0683	0.0724	0.0582	0.0654
500	7	1.50	0.20	0.99	1.0000	0.0689	0.0715	0.0584	0.0614
501	7	2.00	1.00	0.00	1.0000	0.0244	0.0249	0.0212	0.0407
502	7	2.00	1.00	0.40	1.0000	0.0238	0.0239	0.0208	0.0355
503	7	2.00	1.00	0.70	1.0000	0.0223	0.0220	0.0203	0.0258
504	7	2.00	1.00	0.85	1.0000	0.0214	0.0214	0.0201	0.0230
505	7	2.00	1.00	0.99	1.0000	0.0206	0.0230	0.0199	0.0185
506	7	2.00	0.80	0.00	1.0000	0.0292	0.0302	0.0254	0.0419
507	7	2.00	0.80	0.40	1.0000	0.0288	0.0295	0.0252	0.0407
508	7	2.00	0.80	0.70	1.0000	0.0277	0.0281	0.0248	0.0323
509	7	2.00	0.80	0.85	1.0000	0.0270	0.0280	0.0246	0.0291
510	7	2.00	0.80	0.99	1.0000	0.0262	0.0302	0.0242	0.0231
511	7	2.00	0.60	0.00	1.0000	0.0357	0.0374	0.0311	0.0504
512	7	2.00	0.60	0.40	1.0000	0.0355	0.0371	0.0310	0.0506
513	7	2.00	0.60	0.70	1.0000	0.0350	0.0367	0.0306	0.0398
514	7	2.00	0.60	0.85	1.0000	0.0345	0.0369	0.0303	0.0372
515	7	2.00	0.60	0.99	1.0000	0.0339	0.0389	0.0297	0.0299
516	7	2.00	0.40	0.00	1.0000	0.0437	0.0467	0.0380	0.0570
517	7	2.00	0.40	0.40	1.0000	0.0438	0.0469	0.0379	0.0531
518	7	2.00	0.40	0.70	1.0000	0.0436	0.0473	0.0375	0.0541
519	7	2.00	0.40	0.85	1.0000	0.0434	0.0472	0.0371	0.0460
520	7	2.00	0.40	0.99	1.0000	0.0431	0.0484	0.0366	0.0396
521	7	2.00	0.20	0.00	1.0000	0.0517	0.0559	0.0448	0.0680
522	7	2.00	0.20	0.40	1.0000	0.0517	0.0560	0.0447	0.0657
523	7	2.00	0.20	0.70	1.0000	0.0517	0.0568	0.0444	0.0620
524	7	2.00	0.20	0.85	1.0000	0.0517	0.0578	0.0442	0.0608
525	7	2.00	0.20	0.99	1.0000	0.0520	0.0567	0.0442	0.0534
526	10	0.00	1.00	0.00	0.0276	0.0286	0.0285	0.0292	0.0725
527	10	0.00	1.00	0.40	0.0278	0.0284	0.0282	0.0303	0.0708
528	10	0.00	1.00	0.70	0.0320	0.0326	0.0312	0.0398	0.0684
529	10	0.00	1.00	0.85	0.0375	0.0406	0.0380	0.0511	0.0764
530	10	0.00	1.00	0.99	0.0478	0.0579	0.0557	0.0698	0.0742
531	10	0.00	0.80	0.00	0.0282	0.0291	0.0289	0.0305	0.0740
532	10	0.00	0.80	0.40	0.0287	0.0292	0.0289	0.0321	0.0700
533	10	0.00	0.80	0.70	0.0331	0.0339	0.0323	0.0427	0.0697
534	10	0.00	0.80	0.85	0.0384	0.0419	0.0392	0.0527	0.0688
535	10	0.00	0.80	0.99	0.0482	0.0582	0.0561	0.0701	0.0753
536	10	0.00	0.60	0.00	0.0303	0.0308	0.0302	0.0351	0.0726
537	10	0.00	0.60	0.40	0.0312	0.0316	0.0307	0.0374	0.0731
538	10	0.00	0.60	0.70	0.0357	0.0373	0.0351	0.0467	0.0742
539	10	0.00	0.60	0.85	0.0407	0.0452	0.0424	0.0565	0.0694
540	10	0.00	0.60	0.99	0.0487	0.0588	0.0566	0.0707	0.0789
541	10	0.00	0.40	0.00	0.0356	0.0366	0.0347	0.0457	0.0784
542	10	0.00	0.40	0.40	0.0367	0.0384	0.0361	0.0482	0.0803
543	10	0.00	0.40	0.70	0.0406	0.0446	0.0418	0.0559	0.0714
544	10	0.00	0.40	0.85	0.0439	0.0507	0.0482	0.0625	0.0721
545	10	0.00	0.40	0.99	0.0493	0.0596	0.0573	0.0715	0.0880
546	10	0.00	0.20	0.00	0.0445	0.0508	0.0482	0.0628	0.0740
547	10	0.00	0.20	0.40	0.0448	0.0518	0.0493	0.0637	0.0742
548	10	0.00	0.20	0.70	0.0464	0.0550	0.0527	0.0668	0.0736
549	10	0.00	0.20	0.85	0.0476	0.0573	0.0552	0.0692	0.0752
550	10	0.00	0.20	0.99	0.0501	0.0604	0.0580	0.0725	0.1067
551	10	0.25	1.00	0.00	0.0269	0.0279	0.0279	0.0281	0.0831
552	10	0.25	1.00	0.40	0.0270	0.0275	0.0274	0.0290	0.0798
553	10	0.25	1.00	0.70	0.0305	0.0306	0.0293	0.0372	0.0983
554	10	0.25	1.00	0.85	0.0352	0.0370	0.0344	0.0470	0.0928
555	10	0.25	1.00	0.99	0.0442	0.0514	0.0496	0.0633	0.0744
556	10	0.25	0.80	0.00	0.0277	0.0283	0.0281	0.0293	0.0812
557	10	0.25	0.80	0.40	0.0281	0.0282	0.0279	0.0308	0.0855
558	10	0.25	0.80	0.70	0.0320	0.0320	0.0304	0.0393	0.1004
559	10	0.25	0.80	0.85	0.0367	0.0387	0.0359	0.0490	0.1023
560	10	0.25	0.80	0.99	0.0453	0.0523	0.0505	0.0644	0.0776
561	10	0.25	0.60	0.00	0.0301	0.0299	0.0292	0.0337	0.0835
562	10	0.25	0.60	0.40	0.0309	0.0305	0.0295	0.0358	0.1039
563	10	0.25	0.60	0.70	0.0350	0.0353	0.0331	0.0442	0.1025
564	10	0.25	0.60	0.85	0.0395	0.0421	0.0393	0.0531	0.0986
565	10	0.25	0.60	0.99	0.0468	0.0537	0.0518	0.0659	0.0867
566	10	0.25	0.40	0.00	0.0356	0.0353	0.0333	0.0438	0.1044
567	10	0.25	0.40	0.40	0.0367	0.0369	0.0345	0.0460	0.1074
568	10	0.25	0.40	0.70	0.0403	0.0423	0.0395	0.0532	0.0982
569	10	0.25	0.40	0.85	0.0435	0.0477	0.0451	0.0594	0.0837
570	10	0.25	0.40	0.99	0.0484	0.0553	0.0532	0.0676	0.0958
571	10	0.25	0.20	0.00	0.0446	0.0485	0.0459	0.0601	0.0870
572	10	0.25	0.20	0.40	0.0449	0.0494	0.0469	0.0611	0.0860
573	10	0.25	0.20	0.70	0.0463	0.0520	0.0498	0.0638	0.0847
574	10	0.25	0.20	0.85	0.0477	0.0541	0.0521	0.0663	0.0921
575	10	0.25	0.20	0.99	0.0499	0.0566	0.0544	0.0692	0.1095
576	10	0.50	1.00	0.00	0.0268	0.0278	0.0279	0.0269	0.0765
577	10	0.50	1.00	0.40	0.0270	0.0272	0.0271	0.0275	0.0696
578	10	0.50	1.00	0.70	0.0298	0.0286	0.0273	0.0333	0.0769
579	10	0.50	1.00	0.85	0.0336	0.0325	0.0297	0.0401	0.0854

580	10	0.50	1.00	0.99	0.0415	0.0416	0.0403	0.0515	0.0480
581	10	0.50	0.80	0.00	0.0287	0.0286	0.0283	0.0285	0.0761
582	10	0.50	0.80	0.40	0.0293	0.0283	0.0279	0.0295	0.0722
583	10	0.50	0.80	0.70	0.0328	0.0307	0.0290	0.0359	0.0733
584	10	0.50	0.80	0.85	0.0369	0.0352	0.0322	0.0429	0.0942
585	10	0.50	0.80	0.99	0.0452	0.0444	0.0429	0.0540	0.0512
586	10	0.50	0.60	0.00	0.0326	0.0305	0.0296	0.0329	0.0814
587	10	0.50	0.60	0.40	0.0336	0.0310	0.0297	0.0346	0.0834
588	10	0.50	0.60	0.70	0.0376	0.0347	0.0322	0.0411	0.0777
589	10	0.50	0.60	0.85	0.0420	0.0396	0.0365	0.0479	0.0970
590	10	0.50	0.60	0.99	0.0495	0.0477	0.0460	0.0572	0.0570
591	10	0.50	0.40	0.00	0.0401	0.0363	0.0339	0.0426	0.0857
592	10	0.50	0.40	0.40	0.0414	0.0377	0.0349	0.0444	0.0815
593	10	0.50	0.40	0.70	0.0452	0.0420	0.0390	0.0501	0.0927
594	10	0.50	0.40	0.85	0.0486	0.0460	0.0433	0.0549	0.0796
595	10	0.50	0.40	0.99	0.0544	0.0515	0.0495	0.0610	0.0718
596	10	0.50	0.20	0.00	0.0516	0.0485	0.0458	0.0574	0.0992
597	10	0.50	0.20	0.40	0.0524	0.0494	0.0469	0.0584	0.0794
598	10	0.50	0.20	0.70	0.0542	0.0514	0.0490	0.0606	0.0796
599	10	0.50	0.20	0.85	0.0558	0.0530	0.0507	0.0626	0.0851
600	10	0.50	0.20	0.99	0.0589	0.0549	0.0524	0.0649	0.0873
601	10	0.75	1.00	0.00	0.0267	0.0278	0.0282	0.0255	0.0683
602	10	0.75	1.00	0.40	0.0269	0.0269	0.0270	0.0259	0.0610
603	10	0.75	1.00	0.70	0.0292	0.0268	0.0255	0.0294	0.0810
604	10	0.75	1.00	0.85	0.0323	0.0284	0.0257	0.0333	0.0979
605	10	0.75	1.00	0.99	0.0394	0.0330	0.0321	0.0401	0.0580
606	10	0.75	0.80	0.00	0.0301	0.0293	0.0293	0.0277	0.0671
607	10	0.75	0.80	0.40	0.0308	0.0289	0.0285	0.0286	0.0763
608	10	0.75	0.80	0.70	0.0338	0.0298	0.0290	0.0325	0.0759
609	10	0.75	0.80	0.85	0.0377	0.0322	0.0293	0.0369	0.0882
610	10	0.75	0.80	0.99	0.0433	0.0371	0.0362	0.0435	0.0402
611	10	0.75	0.60	0.00	0.0359	0.0323	0.0313	0.0323	0.0767
612	10	0.75	0.60	0.40	0.0370	0.0325	0.0312	0.0336	0.0765
613	10	0.75	0.60	0.70	0.0409	0.0348	0.0323	0.0380	0.0799
614	10	0.75	0.60	0.85	0.0452	0.0378	0.0350	0.0423	0.0855
615	10	0.75	0.60	0.99	0.0501	0.0425	0.0415	0.0480	0.0453
616	10	0.75	0.40	0.00	0.0459	0.0389	0.0367	0.0414	0.0741
617	10	0.75	0.40	0.40	0.0475	0.0399	0.0374	0.0428	0.0662
618	10	0.75	0.40	0.70	0.0514	0.0429	0.0403	0.0466	0.0675
619	10	0.75	0.40	0.85	0.0549	0.0456	0.0434	0.0498	0.0754
620	10	0.75	0.40	0.99	0.0581	0.0489	0.0475	0.0533	0.0537
621	10	0.75	0.20	0.00	0.0602	0.0504	0.0484	0.0541	0.0703
622	10	0.75	0.20	0.40	0.0614	0.0511	0.0491	0.0547	0.0705
623	10	0.75	0.20	0.70	0.0611	0.0524	0.0506	0.0561	0.0741
624	10	0.75	0.20	0.85	0.0622	0.0536	0.0518	0.0574	0.0775
625	10	0.75	0.20	0.99	0.0628	0.0547	0.0531	0.0587	0.0654
626	10	1.00	1.00	0.00	0.0259	0.0270	0.0277	0.0238	0.0688
627	10	1.00	1.00	0.40	0.0261	0.0260	0.0263	0.0240	0.0499
628	10	1.00	1.00	0.70	0.0279	0.0248	0.0236	0.0258	0.0585
629	10	1.00	1.00	0.85	0.0305	0.0249	0.0226	0.0277	0.0577
630	10	1.00	1.00	0.99	0.0330	0.0266	0.0263	0.0312	0.0422
631	10	1.00	0.80	0.00	0.0305	0.0295	0.0299	0.0264	0.0665
632	10	1.00	0.80	0.40	0.0311	0.0289	0.0289	0.0270	0.0468
633	10	1.00	0.80	0.70	0.0336	0.0286	0.0272	0.0293	0.0541
634	10	1.00	0.80	0.85	0.0370	0.0295	0.0271	0.0316	0.0598
635	10	1.00	0.80	0.99	0.0383	0.0316	0.0315	0.0351	0.0406
636	10	1.00	0.60	0.00	0.0378	0.0336	0.0333	0.0313	0.0717
637	10	1.00	0.60	0.40	0.0386	0.0336	0.0329	0.0322	0.0598
638	10	1.00	0.60	0.70	0.0423	0.0346	0.0329	0.0348	0.0654
639	10	1.00	0.60	0.85	0.0441	0.0361	0.0342	0.0373	0.0701
640	10	1.00	0.60	0.99	0.0468	0.0384	0.0385	0.0402	0.0337
641	10	1.00	0.40	0.00	0.0489	0.0411	0.0400	0.0397	0.0718
642	10	1.00	0.40	0.40	0.0508	0.0418	0.0405	0.0407	0.0620
643	10	1.00	0.40	0.70	0.0523	0.0434	0.0422	0.0429	0.0701
644	10	1.00	0.40	0.85	0.0535	0.0450	0.0443	0.0447	0.0662
645	10	1.00	0.40	0.99	0.0536	0.0465	0.0466	0.0463	0.0424
646	10	1.00	0.20	0.00	0.0600	0.0518	0.0514	0.0501	0.0772
647	10	1.00	0.20	0.40	0.0607	0.0522	0.0518	0.0505	0.0819
648	10	1.00	0.20	0.70	0.0623	0.0530	0.0529	0.0513	0.0814
649	10	1.00	0.20	0.85	0.0599	0.0536	0.0536	0.0519	0.0740
650	10	1.00	0.20	0.99	0.0591	0.0542	0.0543	0.0523	0.0630
651	10	1.50	1.00	0.00	1.0000	0.0228	0.0239	0.0197	0.0698
652	10	1.50	1.00	0.40	1.0000	0.0219	0.0226	0.0194	0.0532
653	10	1.50	1.00	0.70	1.0000	0.0201	0.0195	0.0193	0.0489
654	10	1.50	1.00	0.85	1.0000	0.0192	0.0181	0.0193	0.0455
655	10	1.50	1.00	0.99	1.0000	0.0187	0.0196	0.0200	0.0390
656	10	1.50	0.80	0.00	1.0000	0.0265	0.0276	0.0228	0.0633
657	10	1.50	0.80	0.40	1.0000	0.0259	0.0267	0.0227	0.0483
658	10	1.50	0.80	0.70	1.0000	0.0246	0.0243	0.0230	0.0583
659	10	1.50	0.80	0.85	1.0000	0.0241	0.0236	0.0232	0.0577
660	10	1.50	0.80	0.99	1.0000	0.0237	0.0255	0.0237	0.0372
661	10	1.50	0.60	0.00	1.0000	0.0316	0.0329	0.0273	0.0662
662	10	1.50	0.60	0.40	1.0000	0.0315	0.0325	0.0275	0.0501
663	10	1.50	0.60	0.70	1.0000	0.0310	0.0315	0.0281	0.0611
664	10	1.50	0.60	0.85	1.0000	0.0309	0.0318	0.0285	0.0443
665	10	1.50	0.60	0.99	1.0000	0.0307	0.0334	0.0286	0.0275
666	10	1.50	0.40	0.00	1.0000	0.0389	0.0408	0.0337	0.0688
667	10	1.50	0.40	0.40	1.0000	0.0391	0.0410	0.0339	0.0567
668	10	1.50	0.40	0.70	1.0000	0.0393	0.0414	0.0345	0.0530
669	10	1.50	0.40	0.85	1.0000	0.0394	0.0413	0.0346	0.0538
670	10	1.50	0.40	0.99	1.0000	0.0392	0.0429	0.0345	0.0341
671	10	1.50	0.20	0.00	1.0000	0.0469	0.0499	0.0404	0.0731

672	10	1.50	0.20	0.40	1.0000	0.0471	0.0504	0.0406	0.0643
673	10	1.50	0.20	0.70	1.0000	0.0471	0.0509	0.0407	0.0568
674	10	1.50	0.20	0.85	1.0000	0.0473	0.0514	0.0407	0.0499
675	10	1.50	0.20	0.99	1.0000	0.0476	0.0502	0.0408	0.0465
676	10	2.00	1.00	0.00	1.0000	0.0176	0.0183	0.0149	0.0618
677	10	2.00	1.00	0.40	1.0000	0.0170	0.0176	0.0148	0.0432
678	10	2.00	1.00	0.70	1.0000	0.0156	0.0156	0.0142	0.0351
679	10	2.00	1.00	0.85	1.0000	0.0147	0.0148	0.0139	0.0235
680	10	2.00	1.00	0.99	1.0000	0.0139	0.0156	0.0138	0.0257
681	10	2.00	0.80	0.00	1.0000	0.0210	0.0221	0.0179	0.0642
682	10	2.00	0.80	0.40	1.0000	0.0206	0.0216	0.0179	0.0521
683	10	2.00	0.80	0.70	1.0000	0.0195	0.0201	0.0174	0.0402
684	10	2.00	0.80	0.85	1.0000	0.0188	0.0198	0.0171	0.0318
685	10	2.00	0.80	0.99	1.0000	0.0179	0.0208	0.0168	0.0263
686	10	2.00	0.60	0.00	1.0000	0.0255	0.0272	0.0218	0.0615
687	10	2.00	0.60	0.40	1.0000	0.0254	0.0271	0.0219	0.0617
688	10	2.00	0.60	0.70	1.0000	0.0247	0.0264	0.0215	0.0523
689	10	2.00	0.60	0.85	1.0000	0.0242	0.0264	0.0212	0.0409
690	10	2.00	0.60	0.99	1.0000	0.0234	0.0274	0.0207	0.0321
691	10	2.00	0.40	0.00	1.0000	0.0310	0.0337	0.0266	0.0684
692	10	2.00	0.40	0.40	1.0000	0.0311	0.0340	0.0266	0.0571
693	10	2.00	0.40	0.70	1.0000	0.0308	0.0341	0.0263	0.0606
694	10	2.00	0.40	0.85	1.0000	0.0306	0.0339	0.0260	0.0411
695	10	2.00	0.40	0.99	1.0000	0.0301	0.0343	0.0255	0.0279
696	10	2.00	0.20	0.00	1.0000	0.0364	0.0400	0.0313	0.0746
697	10	2.00	0.20	0.40	1.0000	0.0365	0.0406	0.0312	0.0756
698	10	2.00	0.20	0.70	1.0000	0.0364	0.0413	0.0310	0.0672
699	10	2.00	0.20	0.85	1.0000	0.0364	0.0419	0.0308	0.0581
700	10	2.00	0.20	0.99	1.0000	0.0366	0.0431	0.0307	0.0407
701	15	0.00	1.00	0.00	0.0169	0.0172	0.0170	0.0192	0.0689
702	15	0.00	1.00	0.40	0.0175	0.0173	0.0170	0.0198	0.0693
703	15	0.00	1.00	0.70	0.0206	0.0203	0.0192	0.0271	0.0588
704	15	0.00	1.00	0.85	0.0243	0.0255	0.0239	0.0358	0.0622
705	15	0.00	1.00	0.99	0.0307	0.0370	0.0356	0.0502	0.0914
706	15	0.00	0.80	0.00	0.0176	0.0176	0.0173	0.0204	0.0680
707	15	0.00	0.80	0.40	0.0183	0.0179	0.0175	0.0216	0.0636
708	15	0.00	0.80	0.70	0.0214	0.0211	0.0200	0.0288	0.0633
709	15	0.00	0.80	0.85	0.0250	0.0265	0.0247	0.0371	0.0627
710	15	0.00	0.80	0.99	0.0309	0.0372	0.0358	0.0505	0.0898
711	15	0.00	0.60	0.00	0.0192	0.0188	0.0183	0.0240	0.0545
712	15	0.00	0.60	0.40	0.0200	0.0195	0.0188	0.0257	0.0547
713	15	0.00	0.60	0.70	0.0232	0.0235	0.0220	0.0327	0.0583
714	15	0.00	0.60	0.85	0.0263	0.0287	0.0269	0.0401	0.0732
715	15	0.00	0.60	0.99	0.0310	0.0376	0.0362	0.0509	0.0894
716	15	0.00	0.40	0.00	0.0228	0.0230	0.0216	0.0319	0.0717
717	15	0.00	0.40	0.40	0.0237	0.0242	0.0226	0.0338	0.0646
718	15	0.00	0.40	0.70	0.0262	0.0283	0.0265	0.0396	0.0760
719	15	0.00	0.40	0.85	0.0284	0.0325	0.0309	0.0446	0.0685
720	15	0.00	0.40	0.99	0.0314	0.0381	0.0367	0.0516	0.0902
721	15	0.00	0.20	0.00	0.0285	0.0325	0.0309	0.0447	0.0632
722	15	0.00	0.20	0.40	0.0287	0.0332	0.0317	0.0455	0.0651
723	15	0.00	0.20	0.70	0.0297	0.0352	0.0339	0.0479	0.0681
724	15	0.00	0.20	0.85	0.0304	0.0367	0.0354	0.0497	0.0744
725	15	0.00	0.20	0.99	0.0318	0.0386	0.0371	0.0524	0.1105
726	15	0.25	1.00	0.00	0.0173	0.0180	0.0178	0.0192	0.0722
727	15	0.25	1.00	0.40	0.0178	0.0177	0.0174	0.0195	0.0640
728	15	0.25	1.00	0.70	0.0204	0.0197	0.0188	0.0259	0.0712
729	15	0.25	1.00	0.85	0.0237	0.0240	0.0222	0.0338	0.0786
730	15	0.25	1.00	0.99	0.0297	0.0336	0.0324	0.0472	0.0586
731	15	0.25	0.80	0.00	0.0182	0.0183	0.0180	0.0204	0.0867
732	15	0.25	0.80	0.40	0.0189	0.0182	0.0178	0.0214	0.0737
733	15	0.25	0.80	0.70	0.0217	0.0207	0.0196	0.0280	0.0800
734	15	0.25	0.80	0.85	0.0249	0.0252	0.0233	0.0357	0.0659
735	15	0.25	0.80	0.99	0.0306	0.0343	0.0331	0.0482	0.0769
736	15	0.25	0.60	0.00	0.0201	0.0193	0.0188	0.0242	0.0797
737	15	0.25	0.60	0.40	0.0209	0.0198	0.0190	0.0257	0.0696
738	15	0.25	0.60	0.70	0.0239	0.0231	0.0215	0.0322	0.0894
739	15	0.25	0.60	0.85	0.0270	0.0276	0.0257	0.0391	0.0654
740	15	0.25	0.60	0.99	0.0317	0.0353	0.0340	0.0497	0.0936
741	15	0.25	0.40	0.00	0.0241	0.0232	0.0216	0.0321	0.0798
742	15	0.25	0.40	0.40	0.0250	0.0242	0.0224	0.0339	0.0752
743	15	0.25	0.40	0.70	0.0275	0.0279	0.0259	0.0394	0.0835
744	15	0.25	0.40	0.85	0.0297	0.0315	0.0298	0.0443	0.0816
745	15	0.25	0.40	0.99	0.0330	0.0365	0.0350	0.0511	0.0878
746	15	0.25	0.20	0.00	0.0304	0.0322	0.0303	0.0451	0.0803
747	15	0.25	0.20	0.40	0.0307	0.0327	0.0311	0.0459	0.0872
748	15	0.25	0.20	0.70	0.0317	0.0344	0.0329	0.0481	0.0860
749	15	0.25	0.20	0.85	0.0326	0.0358	0.0344	0.0500	0.0808
750	15	0.25	0.20	0.99	0.0341	0.0374	0.0359	0.0525	0.0954
751	15	0.50	1.00	0.00	0.0184	0.0194	0.0193	0.0189	0.0708
752	15	0.50	1.00	0.40	0.0189	0.0188	0.0185	0.0190	0.0596
753	15	0.50	1.00	0.70	0.0211	0.0194	0.0184	0.0236	0.0591
754	15	0.50	1.00	0.85	0.0240	0.0219	0.0199	0.0296	0.0545
755	15	0.50	1.00	0.99	0.0299	0.0282	0.0271	0.0393	0.0374
756	15	0.50	0.80	0.00	0.0202	0.0199	0.0196	0.0205	0.0615
757	15	0.50	0.80	0.40	0.0209	0.0196	0.0191	0.0211	0.0514
758	15	0.50	0.80	0.70	0.0235	0.0210	0.0196	0.0262	0.0819
759	15	0.50	0.80	0.85	0.0267	0.0239	0.0217	0.0321	0.0692
760	15	0.50	0.80	0.99	0.0329	0.0302	0.0290	0.0415	0.0368
761	15	0.50	0.60	0.00	0.0233	0.0213	0.0205	0.0243	0.0523
762	15	0.50	0.60	0.40	0.0243	0.0215	0.0204	0.0255	0.0487
763	15	0.50	0.60	0.70	0.0274	0.0239	0.0219	0.0308	0.0723

764	15	0.50	0.60	0.85	0.0307	0.0272	0.0248	0.0364	0.0681
765	15	0.50	0.60	0.99	0.0364	0.0328	0.0313	0.0442	0.0480
766	15	0.50	0.40	0.00	0.0293	0.0255	0.0234	0.0323	0.0644
767	15	0.50	0.40	0.40	0.0304	0.0263	0.0240	0.0337	0.0588
768	15	0.50	0.40	0.70	0.0333	0.0292	0.0267	0.0383	0.0638
769	15	0.50	0.40	0.85	0.0360	0.0320	0.0297	0.0423	0.0721
770	15	0.50	0.40	0.99	0.0404	0.0358	0.0339	0.0473	0.0515
771	15	0.50	0.20	0.00	0.0383	0.0341	0.0318	0.0444	0.0633
772	15	0.50	0.20	0.40	0.0389	0.0347	0.0325	0.0452	0.0685
773	15	0.50	0.20	0.70	0.0403	0.0360	0.0339	0.0470	0.0742
774	15	0.50	0.20	0.85	0.0416	0.0371	0.0350	0.0485	0.0788
775	15	0.50	0.20	0.99	0.0440	0.0384	0.0362	0.0505	0.0602
776	15	0.75	1.00	0.00	0.0193	0.0205	0.0207	0.0185	0.0714
777	15	0.75	1.00	0.40	0.0198	0.0197	0.0196	0.0184	0.0894
778	15	0.75	1.00	0.70	0.0217	0.0191	0.0180	0.0212	0.0566
779	15	0.75	1.00	0.85	0.0242	0.0198	0.0177	0.0248	0.0718
780	15	0.75	1.00	0.99	0.0300	0.0231	0.0222	0.0310	0.0297
781	15	0.75	0.80	0.00	0.0223	0.0218	0.0217	0.0205	0.0606
782	15	0.75	0.80	0.40	0.0231	0.0213	0.0208	0.0208	0.0731
783	15	0.75	0.80	0.70	0.0255	0.0214	0.0199	0.0240	0.0675
784	15	0.75	0.80	0.85	0.0285	0.0228	0.0204	0.0280	0.0819
785	15	0.75	0.80	0.99	0.0350	0.0264	0.0253	0.0339	0.0325
786	15	0.75	0.60	0.00	0.0270	0.0240	0.0231	0.0244	0.0767
787	15	0.75	0.60	0.40	0.0281	0.0240	0.0227	0.0252	0.0609
788	15	0.75	0.60	0.70	0.0312	0.0253	0.0231	0.0288	0.0779
789	15	0.75	0.60	0.85	0.0346	0.0273	0.0246	0.0326	0.0792
790	15	0.75	0.60	0.99	0.0414	0.0307	0.0294	0.0377	0.0355
791	15	0.75	0.40	0.00	0.0352	0.0290	0.0269	0.0319	0.0616
792	15	0.75	0.40	0.40	0.0365	0.0296	0.0272	0.0329	0.0723
793	15	0.75	0.40	0.70	0.0396	0.0316	0.0290	0.0361	0.0763
794	15	0.75	0.40	0.85	0.0425	0.0334	0.0311	0.0388	0.0594
795	15	0.75	0.40	0.99	0.0475	0.0358	0.0342	0.0419	0.0393
796	15	0.75	0.20	0.00	0.0468	0.0376	0.0354	0.0423	0.0542
797	15	0.75	0.20	0.40	0.0476	0.0380	0.0358	0.0428	0.0626
798	15	0.75	0.20	0.70	0.0495	0.0389	0.0368	0.0440	0.0709
799	15	0.75	0.20	0.85	0.0512	0.0396	0.0376	0.0451	0.0532
800	15	0.75	0.20	0.99	0.0537	0.0404	0.0385	0.0462	0.0540
801	15	1.00	1.00	0.00	0.0195	0.0206	0.0212	0.0175	0.0597
802	15	1.00	1.00	0.40	0.0199	0.0197	0.0199	0.0172	0.0539
803	15	1.00	1.00	0.70	0.0214	0.0182	0.0172	0.0187	0.0588
804	15	1.00	1.00	0.85	0.0237	0.0180	0.0159	0.0206	0.0444
805	15	1.00	1.00	0.99	0.0284	0.0192	0.0186	0.0243	0.0212
806	15	1.00	0.80	0.00	0.0234	0.0227	0.0230	0.0198	0.0522
807	15	1.00	0.80	0.40	0.0241	0.0221	0.0219	0.0199	0.0593
808	15	1.00	0.80	0.70	0.0262	0.0213	0.0200	0.0217	0.0549
809	15	1.00	0.80	0.85	0.0290	0.0216	0.0194	0.0238	0.0538
810	15	1.00	0.80	0.99	0.0344	0.0232	0.0227	0.0274	0.0240
811	15	1.00	0.60	0.00	0.0293	0.0260	0.0256	0.0239	0.0684
812	15	1.00	0.60	0.40	0.0303	0.0258	0.0250	0.0243	0.0671
813	15	1.00	0.60	0.70	0.0331	0.0261	0.0243	0.0264	0.0512
814	15	1.00	0.60	0.85	0.0364	0.0270	0.0249	0.0286	0.0589
815	15	1.00	0.60	0.99	0.0417	0.0286	0.0283	0.0315	0.0278
816	15	1.00	0.40	0.00	0.0389	0.0319	0.0306	0.0307	0.0696
817	15	1.00	0.40	0.40	0.0400	0.0322	0.0308	0.0314	0.0723
818	15	1.00	0.40	0.70	0.0431	0.0332	0.0316	0.0332	0.0536
819	15	1.00	0.40	0.85	0.0454	0.0341	0.0329	0.0347	0.0676
820	15	1.00	0.40	0.99	0.0476	0.0353	0.0348	0.0363	0.0319
821	15	1.00	0.20	0.00	0.0510	0.0400	0.0391	0.0392	0.0752
822	15	1.00	0.20	0.40	0.0516	0.0401	0.0393	0.0394	0.0851
823	15	1.00	0.20	0.70	0.0530	0.0406	0.0399	0.0401	0.0697
824	15	1.00	0.20	0.85	0.0548	0.0410	0.0403	0.0406	0.0868
825	15	1.00	0.20	0.99	0.0546	0.0415	0.0406	0.0411	0.0381
826	15	1.50	1.00	0.00	0.0171	0.0180	0.0189	0.0147	0.0689
827	15	1.50	1.00	0.40	0.0175	0.0170	0.0175	0.0142	0.0549
828	15	1.50	1.00	0.70	0.0183	0.0152	0.0148	0.0141	0.0368
829	15	1.50	1.00	0.85	0.0190	0.0144	0.0134	0.0144	0.0313
830	15	1.50	1.00	0.99	0.0181	0.0140	0.0145	0.0155	0.0185
831	15	1.50	0.80	0.00	0.0214	0.0209	0.0219	0.0171	0.0552
832	15	1.50	0.80	0.40	0.0219	0.0201	0.0209	0.0167	0.0435
833	15	1.50	0.80	0.70	0.0230	0.0188	0.0185	0.0170	0.0617
834	15	1.50	0.80	0.85	0.0241	0.0183	0.0177	0.0174	0.0463
835	15	1.50	0.80	0.99	0.0209	0.0180	0.0193	0.0183	0.0223
836	15	1.50	0.60	0.00	0.0270	0.0250	0.0261	0.0206	0.0590
837	15	1.50	0.60	0.40	0.0280	0.0246	0.0255	0.0205	0.0460
838	15	1.50	0.60	0.70	0.0290	0.0239	0.0243	0.0210	0.0508
839	15	1.50	0.60	0.85	0.0287	0.0238	0.0243	0.0215	0.0445
840	15	1.50	0.60	0.99	0.0251	0.0236	0.0256	0.0220	0.0198
841	15	1.50	0.40	0.00	0.0355	0.0307	0.0323	0.0254	0.0598
842	15	1.50	0.40	0.40	0.0355	0.0306	0.0323	0.0254	0.0606
843	15	1.50	0.40	0.70	0.0338	0.0305	0.0322	0.0260	0.0587
844	15	1.50	0.40	0.85	0.0340	0.0305	0.0325	0.0261	0.0388
845	15	1.50	0.40	0.99	0.0306	0.0304	0.0331	0.0264	0.0243
846	15	1.50	0.20	0.00	0.0384	0.0366	0.0391	0.0304	0.0596
847	15	1.50	0.20	0.40	0.0387	0.0367	0.0392	0.0305	0.0633
848	15	1.50	0.20	0.70	0.0382	0.0367	0.0393	0.0306	0.0609
849	15	1.50	0.20	0.85	0.0349	0.0367	0.0397	0.0307	0.0557
850	15	1.50	0.20	0.99	0.0354	0.0370	0.0398	0.0309	0.0336
851	15	2.00	1.00	0.00	1.0000	0.0140	0.0147	0.0114	0.0475
852	15	2.00	1.00	0.40	1.0000	0.0132	0.0137	0.0111	0.0430
853	15	2.00	1.00	0.70	1.0000	0.0119	0.0119	0.0105	0.0392
854	15	2.00	1.00	0.85	1.0000	0.0111	0.0112	0.0104	0.0223
855	15	2.00	1.00	0.99	1.0000	0.0106	0.0119	0.0106	0.0132

856	15	2.00	0.80	0.00	1.0000	0.0166	0.0177	0.0136	0.0639
857	15	2.00	0.80	0.40	1.0000	0.0161	0.0169	0.0134	0.0620
858	15	2.00	0.80	0.70	1.0000	0.0150	0.0155	0.0129	0.0489
859	15	2.00	0.80	0.85	1.0000	0.0144	0.0152	0.0128	0.0232
860	15	2.00	0.80	0.99	1.0000	0.0138	0.0160	0.0129	0.0121
861	15	2.00	0.60	0.00	1.0000	0.0201	0.0217	0.0165	0.0608
862	15	2.00	0.60	0.40	1.0000	0.0198	0.0213	0.0164	0.0502
863	15	2.00	0.60	0.70	1.0000	0.0191	0.0206	0.0160	0.0423
864	15	2.00	0.60	0.85	1.0000	0.0186	0.0206	0.0158	0.0432
865	15	2.00	0.60	0.99	1.0000	0.0181	0.0212	0.0157	0.0153
866	15	2.00	0.40	0.00	1.0000	0.0243	0.0266	0.0199	0.0870
867	15	2.00	0.40	0.40	1.0000	0.0242	0.0266	0.0198	0.0739
868	15	2.00	0.40	0.70	1.0000	0.0239	0.0265	0.0195	0.0529
869	15	2.00	0.40	0.85	1.0000	0.0236	0.0266	0.0194	0.0554
870	15	2.00	0.40	0.99	1.0000	0.0233	0.0267	0.0191	0.0185
871	15	2.00	0.20	0.00	1.0000	0.0283	0.0312	0.0232	0.0659
872	15	2.00	0.20	0.40	1.0000	0.0283	0.0313	0.0231	0.0620
873	15	2.00	0.20	0.70	1.0000	0.0282	0.0315	0.0229	0.0480
874	15	2.00	0.20	0.85	1.0000	0.0281	0.0319	0.0228	0.0503
875	15	2.00	0.20	0.99	1.0000	0.0283	0.0336	0.0229	0.0287

Appendix L. Rank of Variance of Relative Error Data

Using a tolerance of 0.000001, this appendix lists the rankings for $VAR(RE^i)$ at each design point. However, the spread between first and last place is often no more than one or two percentage points. At design point one, for example, the first four techniques' $VAR(RE^i)$ would round to 0.10, placing them in a virtual tie for first place. Furthermore, Ethridge's last place finish at DP 1 is only by 0.01. This is why we have identified $VAR(RE^i)$ as a "weak" discriminator between estimation techniques.

Index

Design Point - DP

Factors

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

Estimation Methods

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
1	3	0.00	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
2	3	0.00	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
3	3	0.00	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
4	3	0.00	1.00	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
5	3	0.00	1.00	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
6	3	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
7	3	0.00	0.80	0.40	1.0000	4 0000	3.0000	2.0000	5.0000
8	3	0.00	0.80	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
9	3	0.00	0.80	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
10	3	0.00	0.80	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
11	3	0.00	0.60	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
12	3	0.00	0.60	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
13	3	0.00	0.60	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
14	3	0.00	0.60	0.85	1.0000	4.0000	2.0000	3.0000	5.0000

15	3	0.00	0.60	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
16	3	0.00	0.40	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
17	3	0.00	0.40	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
18	3	0.00	0.40	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
19	3	0.00	0.40	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
20	3	0.00	0.40	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
21	3	0.00	0.20	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
22	3	0.00	0.20	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
23	3	0.00	0.20	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
24	3	0.00	0.20	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
25	3	0.00	0.20	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
26	3	0.25	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
27	3	0.25	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
28	3	0.25	1.00	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
29	3	0.25	1.00	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
30	3	0.25	1.00	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
31	3	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
32	3	0.25	0.80	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
33	3	0.25	0.80	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
34	3	0.25	0.80	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
35	3	0.25	0.80	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
36	3	0.25	0.60	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
37	3	0.25	0.60	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
38	3	0.25	0.60	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
39	3	0.25	0.60	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
40	3	0.25	0.60	0.99	1.0000	4.0000	2.0000	2.0000	5.0000
41	3	0.25	0.40	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
42	3	0.25	0.40	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
43	3	0.25	0.40	0.70	1.0000	4.0000	2.0000	3.0000	5.0000
44	3	0.25	0.40	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
45	3	0.25	0.40	0.99	1.0000	4.0000	2.0000	3.0000	5.0000
46	3	0.25	0.20	0.00	1.0000	4.0000	2.0000	3.0000	5.0000
47	3	0.25	0.20	0.40	1.0000	4.0000	2.0000	3.0000	5.0000
48	3	0.25	0.20	0.70	1.0000	4.0000	3.0000	2.0000	5.0000
49	3	0.25	0.20	0.85	1.0000	4.0000	3.0000	2.0000	5.0000
50	3	0.25	0.20	0.99	1.0000	4.0000	3.0000	2.0000	5.0000
51	3	0.50	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
52	3	0.50	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
53	3	0.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
54	3	0.50	1.00	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
55	3	0.50	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
56	3	0.50	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
57	3	0.50	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
58	3	0.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
59	3	0.50	0.80	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
60	3	0.50	0.80	0.99	5.0000	4.0000	3.0000	2.0000	1.0000
61	3	0.50	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
62	3	0.50	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
63	3	0.50	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
64	3	0.50	0.60	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
65	3	0.50	0.60	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
66	3	0.50	0.40	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
67	3	0.50	0.40	0.40	5.0000	4.0000	2.0000	1.0000	3.0000
68	3	0.50	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
69	3	0.50	0.40	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
70	3	0.50	0.40	0.99	5.0000	4.0000	2.0000	1.0000	3.0000
71	3	0.50	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
72	3	0.50	0.20	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
73	3	0.50	0.20	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
74	3	0.50	0.20	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
75	3	0.50	0.20	0.99	5.0000	2.0000	3.0000	1.0000	4.0000
76	3	0.75	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
77	3	0.75	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
78	3	0.75	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
79	3	0.75	1.00	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
80	3	0.75	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
81	3	0.75	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
82	3	0.75	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
83	3	0.75	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
84	3	0.75	0.80	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
85	3	0.75	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
86	3	0.75	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
87	3	0.75	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
88	3	0.75	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
89	3	0.75	0.60	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
90	3	0.75	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
91	3	0.75	0.40	0.00	5.0000	4.0000	2.0000	1.0000	3.0000
92	3	0.75	0.40	0.40	5.0000	4.0000	2.0000	1.0000	3.0000
93	3	0.75	0.40	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
94	3	0.75	0.40	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
95	3	0.75	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
96	3	0.75	0.20	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
97	3	0.75	0.20	0.40	5.0000	3.0000	4.0000	1.0000	2.0000
98	3	0.75	0.20	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
99	3	0.75	0.20	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
100	3	0.75	0.20	0.99	5.0000	4.0000	3.0000	1.0000	2.0000
101	3	1.00	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
102	3	1.00	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
103	3	1.00	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
104	3	1.00	1.00	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
105	3	1.00	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
106	3	1.00	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000

107	3	1.00	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
108	3	1.00	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
109	3	1.00	0.80	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
110	3	1.00	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
111	3	1.00	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
112	3	1.00	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
113	3	1.00	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
114	3	1.00	0.60	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
115	3	1.00	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
116	3	1.00	0.40	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
117	3	1.00	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
118	3	1.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
119	3	1.00	0.40	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
120	3	1.00	0.40	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
121	3	1.00	0.20	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
122	3	1.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
123	3	1.00	0.20	0.70	5.0000	2.0000	4.0000	1.0000	3.0000
124	3	1.00	0.20	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
125	3	1.00	0.20	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
126	3	1.50	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
127	3	1.50	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
128	3	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
129	3	1.50	1.00	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
130	3	1.50	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
131	3	1.50	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
132	3	1.50	0.80	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
133	3	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
134	3	1.50	0.80	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
135	3	1.50	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
136	3	1.50	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
137	3	1.50	0.60	0.40	5.0000	2.0000	2.0000	1.0000	4.0000
138	3	1.50	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
139	3	1.50	0.60	0.85	5.0000	2.0000	3.0000	1.0000	3.0000
140	3	1.50	0.60	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
141	3	1.50	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
142	3	1.50	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
143	3	1.50	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
144	3	1.50	0.40	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
145	3	1.50	0.40	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
146	3	1.50	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
147	3	1.50	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
148	3	1.50	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
149	3	1.50	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
150	3	1.50	0.20	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
151	3	2.00	1.00	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
152	3	2.00	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
153	3	2.00	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
154	3	2.00	1.00	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
155	3	2.00	1.00	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
156	3	2.00	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
157	3	2.00	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
158	3	2.00	0.80	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
159	3	2.00	0.80	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
160	3	2.00	0.80	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
161	3	2.00	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
162	3	2.00	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
163	3	2.00	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
164	3	2.00	0.60	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
165	3	2.00	0.60	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
166	3	2.00	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
167	3	2.00	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
168	3	2.00	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
169	3	2.00	0.40	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
170	3	2.00	0.40	0.99	5.0000	2.0000	4.0000	1.0000	3.0000
171	3	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
172	3	2.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
173	3	2.00	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
174	3	2.00	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
175	3	2.00	0.20	0.99	5.0000	2.0000	4.0000	1.0000	3.0000
176	5	0.00	1.00	0.00	2.0000	3.0000	3.0000	1.0000	5.0000
177	5	0.00	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
178	5	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
179	5	0.00	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
180	5	0.00	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
181	5	0.00	0.80	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
182	5	0.00	0.80	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
183	5	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
184	5	0.00	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
185	5	0.00	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
186	5	0.00	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
187	5	0.00	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
188	5	0.00	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
189	5	0.00	0.60	0.85	1.0000	3.0000	1.0000	4.0000	5.0000
190	5	0.00	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
191	5	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
192	5	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
193	5	0.00	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
194	5	0.00	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
195	5	0.00	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
196	5	0.00	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
197	5	0.00	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
198	5	0.00	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000

199	5	0.00	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
200	5	0.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
201	5	0.25	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
202	5	0.25	1.00	0.40	1.0000	4.0000	3.0000	2.0000	5.0000
203	5	0.25	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
204	5	0.25	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
205	5	0.25	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
206	5	0.25	0.80	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
207	5	0.25	0.80	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
208	5	0.25	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
209	5	0.25	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
210	5	0.25	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
211	5	0.25	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
212	5	0.25	0.60	0.40	2.0000	2.0000	1.0000	4.0000	5.0000
213	5	0.25	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
214	5	0.25	0.60	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
215	5	0.25	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
216	5	0.25	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
217	5	0.25	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
218	5	0.25	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
219	5	0.25	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
220	5	0.25	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
221	5	0.25	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
222	5	0.25	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
223	5	0.25	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
224	5	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
225	5	0.25	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
226	5	0.50	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
227	5	0.50	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
228	5	0.50	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
229	5	0.50	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
230	5	0.50	1.00	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
231	5	0.50	0.80	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
232	[illegible]	0.50	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
233	5	0.50	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
234	5	0.50	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
235	5	0.50	0.80	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
236	5	0.50	0.60	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
237	5	0.50	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
238	5	0.50	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
239	5	0.50	0.60	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
240	5	0.50	0.60	0.99	2.0000	3.0000	1.0000	5.0000	4.0000
241	5	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
242	5	0.50	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
243	5	0.50	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
244	5	0.50	0.40	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
245	5	0.50	0.40	0.99	2.0000	3.0000	1.0000	4.0000	5.0000
246	5	0.50	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
247	5	0.50	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
248	5	0.50	0.20	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
249	5	0.50	0.20	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
250	5	0.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
251	5	0.75	1.00	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
252	5	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
253	5	0.75	1.00	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
254	5	0.75	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
255	5	0.75	1.00	0.99	3.0000	2.0000	1.0000	5.0000	4.0000
256	5	0.75	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
257	5	0.75	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
258	5	0.75	0.80	0.70	5.0000	3.0000	1.0000	2.0000	4.0000
259	5	0.75	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
260	5	0.75	0.80	0.99	4.0000	2.0000	1.0000	5.0000	2.0000
261	5	0.75	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
262	5	0.75	0.60	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
263	5	0.75	0.60	0.70	5.0000	2.0000	1.0000	3.0000	4.0000
264	5	0.75	0.60	0.85	5.0000	2.0000	1.0000	3.0000	4.0000
265	5	0.75	0.60	0.99	4.0000	3.0000	2.0000	5.0000	1.0000
266	5	0.75	0.40	0.00	5.0000	3.0000	1.0000	2.0000	4.0000
267	5	0.75	0.40	0.40	5.0000	4.0000	1.0000	3.0000	2.0000
268	5	0.75	0.40	0.70	5.0000	3.0000	1.0000	4.0000	2.0000
269	5	0.75	0.40	0.85	5.0000	2.0000	1.0000	4.0000	3.0000
270	5	0.75	0.40	0.99	2.0000	3.0000	5.0000	4.0000	1.0000
271	5	0.75	0.20	0.00	5.0000	2.0000	1.0000	4.0000	3.0000
272	5	0.75	0.20	0.40	5.0000	3.0000	1.0000	4.0000	2.0000
273	5	0.75	0.20	0.70	5.0000	3.0000	1.0000	4.0000	2.0000
274	5	0.75	0.20	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
275	5	0.75	0.20	0.99	1.0000	4.0000	2.0000	5.0000	3.0000
276	5	1.00	1.00	0.00	5.0000	2.0000	2.0000	1.0000	4.0000
277	5	1.00	1.00	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
278	5	1.00	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
279	5	1.00	1.00	0.85	5.0000	2.0000	1.0000	3.0000	4.0000
280	5	1.00	1.00	0.99	5.0000	2.0000	3.0000	4.0000	1.0000
281	5	1.00	0.80	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
282	5	1.00	0.80	0.40	5.0000	3.0000	2.0000	1.0000	3.0000
283	5	1.00	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
284	5	1.00	0.80	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
285	5	1.00	0.80	0.99	5.0000	2.0000	3.0000	4.0000	1.0000
286	5	1.00	0.60	0.00	5.0000	3.0000	2.0000	1.0000	4.0000
287	5	1.00	0.60	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
288	5	1.00	0.60	0.70	5.0000	4.0000	2.0000	1.0000	3.0000
289	5	1.00	0.60	0.85	5.0000	4.0000	1.0000	3.0000	2.0000
290	5	1.00	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000

291	5	1.00	0.40	0.00	5.0000	4.0000	2.0000	1.0000	3.0000
292	5	1.00	0.40	0.40	5.0000	4.0000	3.0000	1.0000	2.0000
293	5	1.00	0.40	0.70	5.0000	4.0000	3.0000	1.0000	2.0000
294	5	1.00	0.40	0.85	5.0000	3.0000	4.0000	2.0000	1.0000
295	5	1.00	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
296	5	1.00	0.20	0.00	5.0000	4.0000	3.0000	1.0000	2.0000
297	5	1.00	0.20	0.40	5.0000	3.0000	4.0000	1.0000	2.0000
298	5	1.00	0.20	0.70	5.0000	3.0000	4.0000	1.0000	2.0000
299	5	1.00	0.20	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
300	5	1.00	0.20	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
301	5	1.50	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
302	5	1.50	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
303	5	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
304	5	1.50	1.00	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
305	5	1.50	1.00	0.99	5.0000	2.0000	4.0000	3.0000	1.0000
306	5	1.50	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
307	5	1.50	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
308	5	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
309	5	1.50	0.80	0.85	5.0000	4.0000	2.0000	1.0000	3.0000
310	5	1.50	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
311	5	1.50	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
312	5	1.50	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
313	5	1.50	0.60	0.70	5.0000	2.0000	3.0000	1.0000	3.0000
314	5	1.50	0.60	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
315	5	1.50	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
316	5	1.50	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
317	5	1.50	0.40	0.40	5.0000	3.0000	4.0000	1.0000	2.0000
318	5	1.50	0.40	0.70	5.0000	3.0000	4.0000	1.0000	2.0000
319	5	1.50	0.40	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
320	5	1.50	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
321	5	1.50	0.20	0.00	5.0000	2.0000	4.0000	1.0000	3.0000
322	5	1.50	0.20	0.40	5.0000	3.0000	4.0000	1.0000	2.0000
323	5	1.50	0.20	0.70	5.0000	3.0000	4.0000	1.0000	2.0000
324	5	1.50	0.20	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
325	5	1.50	0.20	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
326	5	2.00	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
327	5	2.00	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
328	5	2.00	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
329	5	2.00	1.00	0.85	5.0000	4.0000	3.0000	1.0000	2.0000
330	5	2.00	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
331	5	2.00	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
332	5	2.00	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
333	5	2.00	0.80	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
334	5	2.00	0.80	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
335	5	2.00	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
336	5	2.00	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
337	5	2.00	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
338	5	2.00	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
339	5	2.00	0.60	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
340	5	2.00	0.60	0.99	5.0000	3.0000	4.0000	1.0000	1.0000
341	5	2.00	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
342	5	2.00	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
343	5	2.00	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
344	5	2.00	0.40	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
345	5	2.00	0.40	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
346	5	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
347	5	2.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
348	5	2.00	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
349	5	2.00	0.20	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
350	5	2.00	0.20	0.99	5.0000	2.0000	4.0000	1.0000	3.0000
351	7	0.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
352	7	0.00	1.00	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
353	7	0.00	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
354	7	0.00	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
355	7	0.00	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
356	7	0.00	0.80	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
357	7	0.00	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
358	7	0.00	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
359	7	0.00	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
360	7	0.00	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
361	7	0.00	0.60	0.00	2.0000	2.0000	1.0000	4.0000	5.0000
362	7	0.00	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
363	7	0.00	0.60	0.70	2.0000	2.0000	1.0000	4.0000	5.0000
364	7	0.00	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
365	7	0.00	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
366	7	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
367	7	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
368	7	0.00	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
369	7	0.00	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
370	7	0.00	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
371	7	0.00	0.20	0.00	1.0000	3.0000	2.0000	5.0000	4.0000
372	7	0.00	0.20	0.40	1.0000	3.0000	2.0000	5.0000	4.0000
373	7	0.00	0.20	0.70	1.0000	3.0000	2.0000	5.0000	4.0000
374	7	0.00	0.20	0.85	1.0000	3.0000	2.0000	5.0000	4.0000
375	7	0.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
376	7	0.25	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
377	7	0.25	1.00	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
378	7	0.25	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
379	7	0.25	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
380	7	0.25	1.00	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
381	7	0.25	0.80	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
382	7	0.25	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000

383	7	0.25	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
384	7	0.25	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
385	7	0.25	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
386	7	0.25	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
387	7	0.25	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
388	7	0.25	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
389	7	0.25	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
390	7	0.25	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
391	7	0.25	0.40	0.00	2.0000	2.0000	1.0000	4.0000	5.0000
392	7	0.25	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
393	7	0.25	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
394	7	0.25	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
395	7	0.25	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
396	7	0.25	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
397	7	0.25	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
398	7	0.25	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
399	7	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
400	7	0.25	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
401	7	0.50	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
402	7	0.50	1.00	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
403	7	0.50	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
404	7	0.50	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
405	7	0.50	1.00	0.99	2.0000	3.0000	1.0000	5.0000	4.0000
406	7	0.50	0.80	0.00	1.0000	3.0000	2.0000	3.0000	5.0000
407	7	0.50	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
408	7	0.50	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
409	7	0.50	0.80	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
410	7	0.50	0.80	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
411	7	0.50	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
412	7	0.50	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
413	7	0.50	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
414	7	0.50	0.60	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
415	7	0.50	0.60	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
416	7	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
417	7	0.50	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
418	7	0.50	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
419	7	0.50	0.40	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
420	7	0.50	0.40	0.99	1.0000	3.0000	2.0000	5.0000	4.0000
421	7	0.50	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
422	7	0.50	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
423	7	0.50	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
424	7	0.50	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
425	7	0.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
426	7	0.75	1.00	0.00	1.0000	3.0000	3.0000	2.0000	5.0000
427	7	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
428	7	0.75	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
429	7	0.75	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
430	7	0.75	1.00	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
431	7	0.75	0.80	0.00	3.0000	4.0000	2.0000	1.0000	5.0000
432	7	0.75	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
433	7	0.75	0.80	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
434	7	0.75	0.80	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
435	7	0.75	0.80	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
436	7	0.75	0.60	0.00	4.0000	3.0000	1.0000	1.0000	5.0000
437	7	0.75	0.60	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
438	7	0.75	0.60	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
439	7	0.75	0.60	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
440	7	0.75	0.60	0.99	3.0000	3.0000	2.0000	5.0000	1.0000
441	7	0.75	0.40	0.00	4.0000	2.0000	1.0000	2.0000	5.0000
442	7	0.75	0.40	0.40	4.0000	2.0000	1.0000	2.0000	5.0000
443	7	0.75	0.40	0.70	5.0000	2.0000	1.0000	3.0000	3.0000
444	7	0.75	0.40	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
445	7	0.75	0.40	0.99	4.0000	2.0000	5.0000	3.0000	1.0000
446	7	0.75	0.20	0.00	3.0000	3.0000	1.0000	2.0000	5.0000
447	7	0.75	0.20	0.40	3.0000	4.0000	1.0000	2.0000	5.0000
448	7	0.75	0.20	0.70	5.0000	3.0000	3.0000	1.0000	2.0000
449	7	0.75	0.20	0.85	1.0000	4.0000	2.0000	3.0000	5.0000
450	7	0.75	0.20	0.99	4.0000	4.0000	2.0000	3.0000	1.0000
451	7	1.00	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
452	7	1.00	1.00	0.40	2.0000	4.0000	3.0000	1.0000	5.0000
453	7	1.00	1.00	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
454	7	1.00	1.00	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
455	7	1.00	1.00	0.99	4.0000	1.0000	3.0000	5.0000	2.0000
456	7	1.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
457	7	1.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
458	7	1.00	0.80	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
459	7	1.00	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
460	7	1.00	0.80	0.99	5.0000	2.0000	3.0000	4.0000	1.0000
461	7	1.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
462	7	1.00	0.60	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
463	7	1.00	0.60	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
464	7	1.00	0.60	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
465	7	1.00	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
466	7	1.00	0.40	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
467	7	1.00	0.40	0.40	5.0000	3.0000	2.0000	1.0000	4.0000
468	7	1.00	0.40	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
469	7	1.00	0.40	0.85	2.0000	4.0000	3.0000	1.0000	5.0000
470	7	1.00	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
471	7	1.00	0.20	0.00	2.0000	4.0000	3.0000	1.0000	5.0000
472	7	1.00	0.20	0.40	2.0000	3.0000	5.0000	1.0000	4.0000
473	7	1.00	0.20	0.70	2.0000	3.0000	5.0000	1.0000	4.0000
474	7	1.00	0.20	0.85	4.0000	2.0000	5.0000	1.0000	3.0000

475	7	1.00	0.20	0.99	4.0000	3.0000	5.0000	2.0000	1.0000
476	7	1.50	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
477	7	1.50	1.00	0.40	5.0000	2.0000	2.0000	1.0000	4.0000
478	7	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
479	7	1.50	1.00	0.85	5.0000	3.0000	1.0000	2.0000	4.0000
480	7	1.50	1.00	0.99	5.0000	2.0000	4.0000	3.0000	1.0000
481	7	1.50	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
482	7	1.50	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
483	7	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
484	7	1.50	0.80	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
485	7	1.50	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
486	7	1.50	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
487	7	1.50	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
488	7	1.50	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
489	7	1.50	0.60	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
490	7	1.50	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
491	7	1.50	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
492	7	1.50	0.40	0.40	5.0000	2.0000	4.0000	1.0000	3.0000
493	7	1.50	0.40	0.70	5.0000	3.0000	4.0000	1.0000	2.0000
494	7	1.50	0.40	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
495	7	1.50	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
496	7	1.50	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
497	7	1.50	0.20	0.40	5.0000	2.0000	4.0000	1.0000	3.0000
498	7	1.50	0.20	0.70	5.0000	2.0000	4.0000	1.0000	3.0000
499	7	1.50	0.20	0.85	5.0000	3.0000	4.0000	1.0000	2.0000
500	7	1.50	0.20	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
501	7	2.00	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
502	7	2.00	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
503	7	2.00	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
504	7	2.00	1.00	0.85	5.0000	2.0000	2.0000	1.0000	4.0000
505	7	2.00	1.00	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
506	7	2.00	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
507	7	2.00	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
508	7	2.00	0.80	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
509	7	2.00	0.80	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
510	7	2.00	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
511	7	2.00	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
512	7	2.00	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
513	7	2.00	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
514	7	2.00	0.60	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
515	7	2.00	0.60	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
516	7	2.00	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
517	7	2.00	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
518	7	2.00	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
519	7	2.00	0.40	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
520	7	2.00	0.40	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
521	7	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
522	7	2.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
523	7	2.00	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
524	7	2.00	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
525	7	2.00	0.20	0.99	5.0000	2.0000	4.0000	1.0000	3.0000
526	10	0.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
527	10	0.00	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
528	10	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
529	10	0.00	1.00	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
530	10	0.00	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
531	10	0.00	0.80	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
532	10	0.00	0.80	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
533	10	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
534	10	0.00	0.80	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
535	10	0.00	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
536	10	0.00	0.60	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
537	10	0.00	0.60	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
538	10	0.00	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
539	10	0.00	0.60	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
540	10	0.00	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
541	10	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
542	10	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
543	10	0.00	0.40	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
544	10	0.00	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
545	10	0.00	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
546	10	0.00	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
547	10	0.00	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
548	10	0.00	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
549	10	0.00	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
550	10	0.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
551	10	0.25	1.00	0.00	1.0000	2.0000	2.0000	4.0000	5.0000
552	10	0.25	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
553	10	0.25	1.00	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
554	10	0.25	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
555	10	0.25	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
556	10	0.25	0.80	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
557	10	0.25	0.80	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
558	10	0.25	0.80	0.70	2.0000	2.0000	1.0000	4.0000	5.0000
559	10	0.25	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
560	10	0.25	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
561	10	0.25	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
562	10	0.25	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
563	10	0.25	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
564	10	0.25	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
565	10	0.25	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
566	10	0.25	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000

567	10	0.25	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
568	10	0.25	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
569	10	0.25	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
570	10	0.25	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
571	10	0.25	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
572	10	0.25	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
573	10	0.25	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
574	10	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
575	10	0.25	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
576	10	0.50	1.00	0.00	1.0000	3.0000	4.0000	2.0000	5.0000
577	10	0.50	1.00	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
578	10	0.50	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
579	10	0.50	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
580	10	0.50	1.00	0.99	2.0000	3.0000	1.0000	5.0000	4.0000
581	10	0.50	0.80	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
582	10	0.50	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
583	10	0.50	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
584	10	0.50	0.80	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
585	10	0.50	0.80	0.99	3.0000	2.0000	1.0000	5.0000	4.0000
586	10	0.50	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
587	10	0.50	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
588	10	0.50	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
589	10	0.50	0.60	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
590	10	0.50	0.60	0.99	3.0000	2.0000	1.0000	5.0000	4.0000
591	10	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
592	10	0.50	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
593	10	0.50	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
594	10	0.50	0.40	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
595	10	0.50	0.40	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
596	10	0.50	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
597	10	0.50	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
598	10	0.50	0.20	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
599	10	0.50	0.20	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
600	10	0.50	0.20	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
601	10	0.75	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
602	10	0.75	1.00	0.40	2.0000	2.0000	4.0000	1.0000	5.0000
603	10	0.75	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
604	10	0.75	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
605	10	0.75	1.00	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
606	10	0.75	0.80	0.00	4.0000	2.0000	2.0000	1.0000	5.0000
607	10	0.75	0.80	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
608	10	0.75	0.80	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
609	10	0.75	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
610	10	0.75	0.80	0.99	4.0000	2.0000	1.0000	5.0000	3.0000
611	10	0.75	0.60	0.00	4.0000	2.0000	1.0000	2.0000	5.0000
612	10	0.75	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
613	10	0.75	0.60	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
614	10	0.75	0.60	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
615	10	0.75	0.60	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
616	10	0.75	0.40	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
617	10	0.75	0.40	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
618	10	0.75	0.40	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
619	10	0.75	0.40	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
620	10	0.75	0.40	0.99	5.0000	2.0000	1.0000	3.0000	4.0000
621	10	0.75	0.20	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
622	10	0.75	0.20	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
623	10	0.75	0.20	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
624	10	0.75	0.20	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
625	10	0.75	0.20	0.99	4.0000	2.0000	1.0000	3.0000	5.0000
626	10	1.00	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
627	10	1.00	1.00	0.40	3.0000	2.0000	4.0000	1.0000	5.0000
628	10	1.00	1.00	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
629	10	1.00	1.00	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
630	10	1.00	1.00	0.99	4.0000	2.0000	1.0000	3.0000	5.0000
631	10	1.00	0.80	0.00	4.0000	2.0000	3.0000	1.0000	5.0000
632	10	1.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000	5.0000
633	10	1.00	0.80	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
634	10	1.00	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
635	10	1.00	0.80	0.99	4.0000	2.0000	1.0000	3.0000	5.0000
636	10	1.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
637	10	1.00	0.60	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
638	10	1.00	0.60	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
639	10	1.00	0.60	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
640	10	1.00	0.60	0.99	5.0000	2.0000	3.0000	4.0000	1.0000
641	10	1.00	0.40	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
642	10	1.00	0.40	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
643	10	1.00	0.40	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
644	10	1.00	0.40	0.85	4.0000	3.0000	1.0000	2.0000	5.0000
645	10	1.00	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
646	10	1.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
647	10	1.00	0.20	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
648	10	1.00	0.20	0.70	4.0000	3.0000	2.0000	1.0000	5.0000
649	10	1.00	0.20	0.85	4.0000	2.0000	2.0000	1.0000	5.0000
650	10	1.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000	5.0000
651	10	1.50	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
652	10	1.50	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
653	10	1.50	1.00	0.70	5.0000	3.0000	2.0000	1.0000	4.0000
654	10	1.50	1.00	0.85	5.0000	2.0000	1.0000	3.0000	4.0000
655	10	1.50	1.00	0.99	5.0000	1.0000	2.0000	3.0000	4.0000
656	10	1.50	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
657	10	1.50	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
658	10	1.50	0.80	0.70	5.0000	3.0000	2.0000	1.0000	4.0000

659	10	1.50	0.80	0.85	5.0000	3.0000	2.0000	1.0000	4.0000
660	10	1.50	0.80	0.99	5.0000	1.0000	3.0000	1.0000	4.0000
661	10	1.50	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
662	10	1.50	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
663	10	1.50	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
664	10	1.50	0.60	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
665	10	1.50	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
666	10	1.50	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
667	10	1.50	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
668	10	1.50	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
669	10	1.50	0.40	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
670	10	1.50	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
671	10	1.50	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
672	10	1.50	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
673	10	1.50	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
674	10	1.50	0.20	0.85	5.0000	2.0000	4.0000	1.0000	3.0000
675	10	1.50	0.20	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
676	10	2.00	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
677	10	2.00	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
678	10	2.00	1.00	0.70	5.0000	2.0000	2.0000	1.0000	4.0000
679	10	2.00	1.00	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
680	10	2.00	1.00	0.99	5.0000	2.0000	3.0000	1.0000	4.0000
681	10	2.00	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
682	10	2.00	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
683	10	2.00	0.80	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
684	10	2.00	0.80	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
685	10	2.00	0.80	0.99	5.0000	2.0000	3.0000	1.0000	4.0000
686	10	2.00	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
687	10	2.00	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
688	10	2.00	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
689	10	2.00	0.60	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
690	10	2.00	0.60	0.99	5.0000	2.0000	3.0000	1.0000	4.0000
691	10	2.00	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
692	10	2.00	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
693	10	2.00	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
694	10	2.00	0.40	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
695	10	2.00	0.40	0.99	5.0000	3.0000	4.0000	1.0000	2.0000
696	10	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
697	10	2.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
698	10	2.00	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
699	10	2.00	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
700	10	2.00	0.20	0.99	5.0000	2.0000	4.0000	1.0000	3.0000
701	15	0.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
702	15	0.00	1.00	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
703	15	0.00	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
704	15	0.00	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
705	15	0.00	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
706	15	0.00	0.80	0.00	2.0000	2.0000	1.0000	4.0000	5.0000
707	15	0.00	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
708	15	0.00	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
709	15	0.00	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
710	15	0.00	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
711	15	0.00	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
712	15	0.00	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
713	15	0.00	0.60	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
714	15	0.00	0.60	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
715	15	0.00	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
716	15	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
717	15	0.00	0.40	0.40	2.0000	3.0000	1.0000	4.0000	5.0000
718	15	0.00	0.40	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
719	15	0.00	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
720	15	0.00	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
721	15	0.00	0.20	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
722	15	0.00	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
723	15	0.00	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
724	15	0.00	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
725	15	0.00	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
726	15	0.25	1.00	0.00	1.0000	3.0000	2.0000	4.0000	5.0000
727	15	0.25	1.00	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
728	15	0.25	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
729	15	0.25	1.00	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
730	15	0.25	1.00	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
731	15	0.25	0.80	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
732	15	0.25	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
733	15	0.25	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
734	15	0.25	0.80	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
735	15	0.25	0.80	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
736	15	0.25	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
737	15	0.25	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
738	15	0.25	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
739	15	0.25	0.60	0.85	2.0000	3.0000	1.0000	4.0000	5.0000
740	15	0.25	0.60	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
741	15	0.25	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
742	15	0.25	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
743	15	0.25	0.40	0.70	2.0000	3.0000	1.0000	4.0000	5.0000
744	15	0.25	0.40	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
745	15	0.25	0.40	0.99	1.0000	3.0000	2.0000	4.0000	5.0000
746	15	0.25	0.20	0.00	2.0000	3.0000	1.0000	4.0000	5.0000
747	15	0.25	0.20	0.40	1.0000	3.0000	2.0000	4.0000	5.0000
748	15	0.25	0.20	0.70	1.0000	3.0000	2.0000	4.0000	5.0000
749	15	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000	5.0000
750	15	0.25	0.20	0.99	1.0000	3.0000	2.0000	4.0000	5.0000

751	15	0.50	1.00	0.00	1.0000	4.0000	3.0000	2.0000	5.0000
752	15	0.50	1.00	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
753	15	0.50	1.00	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
754	15	0.50	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
755	15	0.50	1.00	0.99	3.0000	2.0000	1.0000	5.0000	4.0000
756	15	0.50	0.80	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
757	15	0.50	0.80	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
758	15	0.50	0.80	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
759	15	0.50	0.80	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
760	15	0.50	0.80	0.99	3.0000	2.0000	1.0000	5.0000	4.0000
761	15	0.50	0.60	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
762	15	0.50	0.60	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
763	15	0.50	0.60	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
764	15	0.50	0.60	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
765	15	0.50	0.60	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
766	15	0.50	0.40	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
767	15	0.50	0.40	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
768	15	0.50	0.40	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
769	15	0.50	0.40	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
770	15	0.50	0.40	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
771	15	0.50	0.20	0.00	3.0000	2.0000	1.0000	4.0000	5.0000
772	15	0.50	0.20	0.40	3.0000	2.0000	1.0000	4.0000	5.0000
773	15	0.50	0.20	0.70	3.0000	2.0000	1.0000	4.0000	5.0000
774	15	0.50	0.20	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
775	15	0.50	0.20	0.99	3.0000	2.0000	1.0000	4.0000	5.0000
776	15	0.75	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
777	15	0.75	1.00	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
778	15	0.75	1.00	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
779	15	0.75	1.00	0.85	3.0000	2.0000	1.0000	4.0000	5.0000
780	15	0.75	1.00	0.99	4.0000	2.0000	1.0000	5.0000	3.0000
781	15	0.75	0.80	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
782	15	0.75	0.80	0.40	4.0000	3.0000	1.0000	1.0000	5.0000
783	15	0.75	0.80	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
784	15	0.75	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
785	15	0.75	0.80	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
786	15	0.75	0.60	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
787	15	0.75	0.60	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
788	15	0.75	0.60	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
789	15	0.75	0.60	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
790	15	0.75	0.60	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
791	15	0.75	0.40	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
792	15	0.75	0.40	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
793	15	0.75	0.40	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
794	15	0.75	0.40	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
795	15	0.75	0.40	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
796	15	0.75	0.20	0.00	4.0000	2.0000	1.0000	3.0000	5.0000
797	15	0.75	0.20	0.40	4.0000	2.0000	1.0000	3.0000	5.0000
798	15	0.75	0.20	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
799	15	0.75	0.20	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
800	15	0.75	0.20	0.99	4.0000	2.0000	1.0000	3.0000	5.0000
801	15	1.00	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
802	15	1.00	1.00	0.40	3.0000	2.0000	3.0000	1.0000	5.0000
803	15	1.00	1.00	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
804	15	1.00	1.00	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
805	15	1.00	1.00	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
806	15	1.00	0.80	0.00	4.0000	2.0000	3.0000	1.0000	5.0000
807	15	1.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
808	15	1.00	0.80	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
809	15	1.00	0.80	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
810	15	1.00	0.80	0.99	5.0000	2.0000	1.0000	4.0000	3.0000
811	15	1.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000	5.0000
812	15	1.00	0.60	0.40	4.0000	3.0000	2.0000	1.0000	5.0000
813	15	1.00	0.60	0.70	4.0000	2.0000	1.0000	3.0000	5.0000
814	15	1.00	0.60	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
815	15	1.00	0.60	0.99	5.0000	3.0000	2.0000	4.0000	1.0000
816	15	1.00	0.40	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
817	15	1.00	0.40	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
818	15	1.00	0.40	0.70	4.0000	2.0000	1.0000	2.0000	5.0000
819	15	1.00	0.40	0.85	4.0000	2.0000	1.0000	3.0000	5.0000
820	15	1.00	0.40	0.99	5.0000	3.0000	2.0000	4.0000	1.0000
821	15	1.00	0.20	0.00	4.0000	3.0000	1.0000	2.0000	5.0000
822	15	1.00	0.20	0.40	4.0000	3.0000	1.0000	2.0000	5.0000
823	15	1.00	0.20	0.70	4.0000	3.0000	1.0000	2.0000	5.0000
824	15	1.00	0.20	0.85	4.0000	3.0000	1.0000	2.0000	5.0000
825	15	1.00	0.20	0.99	5.0000	4.0000	2.0000	3.0000	1.0000
826	15	1.50	1.00	0.00	2.0000	3.0000	4.0000	1.0000	5.0000
827	15	1.50	1.00	0.40	3.0000	2.0000	3.0000	1.0000	5.0000
828	15	1.50	1.00	0.70	4.0000	3.0000	2.0000	1.0000	5.0000
829	15	1.50	1.00	0.85	4.0000	2.0000	1.0000	2.0000	5.0000
830	15	1.50	1.00	0.99	4.0000	1.0000	2.0000	3.0000	5.0000
831	15	1.50	0.80	0.00	3.0000	2.0000	4.0000	1.0000	5.0000
832	15	1.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000	5.0000
833	15	1.50	0.80	0.70	4.0000	3.0000	2.0000	1.0000	5.0000
834	15	1.50	0.80	0.85	4.0000	3.0000	2.0000	1.0000	5.0000
835	15	1.50	0.80	0.99	4.0000	1.0000	3.0000	2.0000	5.0000
836	15	1.50	0.60	0.00	4.0000	2.0000	3.0000	1.0000	5.0000
837	15	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000	5.0000
838	15	1.50	0.60	0.70	4.0000	2.0000	3.0000	1.0000	5.0000
839	15	1.50	0.60	0.85	4.0000	2.0000	3.0000	1.0000	5.0000
840	15	1.50	0.60	0.99	4.0000	3.0000	5.0000	2.0000	1.0000
841	15	1.50	0.40	0.00	4.0000	2.0000	3.0000	1.0000	5.0000
842	15	1.50	0.40	0.40	4.0000	2.0000	3.0000	1.0000	5.0000

843	15	1.50	0.40	0.70	4.0000	2.0000	3.0000	1.0000	5.0000
844	15	1.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000	5.0000
845	15	1.50	0.40	0.99	4.0000	3.0000	5.0000	2.0000	1.0000
846	15	1.50	0.20	0.00	3.0000	2.0000	4.0000	1.0000	5.0000
847	15	1.50	0.20	0.40	3.0000	2.0000	4.0000	1.0000	5.0000
848	15	1.50	0.20	0.70	3.0000	2.0000	4.0000	1.0000	5.0000
849	15	1.50	0.20	0.85	2.0000	3.0000	4.0000	1.0000	5.0000
850	15	1.50	0.20	0.99	3.0000	4.0000	5.0000	1.0000	2.0000
851	15	2.00	1.00	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
852	15	2.00	1.00	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
853	15	2.00	1.00	0.70	5.0000	2.0000	2.0000	1.0000	4.0000
854	15	2.00	1.00	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
855	15	2.00	1.00	0.99	5.0000	1.0000	3.0000	1.0000	4.0000
856	15	2.00	0.80	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
857	15	2.00	0.80	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
858	15	2.00	0.80	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
859	15	2.00	0.80	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
860	15	2.00	0.80	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
861	15	2.00	0.60	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
862	15	2.00	0.60	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
863	15	2.00	0.60	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
864	15	2.00	0.60	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
865	15	2.00	0.60	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
866	15	2.00	0.40	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
867	15	2.00	0.40	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
868	15	2.00	0.40	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
869	15	2.00	0.40	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
870	15	2.00	0.40	0.99	5.0000	3.0000	4.0000	2.0000	1.0000
871	15	2.00	0.20	0.00	5.0000	2.0000	3.0000	1.0000	4.0000
872	15	2.00	0.20	0.40	5.0000	2.0000	3.0000	1.0000	4.0000
873	15	2.00	0.20	0.70	5.0000	2.0000	3.0000	1.0000	4.0000
874	15	2.00	0.20	0.85	5.0000	2.0000	3.0000	1.0000	4.0000
875	15	2.00	0.20	0.99	5.0000	2.0000	4.0000	1.0000	3.0000

Appendix M. Mean Square Error of Relative Error Data

This Appendix lists the $MSE(RE^i)$ for each technique at each design point. R234 was assigned a value of 1.00 at those points for which it could not compete.

<u>Index</u>

Design Point - DP

<u>Factors</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
1	3	0.00	1.00	0.00	0.09901	0.10942	0.10438	0.09560	0.11240
2	3	0.00	1.00	0.40	0.10246	0.11625	0.10983	0.10420	0.11910
3	3	0.00	1.00	0.70	0.12810	0.15070	0.14057	0.14092	0.14724
4	3	0.00	1.00	0.85	0.15853	0.19258	0.18028	0.18293	0.18063
5	3	0.00	1.00	0.99	0.18828	0.25520	0.24493	0.24211	0.24371
6	3	0.00	0.80	0.00	0.10341	0.11369	0.10785	0.10004	0.11611
7	3	0.00	0.80	0.40	0.10672	0.12160	0.11458	0.10955	0.12311
8	3	0.00	0.80	0.70	0.13219	0.15613	0.14604	0.14606	0.15112
9	3	0.00	0.80	0.85	0.16146	0.19718	0.18491	0.18708	0.18404
10	3	0.00	0.80	0.99	0.18988	0.25837	0.24675	0.24451	0.24641
11	3	0.00	0.60	0.00	0.11456	0.12837	0.12077	0.11567	0.12790
12	3	0.00	0.60	0.40	0.12219	0.13813	0.12956	0.12661	0.13606
13	3	0.00	0.60	0.70	0.14567	0.17325	0.16213	0.16280	0.16415
14	3	0.00	0.60	0.85	0.17000	0.21102	0.19874	0.19991	0.19468
15	3	0.00	0.60	0.99	0.19193	0.26012	0.24892	0.24598	0.24871
16	3	0.00	0.40	0.00	0.13711	0.16622	0.15551	0.15436	0.15725
17	3	0.00	0.40	0.40	0.14751	0.17710	0.16577	0.16576	0.16621
18	3	0.00	0.40	0.70	0.16410	0.20765	0.19510	0.19615	0.19089
19	3	0.00	0.40	0.85	0.17629	0.23261	0.22076	0.22027	0.21274
20	3	0.00	0.40	0.99	0.19340	0.26108	0.25005	0.24726	0.25173
21	3	0.00	0.20	0.00	0.17620	0.23292	0.22072	0.22001	0.21123
22	3	0.00	0.20	0.40	0.17861	0.23627	0.22408	0.22334	0.21527
23	3	0.00	0.20	0.70	0.18359	0.24815	0.2[illegible]875	0.23466	0.22775
24	3	0.00	0.20	0.85	0.18817	0.25568	0.24459	0.24172	0.23805
25	3	0.00	0.20	0.99	0.19470	0.26522	0.25521	0.25108	0.25990
26	3	0.25	1.00	0.00	0.09878	0.11037	0.10573	0.09591	0.11380
27	3	0.25	1.00	0.40	0.10082	0.11633	0.11004	0.10322	0.11886
28	3	0.25	1.00	0.70	0.12190	0.14583	0.13594	0.13507	0.14229
29	3	0.25	1.00	0.85	0.14792	0.18212	0.17020	0.17160	0.17003
30	3	0.25	1.00	0.99	0.17861	0.23946	0.22855	0.22680	0.21813

31	3	0.25	0.80	0.00	0.10305	0.11500	0.10986	0.10041	0.11690
32	3	0.25	0.80	0.40	0.10705	0.12203	0.11554	0.10876	0.12279
33	3	0.25	0.80	0.70	0.12780	0.15307	0.14326	0.14156	0.14766
34	3	0.25	0.80	0.85	0.15536	0.18926	0.17715	0.17784	0.17581
35	3	0.25	0.80	0.99	0.18243	0.24075	0.23109	0.22791	0.22082
36	3	0.25	0.60	0.00	0.11395	0.13020	0.12405	0.11598	0.12859
37	3	0.25	0.60	0.40	0.12005	0.13898	0.13046	0.12580	0.13572
38	3	0.25	0.60	0.70	0.14450	0.17086	0.15950	0.15863	0.16121
39	3	0.25	0.60	0.85	0.17030	0.20514	0.19320	0.19246	0.18884
40	3	0.25	0.60	0.99	0.18702	0.24967	0.23912	0.23539	0.23157
41	3	0.25	0.40	0.00	0.14532	0.16748	0.15740	0.15367	0.15750
42	3	0.25	0.40	0.40	0.15189	0.17712	0.16592	0.16376	0.16515
43	3	0.25	0.40	0.70	0.17181	0.20519	0.19358	0.19173	0.18801
44	3	0.25	0.40	0.85	0.18147	0.22845	0.21805	0.21446	0.20856
45	3	0.25	0.40	0.99	0.19108	0.25234	0.24033	0.23793	0.23812
46	3	0.25	0.20	0.00	0.17927	0.23187	0.22071	0.21688	0.21065
47	3	0.25	0.20	0.40	0.18203	0.23486	0.22309	0.21994	0.21423
48	3	0.25	0.20	0.70	0.18566	0.24428	0.23526	0.22921	0.22525
49	3	0.25	0.20	0.85	0.19072	0.25252	0.24631	0.23709	0.23576
50	3	0.25	0.20	0.99	0.19415	0.25514	0.24820	0.24111	0.24843
51	3	0.50	1.00	0.00	1.00000	0.11090	0.10584	0.09469	0.11409
52	3	0.50	1.00	0.40	1.00000	0.11468	0.10862	0.09965	0.11596
53	3	0.50	1.00	0.70	1.00000	0.13506	0.12591	0.12235	0.13106
54	3	0.50	1.00	0.85	1.00000	0.16113	0.14966	0.14874	0.14891
55	3	0.50	1.00	0.99	1.00000	0.20560	0.19761	0.19209	0.17393
56	3	0.50	0.80	0.00	1.00000	0.11769	0.11253	0.10061	0.11844
57	3	0.50	0.80	0.40	1.00000	0.12297	0.11606	0.10675	0.12108
58	3	0.50	0.80	0.70	1.00000	0.14624	0.13650	0.13180	0.13827
59	3	0.50	0.80	0.85	1.00000	0.17318	0.16154	0.15896	0.15810
60	3	0.50	0.80	0.99	1.00000	0.21683	0.20647	0.20125	0.18408
61	3	0.50	0.60	0.00	1.00000	0.13510	0.12739	0.11703	0.12998
62	3	0.50	0.60	0.40	1.00000	0.14225	0.13382	0.12491	0.13446
63	3	0.50	0.60	0.70	1.00000	0.16771	0.15701	0.15122	0.15371
64	3	0.50	0.60	0.85	1.00000	0.19426	0.18259	0.17764	0.17416
65	3	0.50	0.60	0.99	1.00000	0.22730	0.22017	0.20992	0.19446
66	3	0.50	0.40	0.00	1.00000	0.17357	0.16429	0.15419	0.15836
67	3	0.50	0.40	0.40	1.00000	0.18188	0.17141	0.16272	0.16350
68	3	0.50	0.40	0.70	1.00000	0.20478	0.19360	0.18550	0.18220
69	3	0.50	0.40	0.85	1.00000	0.22294	0.21275	0.20342	0.19702
70	3	0.50	0.40	0.99	1.00000	0.24377	0.23285	0.22367	0.21322
71	3	0.50	0.20	0.00	1.00000	0.23329	0.22294	0.21142	0.20712
72	3	0.50	0.20	0.40	1.00000	0.23722	0.23053	0.21535	0.21003
73	3	0.50	0.20	0.70	1.00000	0.24424	0.23418	0.22252	0.21848
74	3	0.50	0.20	0.85	1.00000	0.24870	0.24230	0.22696	0.22483
75	3	0.50	0.20	0.99	1.00000	0.25464	0.25401	0.23302	0.23345
76	3	0.75	1.00	0.00	1.00000	0.10835	0.10473	0.09136	0.11353
77	3	0.75	1.00	0.40	1.00000	0.10959	0.10350	0.09410	0.11323
78	3	0.75	1.00	0.70	1.00000	0.12115	0.11287	0.10768	0.11978
79	3	0.75	1.00	0.85	1.00000	0.13733	0.12662	0.12387	0.12743
80	3	0.75	1.00	0.99	1.00000	0.17053	0.18827	0.15531	0.13920
81	3	0.75	0.80	0.00	1.00000	0.11869	0.11302	0.09965	0.12061
82	3	0.75	0.80	0.40	1.00000	0.12156	0.11470	0.10370	0.12171
83	3	0.75	0.80	0.70	1.00000	0.13585	0.12689	0.11954	0.12956
84	3	0.75	0.80	0.85	1.00000	0.15376	0.14321	0.13751	0.14007
85	3	0.75	0.80	0.99	1.00000	0.18473	0.17628	0.16718	0.15013
86	3	0.75	0.60	0.00	1.00000	0.13897	0.13179	0.11762	0.13352
87	3	0.75	0.60	0.40	1.00000	0.14330	0.13861	0.12273	0.13567
88	3	0.75	0.60	0.70	1.00000	0.16087	0.15209	0.14088	0.14703
89	3	0.75	0.60	0.85	1.00000	0.17977	0.16991	0.15943	0.15849
90	3	0.75	0.60	0.99	1.00000	0.20142	0.19353	0.18076	0.16338
91	3	0.75	0.40	0.00	1.00000	0.17830	0.16899	0.15345	0.15966
92	3	0.75	0.40	0.40	1.00000	0.18426	0.17488	0.15952	0.16344
93	3	0.75	0.40	0.70	1.00000	0.19984	0.19047	0.17522	0.17499
94	3	0.75	0.40	0.85	1.00000	0.21221	0.20253	0.18757	0.18343
95	3	0.75	0.40	0.99	1.00000	0.22086	0.22052	0.19649	0.18190
96	3	0.75	0.20	0.00	1.00000	0.23209	0.22351	0.20307	0.20213
97	3	0.75	0.20	0.40	1.00000	0.23324	0.22908	0.20439	0.20355
98	3	0.75	0.20	0.70	1.00000	0.23894	0.23196	0.20993	0.20992
99	3	0.75	0.20	0.85	1.00000	0.24308	0.23591	0.21402	0.21394
100	3	0.75	0.20	0.99	1.00000	0.24561	0.23703	0.21691	0.21390
101	3	1.00	1.00	0.00	1.00000	0.10081	0.09622	0.08480	0.10779
102	3	1.00	1.00	0.40	1.00000	0.10063	0.09524	0.08596	0.10641
103	3	1.00	1.00	0.70	1.00000	0.10596	0.09875	0.09307	0.10694
104	3	1.00	1.00	0.85	1.00000	0.11552	0.10668	0.10186	0.10724
105	3	1.00	1.00	0.99	1.00000	0.13703	0.13081	0.12115	0.10943
106	3	1.00	0.80	0.00	1.00000	0.11373	0.10839	0.09496	0.11710
107	3	1.00	0.80	0.40	1.00000	0.11487	0.10877	0.09721	0.11679
108	3	1.00	0.80	0.70	1.00000	0.12258	0.11526	0.10624	0.11895
109	3	1.00	0.80	0.85	1.00000	0.13456	0.12635	0.11732	0.12195
110	3	1.00	0.80	0.99	1.00000	0.15616	0.14899	0.13730	0.12437
111	3	1.00	0.60	0.00	1.00000	0.13633	0.13142	0.11393	0.13352
112	3	1.00	0.60	0.40	1.00000	0.13858	0.13169	0.11702	0.13373
113	3	1.00	0.60	0.70	1.00000	0.14941	0.14199	0.12828	0.13880
114	3	1.00	0.60	0.85	1.00000	0.16158	0.15357	0.13984	0.14273
115	3	1.00	0.60	0.99	1.00000	0.17464	0.16918	0.15242	0.13870
116	3	1.00	0.40	0.00	1.00000	0.17485	0.16538	0.14770	0.16176
117	3	1.00	0.40	0.40	1.00000	0.17846	0.17116	0.15152	0.16332
118	3	1.00	0.40	0.70	1.00000	0.18746	0.18104	0.16065	0.16859
119	3	1.00	0.40	0.85	1.00000	0.19550	0.19130	0.16844	0.17086
120	3	1.00	0.40	0.99	1.00000	0.19972	0.20362	0.17282	0.16235
121	3	1.00	0.20	0.00	1.00000	0.21833	0.21310	0.18700	0.19878
122	3	1.00	0.20	0.40	1.00000	0.22112	0.21882	0.18945	0.20145

123	3	1.00	0.20	0.70	1.00000	0.22207	0.22113	0.19085	0.20201
124	3	1.00	0.20	0.85	1.00000	0.22350	0.22469	0.19231	0.20159
125	3	1.00	0.20	0.99	1.00000	0.22273	0.22674	0.19198	0.19385
126	3	1.50	1.00	0.00	1.00000	0.07850	0.07585	0.06870	0.09097
127	3	1.50	1.00	0.40	1.00000	0.07747	0.07465	0.06797	0.08756
128	3	1.50	1.00	0.70	1.00000	0.07775	0.07360	0.06774	0.08064
129	3	1.50	1.00	0.85	1.00000	0.08088	0.07489	0.06916	0.07572
130	3	1.50	1.00	0.99	1.00000	0.09354	0.08743	0.07779	0.07560
131	3	1.50	0.80	0.00	1.00000	0.09157	0.08942	0.07889	0.10333
132	3	1.50	0.80	0.40	1.00000	0.09160	0.08918	0.07893	0.10025
133	3	1.50	0.80	0.70	1.00000	0.09354	0.08945	0.08058	0.09588
134	3	1.50	0.80	0.85	1.00000	0.09816	0.09310	0.08344	0.09169
135	3	1.50	0.80	0.99	1.00000	0.10673	0.10179	0.08954	0.08700
136	3	1.50	0.60	0.00	1.00000	0.11190	0.10821	0.09502	0.12106
137	3	1.50	0.60	0.40	1.00000	0.11255	0.11021	0.09574	0.11829
138	3	1.50	0.60	0.70	1.00000	0.11595	0.11253	0.09893	0.11668
139	3	1.50	0.60	0.85	1.00000	0.12056	0.11939	0.10228	0.11217
140	3	1.50	0.60	0.99	1.00000	0.12656	0.12768	0.10678	0.10546
141	3	1.50	0.40	0.00	1.00000	0.13830	0.13634	0.11733	0.14322
142	3	1.50	0.40	0.40	1.00000	0.14080	0.14260	0.11946	0.14329
143	3	1.50	0.40	0.70	1.00000	0.14395	0.14177	0.12236	0.14210
144	3	1.50	0.40	0.85	1.00000	0.14488	0.14478	0.12304	0.13685
145	3	1.50	0.40	0.99	1.00000	0.14403	0.14899	0.12197	0.12502
146	3	1.50	0.20	0.00	1.00000	0.16481	0.17072	0.14097	0.17222
147	3	1.50	0.20	0.40	1.00000	0.16850	0.17324	0.14382	0.17431
148	3	1.50	0.20	0.70	1.00000	0.16909	0.17551	0.14432	0.17342
149	3	1.50	0.20	0.85	1.00000	0.16413	0.16866	0.14032	0.16483
150	3	1.50	0.20	0.99	1.00000	0.15921	0.16449	0.13593	0.15217
151	3	2.00	1.00	0.00	1.00000	0.05765	0.05686	0.05278	0.06782
152	3	2.00	1.00	0.40	1.00000	0.05708	0.05722	0.05167	0.06499
153	3	2.00	1.00	0.70	1.00000	0.05511	0.05384	0.04915	0.05794
154	3	2.00	1.00	0.85	1.00000	0.05736	0.05341	0.04835	0.05377
155	3	2.00	1.00	0.99	1.00000	0.06231	0.05765	0.05013	0.05249
156	3	2.00	0.80	0.00	1.00000	0.06881	0.06877	0.06218	0.08115
157	3	2.00	0.80	0.40	1.00000	0.06839	0.06771	0.06139	0.07905
158	3	2.00	0.80	0.70	1.00000	0.06807	0.06651	0.05947	0.07145
159	3	2.00	0.80	0.85	1.00000	0.06914	0.06645	0.05878	0.06657
160	3	2.00	0.80	0.99	1.00000	0.07266	0.07154	0.06019	0.06320
161	3	2.00	0.60	0.00	1.00000	0.08307	0.08284	0.07456	0.09907
162	3	2.00	0.60	0.40	1.00000	0.08316	0.08392	0.07426	0.09721
163	3	2.00	0.60	0.70	1.00000	0.08383	0.08381	0.07315	0.08973
164	3	2.00	0.60	0.85	1.00000	0.08414	0.08516	0.07233	0.08396
165	3	2.00	0.60	0.99	1.00000	0.08380	0.08527	0.07125	0.07582
166	3	2.00	0.40	0.00	1.00000	0.10031	0.10368	0.08990	0.12066
167	3	2.00	0.40	0.40	1.00000	0.10043	0.10451	0.08952	0.11847
168	3	2.00	0.40	0.70	1.00000	0.10159	0.10436	0.08930	0.11314
169	3	2.00	0.40	0.85	1.00000	0.10081	0.10711	0.08788	0.10592
170	3	2.00	0.40	0.99	1.00000	0.09806	0.10274	0.08487	0.09520
171	3	2.00	0.20	0.00	1.00000	0.11607	0.13316	0.10433	0.14499
172	3	2.00	0.20	0.40	1.00000	0.11749	0.12357	0.10518	0.14472
173	3	2.00	0.20	0.70	1.00000	0.11685	0.12205	0.10428	0.13943
174	3	2.00	0.20	0.85	1.00000	0.11391	0.11862	0.10143	0.13255
175	3	2.00	0.20	0.99	1.00000	0.11551	0.13337	0.10175	0.12730
176	5	0.00	1.00	0.00	0.05644	0.05889	0.05846	0.05588	0.07107
177	5	0.00	1.00	0.40	0.05699	0.05903	0.05760	0.05825	0.07212
178	5	0.00	1.00	0.70	0.06916	0.07166	0.06646	0.08030	0.08560
179	5	0.00	1.00	0.85	0.08475	0.09178	0.08333	0.10931	0.10378
180	5	0.00	1.00	0.99	0.10330	0.12854	0.12027	0.15354	0.14940
181	5	0.00	0.80	0.00	0.05786	0.06033	0.05941	0.05873	0.07305
182	5	0.00	0.80	0.40	0.05939	0.06139	0.05933	0.06242	0.07455
183	5	0.00	0.80	0.70	0.07235	0.07498	0.06921	0.08520	0.08834
184	5	0.00	0.80	0.85	0.08745	0.09507	0.08631	0.11358	0.10643
185	5	0.00	0.30	0.99	0.10406	0.12948	0.12103	0.15450	0.15063
186	5	0.00	0.60	0.00	0.06407	0.06590	0.06327	0.06875	0.07920
187	5	0.00	0.60	0.40	0.06677	0.06863	0.06474	0.07438	0.08179
188	5	0.00	0.60	0.70	0.07997	0.08401	0.07679	0.09801	0.09613
189	5	0.00	0.60	0.85	0.09328	0.10316	0.09385	0.12382	0.11333
190	5	0.00	0.50	0.93	0.10492	0.13074	0.12233	0.15577	0.15332
191	5	0.00	0.40	0.00	0.07946	0.08272	0.07622	0.09472	0.09466
192	5	0.00	0.40	0.40	0.08296	0.08725	0.07973	0.10169	0.09858
193	5	0.00	0.40	0.70	0.09326	0.10225	0.09302	0.12230	0.11215
194	5	0.00	0.40	0.85	0.09791	0.11546	0.10604	0.13880	0.12556
195	5	0.00	0.40	0.99	0.10616	0.13250	0.12576	0.15762	0.15834
196	5	0.00	0.20	0.00	0.09922	0.11667	0.10700	0.13986	0.12593
197	5	0.00	0.20	0.40	0.09948	0.11819	0.10892	0.14181	0.12836
198	5	0.00	0.20	0.70	0.10207	0.12428	0.11534	0.14890	0.13635
199	5	0.00	0.20	0.85	0.10349	0.12846	0.11969	0.15333	0.14432
200	5	0.00	0.20	0.99	0.10719	0.13480	0.12580	0.16034	0.16708
201	5	0.25	1.00	0.00	0.05611	0.05914	0.05864	0.05530	0.07251
202	5	0.25	1.00	0.40	0.05690	0.05942	0.05801	0.05701	0.07131
203	5	0.25	1.00	0.70	0.06696	0.06995	0.06515	0.07599	0.08309
204	5	0.25	1.00	0.85	0.08026	0.08706	0.07911	0.10151	0.09886
205	5	0.25	1.00	0.99	0.09751	0.11943	0.11120	0.14351	0.13129
206	5	0.25	0.80	0.00	0.05813	0.06067	0.05963	0.05814	0.07359
207	5	0.25	0.80	0.40	0.05984	0.06181	0.05971	0.06124	0.07422
208	5	0.25	0.80	0.70	0.07118	0.07402	0.06850	0.08171	0.08715
209	5	0.25	0.80	0.85	0.08479	0.09153	0.08320	0.10713	0.10355
210	5	0.25	0.80	0.99	0.09985	0.12170	0.11369	0.14569	0.13624
211	5	0.25	0.60	0.00	0.06431	0.06647	0.06360	0.06817	0.07952
212	5	0.25	0.60	0.40	0.06760	0.06915	0.06518	0.07313	0.08183
213	5	0.25	0.60	0.70	0.07977	0.08325	0.07613	0.09471	0.09577
214	5	0.25	0.60	0.85	0.09035	0.10053	0.09150	0.11852	0.11289

215	5	0.25	0.60	0.99	0.10329	0.12537	0.11705	0.14939	0.14351
216	5	0.25	0.40	0.00	0.08010	0.08311	0.07646	0.09350	0.09576
217	5	0.25	0.40	0.40	0.08318	0.08727	0.07982	0.09966	0.09930
218	5	0.25	0.40	0.70	0.09223	0.10124	0.09216	0.11882	0.11302
219	5	0.25	0.40	0.85	0.09923	0.11355	0.10430	0.13465	0.12669
220	5	0.25	0.40	0.99	0.10602	0.12872	0.12002	0.15274	0.15269
221	5	0.25	0.20	0.00	0.10229	0.11603	0.10640	0.13703	0.12940
222	5	0.25	0.20	0.40	0.10251	0.11750	0.10868	0.13899	0.13177
223	5	0.25	0.20	0.70	0.10386	0.12247	0.11413	0.14508	0.13983
224	5	0.25	0.20	0.85	0.10554	0.12700	0.11864	0.15036	0.14764
225	5	0.25	0.20	0.99	0.10869	0.13200	0.12464	0.15621	0.16553
226	5	0.50	1.00	0.00	0.05694	0.06043	0.05974	0.05455	0.07048
227	5	0.50	1.00	0.40	0.05769	0.06052	0.05907	0.05504	0.06584
228	5	0.50	1.00	0.70	0.06538	0.06720	0.06279	0.06815	0.07353
229	5	0.50	1.00	0.85	0.07360	0.07897	0.07146	0.08682	0.08455
230	5	0.50	1.00	0.99	0.08837	0.10420	0.09601	0.12226	0.10137
231	5	0.50	0.80	0.00	0.06090	0.06335	0.06194	0.05815	0.07222
232	5	0.50	0.80	0.40	0.06343	0.06436	0.06207	0.06004	0.06925
233	5	0.50	0.80	0.70	0.07230	0.07338	0.06804	0.07534	0.07802
234	5	0.50	0.80	0.85	0.08110	0.08622	0.07819	0.09466	0.09059
235	5	0.50	0.80	0.99	0.09578	0.11054	0.10274	0.12785	0.10739
236	5	0.50	0.60	0.00	0.07081	0.07082	0.06741	0.06864	0.07765
237	5	0.50	0.60	0.40	0.07390	0.07339	0.06902	0.07245	0.07708
238	5	0.50	0.60	0.70	0.08369	0.08480	0.07782	0.08956	0.08772
239	5	0.50	0.60	0.85	0.09333	0.09851	0.08976	0.10855	0.10110
240	5	0.50	0.60	0.99	0.10412	0.11721	0.10938	0.13369	0.11493
241	5	0.50	0.40	0.00	0.08964	0.08926	0.08219	0.09366	0.09321
242	5	0.50	0.40	0.40	0.09317	0.09325	0.08558	0.09874	0.09449
243	5	0.50	0.40	0.70	0.10217	0.10502	0.09613	0.11432	0.10593
244	5	0.50	0.40	0.85	0.10831	0.11482	0.10613	0.12701	0.11574
245	5	0.50	0.40	0.99	0.11311	0.12649	0.11916	0.14146	0.12721
246	5	0.50	0.20	0.00	0.11568	0.12110	0.11204	0.13308	0.12363
247	5	0.50	0.20	0.40	0.11676	0.12330	0.11535	0.13557	0.12474
248	5	0.50	0.20	0.70	0.11826	0.12711	0.11970	0.14005	0.13084
249	5	0.50	0.20	0.85	0.11772	0.13037	0.12271	0.14384	0.13698
250	5	0.50	0.20	0.99	0.11741	0.13464	0.12726	0.14885	0.14503
251	5	0.75	1.00	0.00	0.05701	0.06037	0.05960	0.05312	0.06984
252	5	0.75	1.00	0.40	0.05820	0.06005	0.05873	0.05270	0.06468
253	5	0.75	1.00	0.70	0.06178	0.06295	0.05897	0.06008	0.06646
254	5	0.75	1.00	0.85	0.06698	0.06980	0.06277	0.07177	0.07186
255	5	0.75	1.00	0.99	0.07582	0.08864	0.08001	0.09904	0.07974
256	5	0.75	0.80	0.00	0.06429	0.06564	0.06403	0.05786	0.07234
257	5	0.75	0.80	0.40	0.06613	0.06626	0.06400	0.05881	0.06973
258	5	0.75	0.80	0.70	0.07180	0.07136	0.06645	0.06831	0.07137
259	5	0.75	0.80	0.85	0.07922	0.07989	0.07237	0.08152	0.07927
260	5	0.75	0.80	0.99	0.08670	0.09770	0.09020	0.10677	0.08564
261	5	0.75	0.60	0.00	0.07784	0.07574	0.07210	0.06901	0.07761
262	5	0.75	0.60	0.40	0.07963	0.07748	0.07322	0.07139	0.07574
263	5	0.75	0.60	0.70	0.08834	0.08547	0.07901	0.08318	0.08061
264	5	0.75	0.60	0.85	0.09435	0.09522	0.08725	0.09685	0.08849
265	5	0.75	0.60	0.99	0.09642	0.10981	0.10275	0.11680	0.09411
266	5	0.75	0.40	0.00	0.10196	0.09649	0.08975	0.09303	0.09029
267	5	0.75	0.40	0.40	0.10545	0.09967	0.09259	0.09664	0.08993
268	5	0.75	0.40	0.70	0.10935	0.10823	0.10032	0.10766	0.09696
269	5	0.75	0.40	0.85	0.11315	0.11517	0.10803	0.11686	0.10321
270	5	0.75	0.40	0.99	0.10731	0.12315	0.12500	0.12733	0.10595
271	5	0.75	0.20	0.00	0.12239	0.12707	0.11950	0.12707	0.11519
272	5	0.75	0.20	0.40	0.12344	0.12840	0.12281	0.12834	0.11563
273	5	0.75	0.20	0.70	0.12306	0.13090	0.12572	0.13135	0.11955
274	5	0.75	0.20	0.85	0.12144	0.13353	0.12752	0.13444	0.12304
275	5	0.75	0.20	0.99	0.11825	0.13581	0.13017	0.13716	0.12423
276	5	1.00	1.00	0.00	1.00000	0.05732	0.05684	0.05009	0.06622
277	5	1.00	1.00	0.40	1.00000	0.05670	0.05579	0.04906	0.06147
278	5	1.00	1.00	0.70	1.00000	0.05703	0.05359	0.05235	0.05995
279	5	1.00	1.00	0.85	1.00000	0.06099	0.05471	0.05901	0.05937
280	5	1.00	1.00	0.99	1.00000	0.07536	0.06781	0.07862	0.06442
281	5	1.00	0.80	0.00	1.00000	0.06459	0.06328	0.05585	0.06987
282	5	1.00	0.80	0.40	1.00000	0.06480	0.06301	0.05590	0.06638
283	5	1.00	0.80	0.70	1.00000	0.06695	0.06283	0.06104	0.06590
284	5	1.00	0.80	0.85	1.00000	0.07258	0.06610	0.06926	0.06674
285	5	1.00	0.80	0.99	1.00000	0.08595	0.07859	0.08779	0.07059
286	5	1.00	0.60	0.00	1.00000	0.07706	0.07404	0.06747	0.07742
287	5	1.00	0.60	0.40	1.00000	0.07807	0.07467	0.06854	0.07406
288	5	1.00	0.60	0.70	1.00000	0.08290	0.07766	0.07583	0.07579
289	5	1.00	0.60	0.85	1.00000	0.08952	0.08304	0.08474	0.07800
290	5	1.00	0.60	0.99	1.00000	0.09985	0.09473	0.09908	0.07896
291	5	1.00	0.40	0.00	1.00000	0.09899	0.09389	0.08951	0.09045
292	5	1.00	0.40	0.40	1.00000	0.10114	0.09598	0.09153	0.08864
293	5	1.00	0.40	0.70	1.00000	0.10629	0.10062	0.09817	0.09200
294	5	1.00	0.40	0.85	1.00000	0.11102	0.10707	0.10434	0.09410
295	5	1.00	0.40	0.99	1.00000	0.11586	0.11377	0.11116	0.09071
296	5	1.00	0.20	0.00	1.00000	0.12607	0.12147	0.11663	0.11140
297	5	1.00	0.20	0.40	1.00000	0.12657	0.12462	0.11699	0.11122
298	5	1.00	0.20	0.70	1.00000	0.12842	0.12695	0.11909	0.11312
299	5	1.00	0.20	0.85	1.00000	0.12970	0.12689	0.12070	0.11457
300	5	1.00	0.20	0.99	1.00000	0.12980	0.12964	0.12141	0.10903
301	5	1.50	1.00	0.00	1.00000	0.04592	0.04629	0.04195	0.06049
302	5	1.50	1.00	0.40	1.00000	0.04489	0.04479	0.04019	0.05385
303	5	1.50	1.00	0.70	1.00000	0.04373	0.04159	0.03902	0.04608
304	5	1.50	1.00	0.85	1.00000	0.04538	0.04099	0.04030	0.04184
305	5	1.50	1.00	0.99	1.00000	0.05435	0.04683	0.04933	0.04457
306	5	1.50	0.80	0.00	1.00000	0.05404	0.05414	0.04782	0.06627

307	5	1.50	0.80	0.40	1.00000	0.05360	0.05332	0.04658	0.05960
308	5	1.50	0.80	0.70	1.00000	0.05368	0.05145	0.04686	0.05417
309	5	1.50	0.80	0.85	1.00000	0.05625	0.05235	0.04935	0.05034
310	5	1.50	0.80	0.99	1.00000	0.06334	0.05898	0.05723	0.05004
311	5	1.50	0.60	0.00	1.00000	0.06623	0.06599	0.05720	0.07425
312	5	1.50	0.60	0.40	1.00000	0.06655	0.06597	0.05673	0.06823
313	5	1.50	0.60	0.70	1.00000	0.06814	0.06620	0.05852	0.06524
314	5	1.50	0.60	0.85	1.00000	0.07106	0.06878	0.06170	0.06167
315	5	1.50	0.60	0.99	1.00000	0.07523	0.07532	0.06694	0.05776
316	5	1.50	0.40	0.00	1.00000	0.08365	0.08370	0.07164	0.08577
317	5	1.50	0.40	0.40	1.00000	0.08429	0.08437	0.07172	0.08170
318	5	1.50	0.40	0.70	1.00000	0.08631	0.08654	0.07371	0.07894
319	5	1.50	0.40	0.85	1.00000	0.08733	0.08763	0.07521	0.07592
320	5	1.50	0.40	0.99	1.00000	0.08935	0.09232	0.07765	0.06977
321	5	1.50	0.20	0.00	1.00000	0.10109	0.10329	0.08689	0.10447
322	5	1.50	0.20	0.40	1.00000	0.10165	0.10372	0.08713	0.10268
323	5	1.50	0.20	0.70	1.00000	0.10195	0.10573	0.08742	0.10095
324	5	1.50	0.20	0.85	1.00000	0.10273	0.10626	0.08803	0.09780
325	5	1.50	0.20	0.99	1.00000	0.10310	0.10493	0.08843	0.09108
326	5	2.00	1.00	0.00	1.00000	0.03446	0.03529	0.03303	0.04618
327	5	2.00	1.00	0.40	1.00000	0.03356	0.03376	0.03160	0.04147
328	5	2.00	1.00	0.70	1.00000	0.03236	0.03121	0.02894	0.03378
329	5	2.00	1.00	0.85	1.00000	0.03335	0.03082	0.02837	0.02997
330	5	2.00	1.00	0.99	1.00000	0.03824	0.03416	0.03147	0.03156
331	5	2.00	0.80	0.00	1.00000	0.04116	0.04204	0.03835	0.05437
332	5	2.00	0.80	0.40	1.00000	0.04066	0.04120	0.03724	0.05031
333	5	2.00	0.80	0.70	1.00000	0.04019	0.03962	0.03626	0.04205
334	5	2.00	0.80	0.85	1.00000	0.04122	0.04002	0.03602	0.03748
335	5	2.00	0.80	0.99	1.00000	0.04420	0.04350	0.03714	0.03624
336	5	2.00	0.60	0.00	1.00000	0.05024	0.05169	0.04561	0.06612
337	5	2.00	0.60	0.40	1.00000	0.05018	0.05149	0.04485	0.06170
338	5	2.00	0.60	0.70	1.00000	0.05061	0.05154	0.04382	0.05348
339	5	2.00	0.60	0.85	1.00000	0.05103	0.05332	0.04343	0.04796
340	5	2.00	0.60	0.99	1.00000	0.05218	0.05500	0.04425	0.04351
341	5	2.00	0.40	0.00	1.00000	0.06140	0.06397	0.05482	0.08024
342	5	2.00	0.40	0.40	1.00000	0.06171	0.06457	0.05435	0.07555
343	5	2.00	0.40	0.70	1.00000	0.06198	0.06476	0.05370	0.06906
344	5	2.00	0.40	0.85	1.00000	0.06216	0.06482	0.05320	0.06256
345	5	2.00	0.40	0.99	1.00000	0.06240	0.07149	0.05299	0.05613
346	5	2.00	0.20	0.00	1.00000	0.07236	0.07647	0.06428	0.09808
347	5	2.00	0.20	0.40	1.00000	0.07254	0.07677	0.06398	0.09536
348	5	2.00	0.20	0.70	1.00000	0.07259	0.07950	0.06352	0.08989
349	5	2.00	0.20	0.85	1.00000	0.07274	0.08033	0.06320	0.08593
350	5	2.00	0.20	0.99	1.00000	0.07358	0.07775	0.06332	0.07955
351	7	0.00	1.00	0.00	0.03873	0.03993	0.03944	0.04153	0.06185
352	7	0.00	1.00	0.40	0.04166	0.04189	0.04074	0.04658	0.06600
353	7	0.00	1.00	0.70	0.05092	0.05114	0.04742	0.06536	0.07674
354	7	0.00	1.00	0.85	0.06110	0.06484	0.05850	0.08738	0.08640
355	7	0.00	1.00	0.99	0.07228	0.08772	0.08176	0.11341	0.11093
356	7	0.00	0.80	0.00	0.03959	0.04069	0.04001	0.04294	0.06526
357	7	0.00	0.80	0.40	0.04263	0.04282	0.04139	0.04836	0.06876
358	7	0.00	0.80	0.70	0.05203	0.05244	0.04832	0.06706	0.07645
359	7	0.00	0.80	0.85	0.06191	0.06613	0.05964	0.08849	0.08615
360	7	0.00	0.80	0.99	0.07225	0.08803	0.08205	0.11342	0.11108
361	7	0.00	0.60	0.00	0.04330	0.04380	0.04219	0.04948	0.06808
362	7	0.00	0.60	0.40	0.04667	0.04671	0.04415	0.05573	0.07086
363	7	0.00	0.60	0.70	0.05601	0.05756	0.05230	0.07468	0.07882
364	7	0.00	0.60	0.85	0.06458	0.07071	0.06379	0.09408	0.08831
365	7	0.00	0.60	0.99	0.07256	0.08851	0.08256	0.11352	0.11265
366	7	0.00	0.40	0.00	0.05254	0.05444	0.04997	0.06810	0.07423
367	7	0.00	0.40	0.40	0.05633	0.05826	0.05293	0.07479	0.07764
368	7	0.00	0.40	0.70	0.06272	0.06906	0.06224	0.09103	0.08541
369	7	0.00	0.40	0.85	0.06713	0.07822	0.07140	0.10303	0.09152
370	7	0.00	0.40	0.99	0.07317	0.08937	0.08339	0.11411	0.11724
371	7	0.00	0.20	0.00	0.06651	0.07774	0.07073	0.10159	0.08856
372	7	0.00	0.20	0.40	0.06700	0.07905	0.07237	0.10337	0.09075
373	7	0.00	0.20	0.70	0.06876	0.08355	0.07718	0.10855	0.09645
374	7	0.00	0.20	0.85	0.07013	0.08640	0.08004	0.11134	0.10266
375	7	0.00	0.20	0.99	0.07400	0.09049	0.08431	0.11538	0.12811
376	7	0.25	1.00	0.00	0.03768	0.03923	0.03879	0.04041	0.06643
377	7	0.25	1.00	0.40	0.04050	0.04120	0.04007	0.04469	0.06667
378	7	0.25	1.00	0.70	0.04890	0.04915	0.04560	0.06092	0.07214
379	7	0.25	1.00	0.85	0.05818	0.06085	0.05474	0.08022	0.08325
380	7	0.25	1.00	0.99	0.06693	0.08114	0.07540	0.10616	0.09129
381	7	0.25	0.80	0.00	0.03905	0.04015	0.03949	0.04174	0.06581
382	7	0.25	0.80	0.40	0.04204	0.04225	0.04082	0.04651	0.06545
383	7	0.25	0.80	0.70	0.05101	0.05105	0.04703	0.06334	0.07309
384	7	0.25	0.80	0.85	0.05919	0.06310	0.05670	0.08253	0.08395
385	7	0.25	0.80	0.99	0.06791	0.08236	[illegible]	0.10687	0.09537
386	7	0.25	0.60	0.00	0.04278	0.04359	0.04192	0.04314	0.06680
387	7	0.25	0.60	0.40	0.04689	0.04639	0.04377	0.05377	0.06744
388	7	0.25	0.60	0.70	0.05482	0.05640	0.05122	0.07107	0.07548
389	7	0.25	0.60	0.85	0.06278	0.06842	0.06157	0.08908	0.08868
390	7	0.25	0.60	0.99	0.06967	0.08457	0.07881	0.10871	0.10074
391	7	0.25	0.40	0.00	0.05301	0.05437	0.04989	0.06615	0.07410
392	7	0.25	0.40	0.40	0.05607	0.05790	0.05262	0.07214	0.07553
393	7	0.25	0.40	0.70	0.06300	0.06799	0.06131	0.08725	0.08323
394	7	0.25	0.40	0.85	0.06644	0.07657	0.06989	0.09890	0.09149
395	7	0.25	0.40	0.99	0.07141	0.08652	0.08058	0.11009	0.10905
396	7	0.25	0.20	0.00	0.06696	0.07710	0.07031	0.09848	0.09150
397	7	0.25	0.20	0.40	0.06745	0.07840	0.07191	0.10025	0.09363
398	7	0.25	0.20	0.70	0.06905	0.08206	0.07623	0.10460	0.09976

399	7	0.25	0.20	0.85	0.07064	0.08518	0.07895	0.10821	0.10566
400	7	0.25	0.20	0.99	0.07343	0.08829	0.08276	0.11138	0.12237
401	7	0.50	1.00	0.00	0.03697	0.03950	0.03911	0.03867	0.06843
402	7	0.50	1.00	0.40	0.04009	0.04112	0.04010	0.04153	0.06170
403	7	0.50	1.00	0.70	0.04699	0.04660	0.04329	0.05302	0.06043
404	7	0.50	1.00	0.85	0.05316	0.05486	0.04892	0.06719	0.07438
405	7	0.50	1.00	0.99	0.06132	0.07077	0.06453	0.09088	0.06657
406	7	0.50	0.80	0.00	0.03994	0.04133	0.04051	0.04051	0.06913
407	7	0.50	0.80	0.40	0.04292	0.04327	0.04169	0.04403	0.06257
408	7	0.50	0.80	0.70	0.05060	0.05013	0.04613	0.05690	0.06225
409	7	0.50	0.80	0.85	0.05690	0.05916	0.05287	0.07153	0.07399
410	7	0.50	0.80	0.99	0.06208	0.07482	0.06871	0.09414	0.07062
411	7	0.50	0.60	0.00	0.04665	0.04602	0.04392	0.04721	0.06940
412	7	0.50	0.60	0.40	0.05016	0.04878	0.04575	0.05187	0.06139
413	7	0.50	0.60	0.70	0.05841	0.05720	0.05191	0.06589	0.06980
414	7	0.50	0.60	0.85	0.06443	0.06692	0.06003	0.08035	0.08462
415	7	0.50	0.60	0.99	0.06679	0.07948	0.07364	0.09758	0.07705
416	7	0.50	0.40	0.00	0.06085	0.05835	0.05335	0.06506	0.07284
417	7	0.50	0.40	0.40	0.06416	0.06178	0.05609	0.07029	0.07073
418	7	0.50	0.40	0.70	0.06947	0.07048	0.06364	0.08284	0.08272
419	7	0.50	0.40	0.85	0.07324	0.07741	0.07045	0.09232	0.08762
420	7	0.50	0.40	0.99	0.07323	0.08495	0.07930	0.10166	0.08757
421	7	0.50	0.20	0.00	0.07803	0.08056	0.07364	0.09433	0.09033
422	7	0.50	0.20	0.40	0.07820	0.08231	0.07588	0.09666	0.08991
423	7	0.50	0.20	0.70	0.07527	0.08511	0.07979	0.10005	0.09569
424	7	0.50	0.20	0.85	0.07485	0.08738	0.08138	0.10270	0.10118
425	7	0.50	0.20	0.99	0.07671	0.08988	0.08237	0.10546	0.10453
426	7	0.75	1.00	0.00	0.03675	0.03950	0.03920	0.03688	0.06862
427	7	0.75	1.00	0.40	0.03886	0.04047	0.03963	0.03826	0.05624
428	7	0.75	1.00	0.70	0.04381	0.04334	0.04025	0.04499	0.05477
429	7	0.75	1.00	0.85	0.04820	0.04837	0.04277	0.05393	0.06913
430	7	0.75	1.00	0.99	0.05129	0.06066	0.05369	0.07336	0.06439
431	7	0.75	0.80	0.00	0.04220	0.04283	0.04198	0.03944	0.07192
432	7	0.75	0.80	0.40	0.04480	0.04432	0.04279	0.04166	0.06385
433	7	0.75	0.80	0.70	0.05077	0.04864	0.04487	0.04978	0.05626
434	7	0.75	0.80	0.85	0.05493	0.05493	0.04893	0.06002	0.07600
435	7	0.75	0.80	0.99	0.05788	0.06670	0.06033	0.07822	0.06851
436	7	0.75	0.60	0.00	0.05246	0.04951	0.04711	0.04656	0.06744
437	7	0.75	0.60	0.40	0.05539	0.05159	0.04852	0.04967	0.06523
438	7	0.75	0.60	0.70	0.06143	0.05792	0.05286	0.05946	0.06128
439	7	0.75	0.60	0.85	0.06310	0.06508	0.05866	0.07011	0.06977
440	7	0.75	0.60	0.99	0.06470	0.07473	0.06860	0.08443	0.06060
441	7	0.75	0.40	0.00	0.06951	0.06375	0.05867	0.06355	0.06853
442	7	0.75	0.40	0.40	0.06963	0.06667	0.06114	0.06732	0.06915
443	7	0.75	0.40	0.70	0.07323	0.07330	0.06700	0.07640	0.06857
444	7	0.75	0.40	0.85	0.07592	0.07834	0.07186	0.08341	0.07800
445	7	0.75	0.40	0.99	0.07507	0.08351	0.08014	0.09045	0.06915
446	7	0.75	0.20	0.00	0.08089	0.08533	0.07906	0.08843	0.08415
447	7	0.75	0.20	0.40	0.08143	0.08650	0.08114	0.08977	0.08242
448	7	0.75	0.20	0.70	0.08236	0.08843	0.08449	0.09210	0.08478
449	7	0.75	0.20	0.85	0.08098	0.09025	0.08537	0.09432	0.08916
450	7	0.75	0.20	0.99	0.08246	0.09162	0.08695	0.09591	0.08419
451	7	1.00	1.00	0.00	0.03557	0.03808	0.03798	0.03469	0.05922
452	7	1.00	1.00	0.40	0.03724	0.03846	0.03786	0.03492	0.04881
453	7	1.00	1.00	0.70	0.03928	0.03930	0.03652	0.03820	0.04849
454	7	1.00	1.00	0.85	0.04140	0.04238	0.03726	0.04338	0.05170
455	7	1.00	1.00	0.99	0.04216	0.05246	0.0450[illegible]	0.05793	0.04615
456	7	1.00	0.80	0.00	0.04280	0.04287	0.04219	0.03797	0.06370
457	7	1.00	0.80	0.40	0.04498	0.04372	0.04252	0.03888	0.05279
458	7	1.00	0.80	0.70	0.04607	0.04589	0.04266	0.04342	0.05245
459	7	1.00	0.80	0.85	0.04956	0.05029	0.04499	0.04997	0.05154
460	7	1.00	0.80	0.99	0.05087	0.05971	0.05306	0.06399	0.04574
461	7	1.00	0.60	0.00	0.05292	0.05140	0.04932	0.04537	0.07027
462	7	1.00	0.60	0.40	0.05492	0.05271	0.05022	0.04701	0.05850
463	7	1.00	0.60	0.70	0.05838	0.05682	0.05270	0.05314	0.05821
464	7	1.00	0.60	0.85	0.06206	0.06192	0.05655	0.06032	0.05860
465	7	1.00	0.60	0.99	0.06220	0.06917	0.06401	0.07114	0.05109
466	7	1.00	0.40	0.00	0.07180	0.06682	0.06286	0.06075	0.07690
467	7	1.00	0.40	0.40	0.07307	0.06885	0.06474	0.06300	0.06809
468	7	1.00	0.40	0.70	0.07365	0.07302	0.06851	0.06845	0.07143
469	7	1.00	0.40	0.85	0.06978	0.07668	0.07181	0.07333	0.07189
470	7	1.00	0.40	0.99	0.07491	0.07991	0.07743	0.07818	0.06098
471	7	1.00	0.20	0.00	0.08121	0.08612	0.08202	0.07993	0.08598
472	7	1.00	0.20	0.40	0.08051	0.08663	0.08389	0.08034	0.08720
473	7	1.00	0.20	0.70	0.08189	0.08807	0.08696	0.08202	0.08974
474	7	1.00	0.20	0.85	0.08293	0.08903	0.08684	0.08317	0.08937
475	7	1.00	0.20	0.99	0.08183	0.08994	0.08892	0.08425	0.07987
476	7	1.50	1.00	0.00	1.00000	0.03170	0.03213	0.02951	0.05441
477	7	1.50	1.00	0.40	1.00000	0.03129	0.03120	0.02865	0.04660
478	7	1.50	1.00	0.70	1.00000	0.03062	0.02882	0.02784	0.03912
479	7	1.50	1.00	0.85	1.00000	0.03201	0.02848	0.02888	0.03848
480	7	1.50	1.00	0.99	1.00000	0.03918	0.03263	0.03578	0.03002
481	7	1.50	0.80	0.00	1.00000	0.03741	0.03785	0.03321	0.05739
482	7	1.50	0.80	0.40	1.00000	0.03733	0.03728	0.03258	0.04847
483	7	1.50	0.80	0.70	1.00000	0.03762	0.03594	0.03294	0.04765
484	7	1.50	0.80	0.85	1.00000	0.03982	0.03670	0.03492	0.03943
485	7	1.50	0.80	0.99	1.00000	0.04556	0.04125	0.04116	0.03351
486	7	1.50	0.60	0.00	1.00000	0.04612	0.04640	0.03918	0.06273
487	7	1.50	0.60	0.40	1.00000	0.04655	0.04643	0.03914	0.05297
488	7	1.50	0.60	0.70	1.00000	0.04799	0.04671	0.04078	0.05440
489	7	1.50	0.60	0.85	1.00000	0.05047	0.04342	0.04329	0.04612
490	7	1.50	0.60	0.99	1.00000	0.05384	0.05322	0.04746	0.03872

491	7	1.50	0.40	0.00	1.00000	0.05873	0.05931	0.04903	0.07064
492	7	1.50	0.40	0.40	1.00000	0.05934	0.05988	0.04930	0.06239
493	7	1.50	0.40	0.70	1.00000	0.06103	0.06143	0.05101	0.06011
494	7	1.50	0.40	0.85	1.00000	0.06223	0.06210	0.05236	0.05523
495	7	1.50	0.40	0.99	1.00000	0.06360	0.06377	0.05409	0.04783
496	7	1.50	0.20	0.00	1.00000	0.07126	0.07344	0.05944	0.08606
497	7	1.50	0.20	0.40	1.00000	0.07173	0.07387	0.05965	0.08067
498	7	1.50	0.20	0.70	1.00000	0.07198	0.07438	0.05988	0.08119
499	7	1.50	0.20	0.85	1.00000	0.07260	0.07514	0.06038	0.07414
500	7	1.50	0.20	0.99	1.00000	0.07378	0.07453	0.06133	0.06705
501	7	2.00	1.00	0.00	1.00000	0.02440	0.02486	0.02389	0.04796
502	7	2.00	1.00	0.40	1.00000	0.02382	0.02392	0.02287	0.04081
503	7	2.00	1.00	0.70	1.00000	0.02302	0.02217	0.02071	0.02675
504	7	2.00	1.00	0.85	1.00000	0.02392	0.02197	0.02014	0.02302
505	7	2.00	1.00	0.99	1.00000	0.02824	0.02452	0.02247	0.02223
506	7	2.00	0.80	0.00	1.00000	0.02925	0.03019	0.02737	0.04974
507	7	2.00	0.80	0.40	1.00000	0.02895	0.02952	0.02656	0.04688
508	7	2.00	0.80	0.70	1.00000	0.02870	0.02843	0.02492	0.03383
509	7	2.00	0.80	0.85	1.00000	0.02968	0.02874	0.02473	0.02911
510	7	2.00	0.80	0.99	1.00000	0.03235	0.03158	0.02627	0.02480
511	7	2.00	0.60	0.00	1.00000	0.03593	0.03755	0.03211	0.05954
512	7	2.00	0.60	0.40	1.00000	0.03592	0.03732	0.03161	0.05863
513	7	2.00	0.60	0.70	1.00000	0.03618	0.03716	0.03066	0.04259
514	7	2.00	0.60	0.85	1.00000	0.03681	0.03771	0.03050	0.03783
515	7	2.00	0.60	0.99	1.00000	0.03793	0.04007	0.03099	0.03011
516	7	2.00	0.40	0.00	1.00000	0.04414	0.04696	0.03838	0.06851
517	7	2.00	0.40	0.40	1.00000	0.04440	0.04722	0.03809	0.06317
518	7	2.00	0.40	0.70	1.00000	0.04465	0.04778	0.03754	0.06102
519	7	2.00	0.40	0.85	1.00000	0.04488	0.04791	0.03718	0.04567
520	7	2.00	0.40	0.99	1.00000	0.04520	0.04930	0.03692	0.04053
521	7	2.00	0.20	0.00	1.00000	0.05218	0.05628	0.04500	0.08391
522	7	2.00	0.20	0.40	1.00000	0.05229	0.05643	0.04484	0.08336
523	7	2.00	0.20	0.70	1.00000	0.05232	0.05736	0.04445	0.07702
524	7	2.00	0.20	0.85	1.00000	0.05248	0.05848	0.04420	0.07349
525	7	2.00	0.20	0.99	1.00000	0.05315	0.05755	0.04410	0.06148
526	10	0.00	1.00	0.00	0.02764	0.02870	0.02854	0.02924	0.09249
527	10	0.00	1.00	0.40	0.02782	0.02853	0.02826	0.03040	0.08604
528	10	0.00	1.00	0.70	0.03229	0.03347	0.03148	0.04320	0.07757
529	10	0.00	1.00	0.85	0.03812	0.04288	0.03872	0.06104	0.08203
530	10	0.00	1.00	0.99	0.04897	0.06094	0.05687	0.08508	0.09350
531	10	0.00	0.80	0.00	0.02820	0.02925	0.02898	0.03056	0.09267
532	10	0.00	0.80	0.40	0.02872	0.02943	0.02895	0.03249	0.08522
533	10	0.00	0.80	0.70	0.03346	0.03488	0.03257	0.04584	0.07829
534	10	0.00	0.80	0.85	0.03913	0.04433	0.03999	0.06330	0.07479
535	10	0.00	0.80	0.99	0.04931	0.06139	0.05725	0.08546	0.09521
536	10	0.00	0.60	0.00	0.03040	0.03112	0.03032	0.03577	0.08634
537	10	0.00	0.60	0.40	0.03141	0.03217	0.03087	0.03908	0.08493
538	10	0.00	0.60	0.70	0.03641	0.03895	0.03562	0.05337	0.08198
539	10	0.00	0.60	0.85	0.04137	0.04823	0.04345	0.06932	0.07559
540	10	0.00	0.60	0.99	0.05000	0.06195	0.05780	0.08594	0.10169
541	10	0.00	0.40	0.00	0.03632	0.03805	0.03518	0.05084	0.08757
542	10	0.00	0.40	0.40	0.03759	0.04030	0.03673	0.05529	0.08878
543	10	0.00	0.40	0.70	0.04143	0.04759	0.04284	0.06805	0.07770
544	10	0.00	0.40	0.85	0.04420	0.05423	0.04941	0.07782	0.08052
545	10	0.00	0.40	0.99	0.05130	0.06280	0.05859	0.08670	0.11720
546	10	0.00	0.20	0.00	0.04490	0.05463	0.04958	0.07817	0.08123
547	10	0.00	0.20	0.40	0.04499	0.05543	0.05061	0.07913	0.08278
548	10	0.00	0.20	0.70	0.04638	0.05858	0.05408	0.08295	0.08454
549	10	0.00	0.20	0.85	0.04800	0.06072	0.05644	0.08500	0.08992
550	10	0.00	0.20	0.99	0.05346	0.06374	0.05942	0.08771	0.14999
551	10	0.25	1.00	0.00	0.02693	0.02805	0.02790	0.02812	0.10797
552	10	0.25	1.00	0.40	0.02705	0.02768	0.02741	0.02911	0.10432
553	10	0.25	1.00	0.70	0.03075	0.03143	0.02954	0.04002	0.11346
554	10	0.25	1.00	0.85	0.03565	0.03919	0.03511	0.05569	0.09951
555	10	0.25	1.00	0.99	0.04511	0.05510	0.05090	0.08001	0.08056
556	10	0.25	0.80	0.00	0.02773	0.02851	0.02818	0.02935	0.10412
557	10	0.25	0.80	0.40	0.02819	0.02851	0.02800	0.03113	0.11005
558	10	0.25	0.80	0.70	0.03246	0.03311	0.03079	0.04309	0.11409
559	10	0.25	0.80	0.85	0.03740	0.04120	0.03675	0.05877	0.10952
560	10	0.25	0.80	0.99	0.04608	0.05603	0.05182	0.08075	0.08591
561	10	0.25	0.60	0.00	0.03035	0.03035	0.02939	0.03444	0.10399
562	10	0.25	0.60	0.40	0.03128	0.03120	0.02979	0.03760	0.12250
563	10	0.25	0.60	0.70	0.03589	0.03714	0.03372	0.05055	0.11355
564	10	0.2[illegible]	0.60	0.85	0.04039	0.04540	0.04047	0.06540	0.10517
565	10	0.2[illegible]	0.60	0.99	0.04754	0.05762	0.05331	0.08236	0.09886
566	10	0.25	0.40	0.00	0.03675	0.03706	0.03394	0.04903	0.11661
567	10	0.25	0.40	0.40	0.03791	0.03896	0.03523	0.05302	0.11896
568	10	0.25	0.40	0.70	0.04149	0.04556	0.04067	0.06502	0.10479
569	10	0.25	0.40	0.85	0.04401	0.05165	0.04658	0.07456	0.09250
570	10	0.25	0.40	0.99	0.04949	0.05911	0.05476	0.08358	0.11539
571	10	0.25	0.20	0.00	0.04551	0.06272	0.04754	0.07545	0.09867
572	10	0.25	0.20	0.40	0.04548	0.05341	0.04844	0.07644	0.09783
573	10	0.25	0.20	0.70	0.04640	0.05591	0.05128	0.07365	0.09831
574	10	0.25	0.20	0.85	0.04771	0.05813	0.05365	0.08238	0.11045
575	10	0.25	0.20	0.99	0.051[illegible]0	0.06038	0.05598	0.08449	0.14315
576	10	0.50	1.00	0.00	0.02684	0.02[illegible]8	0.02800	0.02698	0.10109
577	10	0.50	1.00	0.40	0.02697	0.02741	0.02717	0.02752	0.09279
578	10	0.50	1.00	0.70	0.02987	0.[illegible]34	0.02749	0.03490	0.08794
579	10	0.50	1.00	0.85	0.03376	0.[illegible]3	0.03033	0.04624	0.09150
580	10	0.50	1.00	0.99	0.04184	0.[illegible]	0.04186	0.06923	0.04803
581	10	0.50	0.80	0.00	0.02892	0.02[illegible]	0.02848	0.02850	0.09988
582	10	0.50	0.80	0.40	0.02950	0.02877	0.02804	0.02981	0.09350

583	10	0.50	0.80	0.70	0.03328	0.03192	0.02937	0.03873	0.08251
584	10	0.50	0.80	0.85	0.03756	0.03772	0.03302	0.05058	0.10169
585	10	0.50	0.80	0.99	0.04530	0.04965	0.04459	0.07180	0.05133
586	10	0.50	0.60	0.00	0.03346	0.03140	0.02996	0.03382	0.10126
587	10	0.50	0.60	0.40	0.03466	0.03212	0.03017	0.03637	0.09743
588	10	0.50	0.60	0.70	0.03914	0.03685	0.03295	0.04681	0.08466
589	10	0.50	0.60	0.85	0.04349	0.04333	0.03786	0.05874	0.10417
590	10	0.50	0.60	0.99	0.04951	0.05275	0.04776	0.07442	0.05879
591	10	0.50	0.40	0.00	0.04296	0.03889	0.03498	0.04824	0.09532
592	10	0.50	0.40	0.40	0.04444	0.04065	0.03614	0.05181	0.08875
593	10	0.50	0.40	0.70	0.04808	0.04613	0.04056	0.06164	0.10002
594	10	0.50	0.40	0.85	0.05038	0.05086	0.04518	0.06938	0.08868
595	10	0.50	0.40	0.99	0.05443	0.05642	0.05145	0.07749	0.07909
596	10	0.50	0.20	0.00	0.05440	0.05363	0.04793	0.07203	0.10893
597	10	0.50	0.20	0.40	0.05483	0.05466	0.04904	0.07365	0.09056
598	10	0.50	0.20	0.70	0.05541	0.05645	0.05111	0.07606	0.09249
599	10	0.50	0.20	0.85	0.056[illegible]	0.05797	0.05278	0.07811	0.10136
600	10	0.50	0.20	0.99	0.0590[illegible]	0.05978	0.05456	0.08038	0.10662
601	10	0.75	1.00	0.00	0.02676	0.02812	0.02834	0.02567	0.09351
602	10	0.75	1.00	0.40	0.02692	0.02714	0.02710	0.02596	0.07987
603	10	0.75	1.00	0.70	0.02926	0.02745	0.02566	0.03008	0.09545
604	10	0.75	1.00	0.85	0.03240	0.03034	0.02619	0.03707	0.10229
605	10	0.75	1.00	0.99	0.03943	0.03995	0.03376	0.05627	0.06171
606	10	0.75	0.80	0.00	0.03072	0.02996	0.02962	0.02767	0.09002
607	10	0.75	0.80	0.40	0.03132	0.02956	0.02883	0.02870	0.09871
608	10	0.75	0.80	0.70	0.03452	0.03103	0.02845	0.03423	0.08776
609	10	0.75	0.80	0.85	0.03857	0.03493	0.03012	0.04241	0.09631
610	10	0.75	0.80	0.99	0.04330	0.04389	0.03802	0.05996	0.04059
611	10	0.75	0.60	0.00	0.03818	0.03370	0.03203	0.03327	0.09773
612	10	0.75	0.60	0.40	0.03926	0.03403	0.03185	0.03514	0.09587
613	10	0.75	0.60	0.70	0.04345	0.03733	0.03329	0.04244	0.09062
614	10	0.75	0.60	0.85	0.04772	0.04201	0.03644	0.05114	0.09248
615	10	0.75	0.60	0.99	0.05033	0.04922	0.04371	0.06465	0.04537
616	10	0.75	0.40	0.00	0.05191	0.04253	0.03827	0.04707	0.08625
617	10	0.75	0.40	0.40	0.05339	0.04389	0.03918	0.04975	0.07639
618	10	0.75	0.40	0.70	0.05678	0.04793	0.04238	0.05674	0.07552
619	10	0.75	0.40	0.85	0.05889	0.05128	0.04572	0.06248	0.08431
620	10	0.75	0.40	0.99	0.05854	0.05509	0.04996	0.06891	0.05589
621	10	0.75	0.20	0.00	0.06671	0.05662	0.05116	0.06715	0.08112
622	10	0.75	0.20	0.40	0.06726	0.05724	0.05184	0.06807	0.08188
623	10	0.75	0.20	0.70	0.06479	0.05834	0.05325	0.06961	0.08763
624	10	0.75	0.20	0.85	0.06437	0.05958	0.05456	0.07136	0.09241
625	10	0.75	0.20	0.99	0.06293	0.06052	0.05590	0.07274	0.07704
626	10	1.00	1.00	0.00	0.02596	0.02726	0.02788	0.02421	0.09478
627	10	1.00	1.00	0.40	0.02615	0.02621	0.02642	0.02414	0.06573
628	10	1.00	1.00	0.70	0.02793	0.02538	0.02373	0.02599	0.06660
629	10	1.00	1.00	0.85	0.03070	0.02701	0.02303	0.02991	0.05994
630	10	1.00	1.00	0.99	0.03300	0.03497	0.02799	0.04446	0.04755
631	10	1.00	0.80	0.00	0.03145	0.03016	0.03025	0.02645	0.08955
632	10	1.00	0.80	0.40	0.03183	0.02958	0.02920	0.02702	0.05976
633	10	1.00	0.80	0.70	0.03435	0.02985	0.02759	0.03012	0.06375
634	10	1.00	0.80	0.85	0.03821	0.03248	0.02802	0.03537	0.06347
635	10	1.00	0.80	0.99	0.03847	0.03974	0.03353	0.04900	0.04336
636	10	1.00	0.60	0.00	0.04147	0.03535	0.03415	0.03200	0.09191
637	10	1.00	0.60	0.40	0.04188	0.03537	0.03365	0.03320	0.07346
638	10	1.00	0.60	0.70	0.04575	0.03731	0.03392	0.03790	0.07557
639	10	1.00	0.60	0.85	0.04769	0.04061	0.03577	0.04383	0.07612
640	10	1.00	0.60	0.99	0.04737	0.04606	0.04088	0.05422	0.03401
641	10	1.00	0.40	0.00	0.05736	0.04524	0.04190	0.04423	0.08617
642	10	1.00	0.40	0.40	0.05910	0.04615	0.04250	0.04600	0.07270
643	10	1.00	0.40	0.70	0.05916	0.04857	0.04435	0.05035	0.08082
644	10	1.00	0.40	0.85	0.05818	0.05096	0.04674	0.05440	0.07343
645	10	1.00	0.40	0.99	0.05412	0.05326	0.04927	0.05904	0.04317
646	10	1.00	0.20	0.00	0.06734	0.05792	0.05431	0.05936	0.09845
647	10	1.00	0.20	0.40	0.06730	0.05813	0.05467	0.05974	0.10514
648	10	1.00	0.20	0.70	0.06743	0.05895	0.05573	0.06099	0.10362
649	10	1.00	0.20	0.85	0.06269	0.05952	0.05650	0.06185	0.09399
650	10	1.00	0.20	0.99	0.05931	0.06012	0.05722	0.06283	0.07733
651	10	1.50	1.00	0.00	1.00000	0.02286	0.02387	0.02125	0.09561
652	10	1.50	1.00	0.40	1.00000	0.02199	0.02259	0.02057	0.07100
653	10	1.50	1.00	0.70	1.00000	0.02066	0.01965	0.01936	0.05630
654	10	1.50	1.00	0.85	1.00000	0.02138	0.01848	0.01997	0.04581
655	10	1.50	1.00	0.99	1.00000	0.02728	0.02093	0.02693	0.04616
656	10	1.50	0.80	0.00	1.00000	0.02668	0.02774	0.02340	0.08580
657	10	1.50	0.80	0.40	1.00000	0.02616	0.02677	0.02306	0.06394
658	10	1.50	0.80	0.70	1.00000	0.02562	0.02461	0.02303	0.06734
659	10	1.50	0.80	0.85	1.00000	0.02696	0.02431	0.02456	0.05882
660	10	1.50	0.80	0.99	1.00000	0.03147	0.02704	0.03073	0.04115
661	10	1.50	0.60	0.00	1.00000	0.03245	0.03331	0.02735	0.08841
662	10	1.50	0.60	0.40	1.00000	0.03244	0.03291	0.02749	0.06427
663	[illegible]	1.50	0.60	0.70	1.00000	0.03300	0.03220	0.02880	0.07102
664		1.50	0.60	0.85	1.00000	0.03461	0.03299	0.03088	0.04670
665	10	1.50	0.60	0.99	1.00000	0.03707	0.03513	0.03497	0.02812
666	10	1.50	0.40	0.00	1.00000	0.04094	0.04177	0.03428	0.09041
667	10	1.50	0.40	0.40	1.00000	0.04123	0.04198	0.03478	0.07260
668	10	1.50	0.40	0.70	1.00000	0.04223	0.04254	0.03630	0.06422
669	10	1.50	0.40	0.85	1.00000	0.04294	0.04264	0.03742	0.06008
670	10	1.50	0.40	0.99	1.00000	0.04375	0.04454	0.03908	0.03480
671	10	1.50	0.20	0.00	1.00000	0.04934	0.05117	0.04175	0.10359
672	10	1.50	0.20	0.40	1.00000	0.04966	0.05169	0.04211	0.09042
673	10	1.50	0.20	0.70	1.00000	0.04976	0.05220	0.04241	0.07855
674	10	1.50	0.20	0.85	1.00000	0.05015	0.05289	0.04278	0.06761

675	10	1.50	0.20	0.99	1.00000	0.05093	0.05189	0.04355	0.05895
676	10	2.00	1.00	0.00	1.00000	0.01759	0.01830	0.01768	0.08245
677	10	2.00	1.00	0.40	1.00000	0.01701	0.01759	0.01693	0.05486
678	10	2.00	1.00	0.70	1.00000	0.01598	0.01565	0.01464	0.03920
679	10	2.00	1.00	0.85	1.00000	0.01656	0.01502	0.01396	0.02367
680	10	2.00	1.00	0.99	1.00000	0.02021	0.01641	0.01631	0.03016
681	10	2.00	0.80	0.00	1.00000	0.02096	0.02208	0.01986	0.08686
682	10	2.00	0.80	0.40	1.00000	0.02063	0.02162	0.01929	0.06769
683	10	2.00	0.80	0.70	1.00000	0.02008	0.02026	0.01756	0.04596
684	10	2.00	0.80	0.85	1.00000	0.02070	0.02014	0.01725	0.03266
685	10	2.00	0.80	0.99	1.00000	0.02282	0.02149	0.01883	0.02826
686	10	2.00	0.60	0.00	1.00000	0.02554	0.02724	0.02290	0.08373
687	10	2.00	0.60	0.40	1.00000	0.02552	0.02716	0.02255	0.08079
688	10	2.00	0.60	0.70	1.00000	0.02546	0.02665	0.02157	0.06221
689	10	2.00	0.60	0.85	1.00000	0.02580	0.02673	0.02135	0.04423
690	10	2.00	0.60	0.99	1.00000	0.02651	0.02798	0.02188	0.03215
691	10	2.00	0.40	0.00	1.00000	0.03116	0.03382	0.02705	0.09666
692	10	2.00	0.40	0.40	1.00000	0.03137	0.03412	0.02685	0.07911
693	10	2.00	0.40	0.70	1.00000	0.03145	0.03428	0.02633	0.07805
694	10	2.00	0.40	0.85	1.00000	0.03151	0.03416	0.02599	0.04931
695	10	2.00	0.40	0.99	1.00000	0.03155	0.03469	0.02577	0.03028
696	10	2.00	0.20	0.00	1.00000	0.03665	0.04015	0.03154	0.11580
697	10	2.00	0.20	0.40	1.00000	0.03677	0.04075	0.03143	0.11477
698	10	2.00	0.20	0.70	1.00000	0.03676	0.04148	0.03111	0.09931
699	10	2.00	0.20	0.85	1.00000	0.03681	0.04220	0.03088	0.08379
700	10	2.00	0.20	0.99	1.00000	0.03722	0.04366	0.03074	0.05573
701	15	0.00	1.00	0.00	0.01688	0.01723	0.01699	0.01921	0.09649
702	15	0.00	1.00	0.40	0.01750	0.01739	0.01701	0.01998	0.09784
703	15	0.00	1.00	0.70	0.02074	0.02070	0.01933	0.03049	0.07221
704	15	0.00	1.00	0.85	0.02458	0.02693	0.02416	0.04562	0.07219
705	15	0.00	1.00	0.99	0.03320	0.03894	0.03617	0.06528	0.12764
706	15	0.00	0.80	0.00	0.01760	0.01772	0.01737	0.02041	0.09591
707	15	0.00	0.80	0.40	0.01828	0.01805	0.01752	0.02197	0.08661
708	15	0.00	0.80	0.70	0.02161	0.02169	0.02009	0.03289	0.07633
709	15	0.00	0.80	0.85	0.02530	0.02802	0.02507	0.04762	0.07437
710	15	0.00	0.80	0.99	0.03340	0.03927	0.03644	0.06562	0.12674
711	15	0.00	0.60	0.00	0.01922	0.01902	0.01840	0.02462	0.07109
712	15	0.00	0.60	0.40	0.02013	0.01985	0.01892	0.02736	0.06804
713	15	0.00	0.60	0.70	0.02355	0.02445	0.02219	0.03930	0.06802
714	15	0.00	0.60	0.85	0.02662	0.03071	0.02738	0.05269	0.08699
715	15	0.00	0.60	0.99	0.03390	0.03962	0.03680	0.06594	0.12701
716	15	0.00	0.40	0.00	0.02324	0.02383	0.02182	0.03699	0.08543
717	15	0.00	0.40	0.40	0.02418	0.02533	0.02289	0.04082	0.07542
718	15	0.00	0.40	0.70	0.02661	0.03032	0.02704	0.05163	0.09155
719	15	0.00	0.40	0.85	0.02837	0.03481	0.03148	0.05965	0.08378
720	15	0.00	0.40	0.99	0.03523	0.04022	0.03732	0.06660	0.13210
721	15	0.00	0.20	0.00	0.02854	0.03509	0.03160	0.05997	0.07632
722	15	0.00	0.20	0.40	0.02873	0.03560	0.03231	0.06070	0.08011
723	15	0.00	0.20	0.70	0.02991	0.03763	0.03458	0.06391	0.08601
724	15	0.00	0.20	0.85	0.03158	0.03891	0.03602	0.06535	0.09599
725	15	0.00	0.20	0.99	0.03759	0.04079	0.03786	0.06738	0.17812
726	15	0.25	1.00	0.00	0.01728	0.01803	0.01777	0.01918	0.10552
727	15	0.25	1.00	0.40	0.01781	0.01778	0.01743	0.01964	0.09629
728	15	0.25	1.00	0.70	0.02053	0.02011	0.01884	0.02872	0.09619
729	15	0.25	1.00	0.85	0.02390	0.02523	0.02247	0.04244	0.09790
730	15	0.25	1.00	0.99	0.03181	0.03602	0.03302	0.06375	0.06685
731	15	0.25	0.80	0.00	0.01820	0.01338	0.01801	0.02045	0.12624
732	15	0.25	0.80	0.40	0.01887	0.01836	0.01785	0.02173	0.10226
733	15	0.25	0.80	0.70	0.02190	0.02131	0.01969	0.03177	0.10408
734	15	0.25	0.80	0.85	0.02523	0.02672	0.02367	0.04543	0.07994
735	15	0.25	0.80	0.99	0.03256	0.03673	0.03369	0.06449	0.09356
736	15	0.25	0.60	0.00	0.02025	0.01955	0.01886	0.02486	0.11122
737	15	0.25	0.60	0.40	0.02116	0.02016	0.01909	0.02736	0.09215
738	15	0.25	0.60	0.70	0.02441	0.02411	0.02172	0.03850	0.11357
739	15	0.25	0.60	0.85	0.02738	0.02969	0.02617	0.05135	0.07823
740	15	0.25	0.60	0.99	0.03367	0.03787	0.03476	0.06604	0.12136
741	15	0.25	0.40	0.00	0.02490	0.02419	0.02195	0.03733	0.09961
742	15	0.25	0.40	0.40	0.02677	0.02542	0.02277	0.04085	0.09244
743	15	0.25	0.40	0.70	0.02817	0.02993	0.02641	0.05119	0.10198
744	15	0.25	0.40	0.85	0.02985	0.03405	0.03045	0.05934	0.10106
745	15	0.25	0.40	0.99	0.03556	0.03894	0.03576	0.06695	0.12220
746	15	0.25	0.20	0.00	0.03080	0.03495	0.03112	0.06034	0.09941
747	15	0.25	0.20	0.40	0.03085	0.03536	0.03178	0.06116	0.10848
748	15	0.25	0.20	0.70	0.03170	0.03692	0.03361	0.06378	0.11079
749	15	0.25	0.20	0.85	0.03310	0.03837	0.03614	0.06605	0.10976
750	15	0.25	0.20	0.99	0.03815	0.03982	0.03664	0.06776	0.14325
751	15	0.50	1.00	0.00	0.01837	0.01949	0.01935	0.01898	0.11050
752	15	0.50	1.00	0.40	0.01887	0.01887	0.01856	0.01905	0.08763
753	15	0.50	1.00	0.70	0.02112	0.01976	0.01850	0.02528	0.07828
754	15	0.50	1.00	0.85	0.02402	0.02303	0.02009	0.03570	0.06776
755	15	0.50	1.00	0.99	0.03101	0.03180	0.02786	0.05703	0.03749
[illegible]	15	0.50	0.80	0.00	0.02028	0.02012	0.01971	0.02052	0.08843
757	15	0.50	0.80	0.40	0.02099	0.01981	0.01918	0.02137	0.07195
758	15	0.50	0.80	0.70	0.02382	0.02162	0.01979	0.02904	0.10841
759	15	0.50	0.80	0.85	0.02698	0.02543	0.02197	0.03980	0.08374
760	15	0.50	0.80	0.99	0.03361	0.03384	0.02983	0.05926	0.03738
761	15	0.50	0.60	0.00	0.02400	0.02176	0.02069	0.02521	0.07012
762	15	0.50	0.60	0.40	0.02510	0.02215	0.02061	0.02735	0.06427
763	15	0.50	0.60	0.70	0.02843	0.02519	0.02223	0.03649	0.09418
764	15	0.50	0.60	0.85	0.03157	0.02961	0.02535	0.04728	0.08136
765	15	0.50	0.60	0.99	0.03690	0.03621	0.03217	0.06143	0.05142
766	15	0.50	0.40	0.00	0.03147	0.02704	0.02393	0.03798	0.07851

767	15	0.50	0.40	0.40	0.03261	0.02815	0.02458	0.04111	0.06961
768	15	0.50	0.40	0.70	0.03524	0.03191	0.02744	0.04967	0.07821
769	15	0.50	0.40	0.85	0.03686	0.03520	0.03060	0.05676	0.08913
770	15	0.50	0.40	0.99	0.04095	0.03899	0.03484	0.06385	0.05930
771	15	0.50	0.20	0.00	0.03998	0.03748	0.03279	0.05908	0.07643
772	15	0.50	0.20	0.40	0.04028	0.03818	0.03350	0.06041	0.08485
773	15	0.50	0.20	0.70	0.04076	0.03931	0.03493	0.06246	0.09649
774	15	0.50	0.20	0.85	0.04165	0.04032	0.03599	0.06414	0.10573
775	15	0.50	0.20	0.99	0.04493	0.04157	0.03731	0.06601	0.08115
776	15	0.75	1.00	0.00	0.01935	0.02067	0.02082	0.01863	0.11397
777	15	0.75	1.00	0.40	0.01979	0.01978	0.01965	0.01839	0.13841
778	15	0.75	1.00	0.70	0.02171	0.01935	0.01806	0.02186	0.07829
779	15	0.75	1.00	0.85	0.02420	0.02098	0.01786	0.02859	0.08703
780	15	0.75	1.00	0.99	0.03022	0.02822	0.02299	0.04729	0.03081
781	15	0.75	0.80	0.00	0.02274	0.02212	0.02182	0.02047	0.09435
782	15	0.75	0.80	0.40	0.02343	0.02158	0.02093	0.02099	0.10915
783	15	0.75	0.80	0.70	0.02590	0.02209	0.02010	0.02577	0.09192
784	15	0.75	0.80	0.85	0.02890	0.02451	0.02071	0.03351	0.03941
785	15	0.75	0.80	0.99	0.03499	0.03127	0.02617	0.05047	0.03274
786	15	0.75	0.60	0.00	0.02891	0.02484	0.02345	0.02538	0.11023
787	15	0.75	0.60	0.40	0.02990	0.02428	0.02300	0.02683	0.08687
788	15	0.75	0.60	0.70	0.03311	0.02685	0.02349	0.03332	0.10335
789	15	0.75	0.60	0.85	0.03632	0.03002	0.02529	0.04148	0.09609
790	15	0.75	0.60	0.99	0.04140	0.03539	0.03048	0.05438	0.03561
791	15	0.75	0.40	0.00	0.04017	0.03138	0.02763	0.03764	0.08045
792	15	0.75	0.40	0.40	0.04139	0.03222	0.02804	0.03997	0.09596
793	15	0.75	0.40	0.70	0.04388	0.03493	0.02997	0.04632	0.09958
794	15	0.75	0.40	0.85	0.04544	0.03728	0.03219	0.05163	0.07260
795	15	0.75	0.40	0.99	0.04760	0.03999	0.03534	0.05766	0.04193
796	15	0.75	0.20	0.00	0.05192	0.04181	0.03673	0.05544	0.06871
797	15	0.75	0.20	0.40	0.05203	0.04214	0.03720	0.05624	0.08563
798	15	0.75	0.20	0.70	0.05230	0.04281	0.03810	0.05759	0.10037
799	15	0.75	0.20	0.85	0.05284	0.04362	0.03895	0.05915	0.07409
800	15	0.75	0.20	0.99	0.05372	0.04431	0.03980	0.06037	0.07135
801	15	1.00	1.00	0.00	0.01952	0.02076	0.02128	0.01787	0.09347
802	15	1.00	1.00	0.40	0.01990	0.01975	0.01951	0.01736	0.07915
803	15	1.00	1.00	0.70	0.02144	0.01849	0.01727	0.01886	0.07704
804	15	1.00	1.00	0.85	0.02377	0.01931	0.01611	0.02287	0.04907
805	15	1.00	1.00	0.99	0.02838	0.02565	0.01946	0.03769	0.02471
806	15	1.00	0.80	0.00	0.02410	0.02307	0.02315	0.01981	0.07943
807	15	1.00	0.80	0.40	0.02469	0.02239	0.02207	0.01991	0.08735
808	15	1.00	0.80	0.70	0.02676	0.02199	0.02013	0.02256	0.07154
809	15	1.00	0.80	0.85	0.02985	0.02361	0.01981	0.02772	0.06060
810	15	1.00	0.80	0.99	0.03457	0.02941	0.02374	0.04146	0.02595
811	15	1.00	0.60	0.00	0.03264	0.02707	0.02598	0.02460	0.09486
812	15	1.00	0.60	0.40	0.03328	0.02686	0.02532	0.02642	0.09329
813	15	1.00	0.60	0.70	0.03610	0.02784	0.02478	0.02958	0.06385
814	15	1.00	0.60	0.85	0.03936	0.03007	0.02565	0.03527	0.06786
815	15	1.00	0.60	0.99	0.04245	0.03436	0.02946	0.04571	0.02815
816	15	1.00	0.40	0.00	0.04682	0.03470	0.03152	0.03536	0.09102
817	15	1.00	0.40	0.40	0.04774	0.03517	0.03173	0.03677	0.09476
818	15	1.00	0.40	0.70	0.04972	0.03670	0.03263	0.04073	0.06576
819	15	1.00	0.40	0.85	0.05030	0.03836	0.03410	0.04459	0.08048
820	15	1.00	0.40	0.99	0.04858	0.04008	0.03604	0.04927	0.03247
821	15	1.00	0.20	0.00	0.05878	0.04422	0.04055	0.04860	0.10375
822	15	1.00	0.20	0.40	0.05859	0.04421	0.04070	0.04886	0.12171
823	15	1.00	0.20	0.70	0.05807	0.04471	0.04129	0.04993	0.09673
824	15	1.00	0.20	0.85	0.05845	0.04508	0.04171	0.05075	0.11997
825	15	1.00	0.20	0.99	0.05562	0.04553	0.04204	0.05172	0.04830
826	15	1.50	1.00	0.00	0.01712	0.01796	0.01889	0.01623	0.10050
827	15	1.50	1.00	0.40	0.01749	0.01697	0.01754	0.01528	0.07776
828	15	1.50	1.00	0.70	0.01833	0.01555	0.01480	0.01414	0.04414
829	15	1.50	1.00	0.85	0.01912	0.01602	0.01353	0.01505	0.03240
830	15	1.50	1.00	0.99	0.01812	0.02127	0.01524	0.02251	0.02430
831	15	1.50	0.80	0.00	0.02207	0.02097	0.02199	0.01767	0.07993
832	15	1.50	0.80	0.40	0.02245	0.02025	0.02090	0.01707	0.06319
833	15	1.50	0.80	0.70	0.02368	0.01948	0.01867	0.01704	0.07521
834	15	1.50	0.80	0.85	0.02498	0.02046	0.01806	0.01881	0.04903
835	15	1.50	0.80	0.99	0.02101	0.02446	0.02008	0.02550	0.02577
836	15	1.50	0.60	0.00	0.02975	0.02549	0.02633	0.02056	0.08349
837	15	1.50	0.60	0.40	0.03070	0.02522	0.02575	0.02050	0.06477
838	15	1.50	0.60	0.70	0.03160	0.02534	0.02463	0.02168	0.06215
839	15	1.50	0.60	0.85	0.03082	0.02656	0.02488	0.02397	0.04827
840	15	1.50	0.60	0.99	0.02522	0.02872	0.02650	0.02853	0.02029
841	15	1.50	0.40	0.00	0.04153	0.03209	0.03282	0.02605	0.08710
842	15	1.50	0.40	0.40	0.04074	0.03213	0.03279	0.02634	0.08541
843	15	1.50	0.40	0.70	0.03726	0.03267	0.03285	0.02781	0.07527
844	15	1.50	0.40	0.85	0.03667	0.03317	0.03320	0.02905	0.04483
845	15	1.50	0.40	0.99	0.03071	0.03387	0.03399	0.03112	0.02490
846	15	1.50	0.20	0.00	0.04188	0.03835	0.03978	0.03187	0.09599
847	15	1.50	0.20	0.40	0.04176	0.03851	0.03994	0.03216	0.09862
848	15	1.50	0.20	0.70	0.04003	0.03851	0.03997	0.03241	0.09095
849	15	1.50	0.20	0.85	0.03564	0.03877	0.04048	0.03282	0.07968
850	15	1.50	0.20	0.99	0.03539	0.03941	0.04077	0.03377	0.04474
851	15	2.00	1.00	0.00	1.00000	0.01400	0.01469	0.01411	0.06998
852	15	2.00	1.00	0.40	1.00000	0.01320	0.01374	0.01312	0.05870
853	15	2.00	1.00	0.70	1.00000	0.01215	0.01196	0.01093	0.04583
854	15	2.00	1.00	0.85	1.00000	0.01268	0.01131	0.01043	0.02256
855	15	2.00	1.00	0.99	1.00000	0.01615	0.01235	0.01315	0.01715
856	15	2.00	0.80	0.00	1.00000	0.01663	0.01770	0.01550	0.09444
857	15	2.00	0.80	0.40	1.00000	0.01606	0.01695	0.01471	0.08580
858	15	2.00	0.80	0.70	1.00000	0.01541	0.01561	0.01308	0.05890

859	15	2.00	0.80	0.85	1.00000	0.01594	0.01538	0.01294	0.02426
860	15	2.00	0.80	0.99	1.00000	0.01803	0.01640	0.01495	0.01331
861	15	2.00	0.60	0.00	1.00000	0.02015	0.02169	0.01747	0.09361
862	15	2.00	0.60	0.40	1.00000	0.01986	0.02132	0.01697	0.07282
863	15	2.00	0.60	0.70	1.00000	0.01964	0.02071	0.01604	0.05199
864	15	2.00	0.60	0.85	1.00000	0.01990	0.02082	0.01600	0.04933
865	15	2.00	0.60	0.99	1.00000	0.02066	0.02152	0.01697	0.01531
866	15	2.00	0.40	0.00	1.00000	0.02438	0.02664	0.02033	0.13547
867	15	2.00	0.40	0.40	1.00000	0.02436	0.02668	0.02004	0.11081
868	15	2.00	0.40	0.70	1.00000	0.02429	0.02664	0.01956	0.07332
869	15	2.00	0.40	0.85	1.00000	0.02429	0.02678	0.01940	0.07096
870	15	2.00	0.40	0.99	1.00000	0.02441	0.02692	0.01949	0.02029
871	15	2.00	0.20	0.00	1.00000	0.02841	0.03128	0.02341	0.11662
872	15	2.00	0.20	0.40	1.00000	0.02843	0.03140	0.02327	0.11457
873	15	2.00	0.20	0.70	1.00000	0.02837	0.03162	0.02302	0.08638
874	15	2.00	0.20	0.85	1.00000	0.02840	0.03212	0.02286	0.08434
875	15	2.00	0.20	0.99	1.00000	0.02874	0.03396	0.02286	0.04530

Appendix N. Rank of Mean Square Error of Relative Error Data

Like $VAR(RE^i)$, $MSE(RE^i)$ provides a "weak" distinction between estimators, and these rankings should not be overemphasized. Furthermore, this MOE confounds the distinctions made by $\overline{RE}^i$. For these reasons we do not recommend using $MSE(RE^i)$ as a discriminator between CEP estimation techniques.

<u>Index</u>

Design Point - DP

<u>Factors</u>

Sample Size - SS

Bias - Bias

Ratio of Standard Deviations - STDR

Correlation - Corr

<u>Estimation Methods</u>

Modified RAND-234 method - R234

Grubbs-Patnaik/chi-square method - Grubbs

Correlated Bivariate Normal - CBN

Rayleigh-based Estimator - RAYL

Ethridge method - Eth

DP	SS	Bias	STDR	Corr	R234	Grubbs	CBN	RAYL	Eth
1	3	0.00	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
2	3	0.00	1.00	0.40	1.00000	4.00000	3.00000	2.00000	5.00000
3	3	0.00	1.00	0.70	1.00000	5.00000	2.00000	3.00000	4.00000
4	3	0.00	1.00	0.85	1.00000	5.00000	2.00000	4.00000	3.00000
5	3	0.00	1.00	0.99	1.00000	5.00000	4.00000	2.00000	3.00000
6	3	0.00	0.80	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
7	3	0.00	0.80	0.40	1.00000	4.00000	3.00000	2.00000	5.00000
8	3	0.00	0.80	0.70	1.00000	5.00000	2.00000	3.00000	4.00000
9	3	0.00	0.80	0.85	1.00000	5.00000	3.00000	4.00000	2.00000
10	3	0.00	0.80	0.99	1.00000	5.00000	4.00000	2.00000	3.00000
11	3	0.00	0.60	0.00	1.00000	5.00000	3.00000	2.00000	4.00000
12	3	0.00	0.60	0.40	1.00000	5.00000	3.00000	2.00000	4.00000
13	3	0.00	0.60	0.70	1.00000	5.00000	2.00000	3.00000	4.00000
14	3	0.00	0.60	0.85	1.00000	5.00000	3.00000	4.00000	2.00000
15	3	0.00	0.60	0.99	1.00000	5.00000	4.00000	2.00000	3.00000
16	3	0.00	0.40	0.00	1.00000	5.00000	3.00000	2.00000	4.00000
17	3	0.00	0.40	0.40	1.00000	5.00000	3.00000	2.00000	4.00000
18	3	0.00	0.40	0.70	1.00000	5.00000	3.00000	4.00000	2.00000
19	3	0.00	0.40	0.85	1.00000	5.00000	4.00000	3.00000	2.00000
20	3	0.00	0.40	0.99	1.00000	5.00000	3.00000	2.00000	4.00000
21	3	0.00	0.20	0.00	1.00000	5.00000	4.00000	3.00000	2.00000
22	3	0.00	0.20	0.40	1.00000	5.00000	4.00000	3.00000	2.00000
23	3	0.00	0.20	0.70	1.00000	5.00000	4.00000	3.00000	2.00000
24	3	0.00	0.20	0.85	1.00000	5.00000	4.00000	3.00000	2.00000

25	3	0.00	0.20	0.99	1.00000	5.00000	3.00000	2.00000	4.00000
26	3	0.25	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
27	3	0.25	1.00	0.40	1.00000	4.00000	3.00000	2.00000	5.00000
28	3	0.25	1.00	0.70	1.00000	5.00000	3.00000	2.00000	4.00000
29	3	0.25	1.00	0.85	1.00000	5.00000	3.00000	4.00000	2.00000
30	3	0.25	1.00	0.99	1.00000	5.00000	4.00000	3.00000	2.00000
31	3	0.25	0.80	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
32	3	0.25	0.80	0.40	1.00000	4.00000	3.00000	2.00000	5.00000
33	3	0.25	0.80	0.70	1.00000	5.00000	3.00000	2.00000	4.00000
34	3	0.25	0.80	0.85	1.00000	5.00000	3.00000	4.00000	2.00000
35	3	0.25	0.80	0.99	1.00000	5.00000	4.00000	3.00000	2.00000
36	3	0.25	0.60	0.00	1.00000	5.00000	3.00000	2.00000	4.00000
37	3	0.25	0.60	0.40	1.00000	5.00000	3.00000	2.00000	4.00000
38	3	0.25	0.60	0.70	1.00000	5.00000	3.00000	2.00000	4.00000
39	3	0.25	0.60	0.85	1.00000	5.00000	4.00000	3.00000	2.00000
40	3	0.25	0.60	0.99	1.00000	5.00000	4.00000	3.00000	2.00000
41	3	0.25	0.40	0.00	1.00000	5.00000	3.00000	2.00000	4.00000
42	3	0.25	0.40	0.40	1.00000	5.00000	4.00000	2.00000	3.00000
43	3	0.25	0.40	0.70	1.00000	5.00000	4.00000	3.00000	2.00000
44	3	0.25	0.40	0.85	1.00000	5.00000	4.00000	3.00000	2.00000
45	3	0.25	0.40	0.99	1.00000	5.00000	4.00000	2.00000	3.00000
46	3	0.25	0.20	0.00	1.00000	5.00000	4.00000	3.00000	2.00000
47	3	0.25	0.20	0.40	1.00000	5.00000	4.00000	3.00000	2.00000
48	3	0.25	0.20	0.70	1.00000	5.00000	4.00000	3.00000	2.00000
49	3	0.25	0.20	0.85	1.00000	5.00000	4.00000	3.00000	2.00000
50	3	0.25	0.20	0.99	1.00000	5.00000	3.00000	2.00000	4.00000
51	3	0.50	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
52	3	0.50	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
53	3	0.50	1.00	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
54	3	0.50	1.00	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
55	3	0.50	1.00	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
56	3	0.50	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
57	3	0.50	0.80	0.40	5.00000	4.00000	2.00000	1.00000	3.00000
58	3	0.50	0.80	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
59	3	0.50	0.80	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
60	3	0.50	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
61	3	0.50	0.60	0.00	5.00000	4.00000	2.00000	1.00000	3.00000
62	3	0.50	0.60	0.40	5.00000	4.00000	2.00000	1.00000	3.00000
63	3	0.50	0.60	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
64	3	0.50	0.60	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
65	3	0.50	0.60	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
66	3	0.50	0.40	0.00	5.00000	4.00000	3.00000	1.00000	2.00000
67	3	0.50	0.40	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
68	3	0.50	0.40	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
69	3	0.50	0.40	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
70	3	0.50	0.40	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
71	3	0.50	0.20	0.00	5.00000	4.00000	3.00000	2.00000	1.00000
72	3	0.50	0.20	0.40	5.00000	4.00000	3.00000	2.00000	1.00000
73	3	0.50	0.20	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
74	3	0.50	0.20	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
75	3	0.50	0.20	0.99	5.00000	4.00000	3.00000	1.00000	2.00000
76	3	0.75	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
77	3	0.75	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
78	3	0.75	1.00	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
79	3	0.75	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
80	3	0.75	1.00	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
81	3	0.75	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
82	3	0.75	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
83	3	0.75	0.80	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
84	3	0.75	0.80	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
85	3	0.75	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
86	3	0.75	0.60	0.00	5.00000	4.00000	2.00000	1.00000	3.00000
87	3	0.75	0.60	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
88	3	0.75	0.60	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
89	3	0.75	0.60	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
90	3	0.75	0.60	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
91	3	0.75	0.40	0.00	5.00000	4.00000	3.00000	1.00000	2.00000
92	3	0.75	0.40	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
93	3	0.75	0.40	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
94	3	0.75	0.40	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
95	3	0.75	0.40	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
96	3	0.75	0.20	0.00	5.00000	4.00000	3.00000	2.00000	1.00000
97	3	0.75	0.20	0.40	5.00000	4.00000	3.00000	2.00000	1.00000
98	3	0.75	0.20	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
99	3	0.75	0.20	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
100	3	0.75	0.20	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
101	3	1.00	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
102	3	1.00	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
103	3	1.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
104	3	1.00	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
105	3	1.00	1.00	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
106	3	1.00	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
107	3	1.00	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
108	3	1.00	0.80	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
109	3	1.00	0.80	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
110	3	1.00	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
111	3	1.00	0.60	0.00	5.00000	4.00000	2.00000	1.00000	3.00000
112	3	1.00	0.60	0.40	5.00000	4.00000	2.00000	1.00000	3.00000
113	3	1.00	0.60	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
114	3	1.00	0.60	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
115	3	1.00	0.60	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
116	3	1.00	0.40	0.00	5.00000	4.00000	3.00000	1.00000	2.00000

117	3	1.00	0.40	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
118	3	1.00	0.40	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
119	3	1.00	0.40	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
120	3	1.00	0.40	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
121	3	1.00	0.20	0.00	5.00000	4.00000	3.00000	1.00000	2.00000
122	3	1.00	0.20	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
123	3	1.00	0.20	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
124	3	1.00	0.20	0.85	5.00000	3.00000	4.00000	1.00000	2.00000
125	3	1.00	0.20	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
126	3	1.50	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
127	3	1.50	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
128	3	1.50	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
129	3	1.50	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
130	3	1.50	1.00	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
131	3	1.50	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
132	3	1.50	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
133	3	1.50	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
134	3	1.50	0.80	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
135	3	1.50	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
136	3	1.50	0.60	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
137	3	1.50	0.60	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
138	3	1.50	0.60	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
139	3	1.50	0.60	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
140	3	1.50	0.60	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
141	3	1.50	0.40	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
142	3	1.50	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
143	3	1.50	0.40	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
144	3	1.50	0.40	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
145	3	1.50	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
146	3	1.50	0.20	0.00	5.00000	[illegible].00000	3.00000	1.00000	4.00000
147	3	1.50	0.20	0.40	5.00000	[illegible].00000	3.00000	1.00000	4.00000
148	3	1.50	0.20	0.70	5.00000	2.00000	4.00000	1.00000	3.00000
149	3	1.50	0.20	0.85	5.00000	2.00000	4.00000	1.00000	3.00000
150	3	1.50	0.20	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
151	3	2.00	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
152	3	2.00	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
153	3	2.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
154	3	2.00	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
155	3	2.00	1.00	0.99	5.00000	4.00000	3.00000	1.00000	2.00000
156	3	2.00	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
157	3	2.00	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
158	3	2.00	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
159	3	2.00	0.80	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
160	3	2.00	0.80	0.99	5.00000	4.00000	3.00000	1.00000	2.00000
161	3	2.00	0.60	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
162	3	2.00	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
163	3	2.00	0.60	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
164	3	2.00	0.60	0.85	5.00000	3.00000	4.00000	1.00000	2.00000
165	3	2.00	0.60	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
166	3	2.00	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
167	3	2.00	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
168	3	2.00	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
169	3	2.00	0.40	0.85	5.00000	2.00000	4.00000	1.00000	3.00000
170	3	2.00	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
171	3	2.00	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
172	3	2.00	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
173	3	2.00	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
174	3	2.00	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
175	3	2.00	0.20	0.99	5.00000	2.00000	4.00000	1.00000	3.00000
176	5	0.00	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
177	5	0.00	1.00	0.40	1.00000	4.00000	2.00000	3.00000	5.00000
178	5	0.00	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
179	5	0.00	1.00	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
180	5	0.00	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
181	5	0.00	0.80	0.00	1.00000	4.00000	3.00000	2.00000	5.00000
182	5	0.00	0.80	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
183	5	0.00	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
184	5	0.00	0.80	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
185	5	0.00	0.80	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
186	5	0.00	0.60	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
187	5	0.00	0.60	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
188	5	0.00	0.60	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
189	5	0.00	0.60	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
190	5	0.00	0.60	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
191	5	0.00	0.40	0.00	2.00000	3.00000	1.00000	5.00000	4.00000
192	5	0.00	0.40	0.40	2.00000	3.00000	1.00000	5.00000	4.00000
193	5	0.00	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
194	5	0.00	0.40	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
195	5	0.00	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
196	5	0.00	0.20	0.00	1.00000	3.00000	2.00000	5.00000	4.00000
197	5	0.00	0.20	0.40	1.00000	3.00000	2.00000	5.00000	4.00000
198	5	0.00	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
199	5	0.00	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
200	5	0.00	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
201	5	0.25	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
202	5	0.25	1.00	0.40	1.00000	4.00000	3.00000	2.00000	5.00000
203	5	0.25	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
204	5	0.25	1.00	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
205	5	0.25	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
206	5	0.25	0.80	0.00	1.00000	4.00000	3.00000	2.00000	5.00000
207	5	0.25	0.80	0.40	2.00000	4.00000	1.00000	3.00000	5.00000
208	5	0.25	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000

209	5	0.25	0.80	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
210	5	0.25	0.80	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
211	5	0.25	0.60	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
212	5	0.25	0.60	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
213	5	0.25	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
214	5	0.25	0.60	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
215	5	0.25	0.60	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
216	5	0.25	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
217	5	0.25	0.40	0.40	2.00000	3.00000	1.00000	5.00000	4.00000
218	5	0.25	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
219	5	0.25	0.40	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
220	5	0.25	0.40	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
221	5	0.25	0.20	0.00	1.00000	3.00000	2.00000	5.00000	4.00000
222	5	0.25	0.20	0.40	1.00000	3.00000	2.00000	5.00000	4.00000
223	5	0.25	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
224	5	0.25	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
225	5	0.25	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
226	5	0.50	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
227	5	0.50	1.00	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
228	5	0.50	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
229	5	0.50	1.00	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
230	5	0.50	1.00	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
231	5	0.50	0.80	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
232	5	0.50	0.80	0.40	3.00000	4.00000	2.00000	1.00000	5.00000
233	5	0.50	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
234	5	0.50	0.80	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
235	5	0.50	0.80	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
236	5	0.50	0.60	0.00	3.00000	4.00000	1.00000	2.00000	5.00000
237	5	0.50	0.60	0.40	4.00000	3.00000	1.00000	2.00000	5.00000
238	5	0.50	0.60	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
239	5	0.50	0.60	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
240	5	0.50	0.60	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
241	5	0.50	0.40	0.00	3.00000	2.00000	1.00000	5.00000	4.00000
242	5	0.50	0.40	0.40	2.00000	3.00000	1.00000	5.00000	4.00000
243	5	0.50	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
244	5	0.50	0.40	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
245	5	0.50	0.40	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
246	5	0.50	0.20	0.00	2.00000	3.00000	1.00000	5.00000	4.00000
247	5	0.50	0.20	0.40	2.00000	3.00000	1.00000	5.00000	4.00000
248	5	0.50	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
249	5	0.50	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
250	5	0.50	0.20	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
251	5	0.75	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
252	5	0.75	1.00	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
253	5	0.75	1.00	0.70	3.00000	4.00000	1.00000	2.00000	5.00000
254	5	0.75	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
255	5	0.75	1.00	0.99	1.00000	4.00000	3.00000	5.00000	2.00000
256	5	0.75	0.80	0.00	3.00000	4.00000	2.00000	1.00000	5.00000
257	5	0.75	0.80	0.40	3.00000	4.00000	2.00000	1.00000	5.00000
258	5	0.75	0.80	0.70	5.00000	3.00000	1.00000	2.00000	4.00000
259	5	0.75	0.80	0.85	2.00000	4.00000	1.00000	5.00000	3.00000
260	5	0.75	0.80	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
261	5	0.75	0.60	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
262	5	0.75	0.60	0.40	5.00000	4.00000	2.00000	1.00000	3.00000
263	5	0.75	0.60	0.70	5.00000	4.00000	1.00000	3.00000	2.00000
264	5	0.75	0.60	0.85	3.00000	4.00000	1.00000	5.00000	2.00000
265	5	0.75	0.60	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
266	5	0.75	0.40	0.00	5.00000	4.00000	1.00000	3.00000	2.00000
267	5	0.75	0.40	0.40	5.00000	4.00000	2.00000	3.00000	1.00000
268	5	0.75	0.40	0.70	5.00000	4.00000	2.00000	3.00000	1.00000
269	5	0.75	0.40	0.85	3.00000	4.00000	2.00000	5.00000	1.00000
270	5	0.75	0.40	0.99	2.00000	3.00000	4.00000	5.00000	1.00000
271	5	0.75	0.20	0.00	3.00000	4.00000	2.00000	4.00000	1.00000
272	5	0.75	0.20	0.40	3.00000	5.00000	2.00000	4.00000	1.00000
273	5	0.75	0.20	0.70	2.00000	4.00000	3.00000	5.00000	1.00000
274	5	0.75	0.20	0.85	1.00000	4.00000	3.00000	5.00000	2.00000
275	5	0.75	0.20	0.99	1.00000	4.00000	3.00000	5.00000	2.00000
276	5	1.00	1.00	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
277	5	1.00	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
278	5	1.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
279	5	1.00	1.00	0.85	5.00000	4.00000	1.00000	2.00000	3.00000
280	5	1.00	1.00	0.99	5.00000	3.00000	2.00000	4.00000	1.00000
281	5	1.00	0.80	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
282	5	1.00	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
283	5	1.00	0.80	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
284	5	1.00	0.80	0.85	5.00000	4.00000	1.00000	3.00000	2.00000
285	5	1.00	0.80	0.99	5.00000	3.00000	2.00000	4.00000	1.00000
286	5	1.00	0.60	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
287	5	1.00	0.60	0.40	5.00000	4.00000	3.00000	1.00000	2.00000
288	5	1.00	0.60	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
289	5	1.00	0.60	0.85	5.00000	4.00000	2.00000	3.00000	1.00000
290	5	1.00	0.60	0.99	5.00000	4.00000	2.00000	3.00000	1.00000
291	5	1.00	0.40	0.00	5.00000	4.00000	3.00000	1.00000	2.00000
292	5	1.00	0.40	0.40	5.00000	4.00000	3.00000	2.00000	1.00000
293	5	1.00	0.40	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
294	5	1.00	0.40	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
295	5	1.00	0.40	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
296	5	1.00	0.20	0.00	5.00000	4.00000	3.00000	2.00000	1.00000
297	5	1.00	0.20	0.40	5.00000	4.00000	3.00000	2.00000	1.00000
298	5	1.00	0.20	0.70	5.00000	4.00000	3.00000	2.00000	1.00000
299	5	1.00	0.20	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
300	5	1.00	0.20	0.99	5.00000	4.00000	3.00000	2.00000	1.00000

301	5	1.50	1.00	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
302	5	1.50	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
303	5	1.50	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
304	5	1.50	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
305	5	1.50	1.00	0.99	5.00000	4.00000	2.00000	3.00000	1.00000
306	5	1.50	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
307	5	1.50	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
308	5	1.50	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
309	5	1.50	0.80	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
310	5	1.50	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
311	5	1.50	0.60	0.00	5.00000	3.00000	2.00000	1.00000	4.00000
312	5	1.50	0.60	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
313	5	1.50	0.60	0.70	5.00000	4.00000	3.00000	1.00000	2.00000
314	5	1.50	0.60	0.85	5.00000	4.00000	3.00000	2.00000	1.00000
315	5	1.50	0.60	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
316	5	1.50	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
317	5	1.50	0.40	0.40	5.00000	3.00000	4.00000	1.00000	2.00000
318	5	1.50	0.40	0.70	5.00000	3.00000	4.00000	1.00000	2.00000
319	5	1.50	0.40	0.85	5.00000	3.00000	4.00000	1.00000	2.00000
320	5	1.50	0.40	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
321	5	1.50	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
322	5	1.50	0.20	0.40	5.00000	2.00000	4.00000	1.00000	3.00000
323	5	1.50	0.20	0.70	5.00000	3.00000	4.00000	1.00000	2.00000
324	5	1.50	0.20	0.85	5.00000	3.00000	4.00000	1.00000	2.00000
325	5	1.50	0.20	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
326	5	2.00	1.00	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
327	5	2.00	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
328	5	2.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
329	5	2.00	1.00	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
330	5	2.00	1.00	0.99	5.00000	4.00000	3.00000	1.00000	2.00000
331	5	2.00	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
332	5	2.00	0.80	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
333	5	2.00	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
334	5	2.00	0.80	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
335	5	2.00	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
336	5	2.00	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
337	5	2.00	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
338	5	2.00	0.60	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
339	5	2.00	0.60	0.85	5.00000	3.00000	4.00000	1.00000	2.00000
340	5	2.00	0.60	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
341	5	2.00	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
342	5	2.00	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
343	5	2.00	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
344	5	2.00	0.40	0.85	5.00000	2.00000	4.00000	1.00000	3.00000
345	5	2.00	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
346	5	2.00	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
347	5	2.00	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
348	5	2.00	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
349	5	2.00	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
350	5	2.00	0.20	0.99	5.00000	2.00000	3.00000	1.00000	4.00000
351	7	0.00	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
352	7	0.00	1.00	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
353	7	0.00	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
354	7	0.00	1.00	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
355	7	0.00	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
356	7	0.00	0.80	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
357	7	0.00	0.80	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
358	7	0.00	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
359	7	0.00	0.80	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
360	7	0.00	0.80	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
361	7	0.00	0.60	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
362	7	0.00	0.60	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
363	7	0.00	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
364	7	0.00	0.60	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
365	7	0.00	0.60	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
366	7	0.00	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
367	7	0.00	0.40	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
368	7	0.00	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
369	7	0.00	0.40	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
370	7	0.00	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
371	7	0.00	0.20	0.00	1.00000	3.00000	2.00000	5.00000	4.00000
372	7	0.00	0.20	0.40	1.00000	3.00000	2.00000	5.00000	4.00000
373	7	0.00	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
374	7	0.00	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
375	7	0.00	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
376	7	0.25	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
377	7	0.25	1.00	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
378	7	0.25	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
379	7	0.25	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
380	7	0.25	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
381	7	0.25	0.80	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
382	7	0.25	0.80	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
383	7	0.25	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
384	7	0.25	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
385	7	0.25	0.80	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
386	7	0.25	0.60	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
387	7	0.25	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
388	7	0.25	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
389	7	0.25	0.60	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
390	7	0.25	0.60	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
391	7	0.25	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
392	7	0.25	0.40	0.40	2.00000	3.00000	1.00000	4.00000	5.00000

393	7	0.25	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
394	7	0.25	0.40	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
395	7	0.25	0.40	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
396	7	0.25	0.20	0.00	1.00000	3.00000	2.00000	5.00000	4.00000
397	7	0.25	0.20	0.40	1.00000	3.00000	2.00000	5.00000	4.00000
398	7	0.25	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
399	7	0.25	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
400	7	0.25	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
401	7	0.50	1.00	0.00	1.00000	4.00000	3.00000	2.00000	5.00000
402	7	0.50	1.00	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
403	7	0.50	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
404	7	0.50	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
405	7	0.50	1.00	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
406	7	0.50	0.80	0.00	1.00000	4.00000	2.00000	2.00000	5.00000
407	7	0.50	0.80	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
408	7	0.50	0.80	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
409	7	0.50	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
410	7	0.50	0.80	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
411	7	0.50	0.60	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
412	7	0.50	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
413	7	0.50	0.60	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
414	7	0.50	0.60	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
415	7	0.50	0.60	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
416	7	0.50	0.40	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
417	7	0.50	0.40	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
418	7	0.50	0.40	0.70	2.00000	3.00000	1.00000	5.00000	4.00000
419	7	0.50	0.40	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
420	7	0.50	0.40	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
421	7	0.50	0.20	0.00	2.00000	3.00000	1.00000	5.00000	4.00000
422	7	0.50	0.20	0.40	2.00000	3.00000	1.00000	5.00000	4.00000
423	7	0.50	0.20	0.70	1.00000	3.00000	2.00000	5.00000	4.00000
424	7	0.50	0.20	0.85	1.00000	3.00000	2.00000	5.00000	4.00000
425	7	0.50	0.20	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
426	7	0.75	1.00	0.00	1.00000	4.00000	3.00000	2.00000	5.00000
427	7	0.75	1.00	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
428	7	0.75	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
429	7	0.75	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
430	7	0.75	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
431	7	0.75	0.80	0.00	3.00000	4.00000	2.00000	1.00000	5.00000
432	7	0.75	0.80	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
433	7	0.75	0.80	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
434	7	0.75	0.80	0.85	2.00000	2.00000	1.00000	4.00000	5.00000
435	7	0.75	0.80	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
436	7	0.75	0.60	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
437	7	0.75	0.60	0.40	4.00000	3.00000	1.00000	2.00000	5.00000
438	7	0.75	0.60	0.70	5.00000	2.00000	1.00000	3.00000	4.00000
439	7	0.75	0.60	0.85	2.00000	3.00000	1.00000	5.00000	4.00000
440	7	0.75	0.60	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
441	7	0.75	0.40	0.00	5.00000	3.00000	1.00000	2.00000	4.00000
442	7	0.75	0.40	0.40	5.00000	2.00000	1.00000	3.00000	4.00000
443	7	0.75	0.40	0.70	3.00000	4.00000	1.00000	5.00000	2.00000
444	7	0.75	0.40	0.85	2.00000	4.00000	1.00000	5.00000	3.00000
445	7	0.75	0.40	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
446	7	0.75	0.20	0.00	2.00000	4.00000	1.00000	5.00000	3.00000
447	7	0.75	0.20	0.40	2.00000	4.00000	1.00000	5.00000	3.00000
448	7	0.75	0.20	0.70	1.00000	4.00000	2.00000	5.00000	3.00000
449	7	0.75	0.20	0.85	1.00000	4.00000	2.00000	5.00000	3.00000
450	7	0.75	0.20	0.99	1.00000	4.00000	3.00000	5.00000	2.00000
451	7	1.00	1.00	0.00	2.00000	4.00000	3.00000	1.00000	5.00000
452	7	1.00	1.00	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
453	7	1.00	1.00	0.70	3.00000	4.00000	1.00000	2.00000	5.00000
454	7	1.00	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
455	7	1.00	1.00	0.99	1.00000	4.00000	2.00000	5.00000	3.00000
456	7	1.00	0.80	0.00	3.00000	4.00000	2.00000	1.00000	5.00000
457	7	1.00	0.80	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
458	7	1.00	0.80	0.70	4.00000	3.00000	1.00000	2.00000	5.00000
459	7	1.00	0.80	0.85	2.00000	4.00000	1.00000	3.00000	5.00000
460	7	1.00	0.80	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
461	7	1.00	0.60	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
462	7	1.00	0.60	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
463	7	1.00	0.60	0.70	5.00000	3.00000	1.00000	2.00000	4.00000
464	7	1.00	0.60	0.85	5.00000	4.00000	1.00000	3.00000	2.00000
465	7	1.00	0.60	0.99	2.00000	4.00000	3.00000	5.00000	1.00000
466	7	1.00	0.40	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
467	7	1.00	0.40	0.40	5.00000	4.00000	2.00000	1.00000	3.00000
468	7	1.00	0.40	0.70	5.00000	4.00000	2.00000	1.00000	3.00000
469	7	1.00	0.40	0.85	1.00000	5.00000	2.00000	4.00000	3.00000
470	7	1.00	0.40	0.99	2.00000	5.00000	3.00000	4.00000	1.00000
471	7	1.00	0.20	0.00	2.00000	5.00000	3.00000	1.00000	4.00000
472	7	1.00	0.20	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
473	7	1.00	0.20	0.70	1.00000	4.00000	3.00000	2.00000	5.00000
474	7	1.00	0.20	0.85	1.00000	4.00000	3.00000	2.00000	5.00000
475	7	1.00	0.20	0.99	2.00000	5.00000	4.00000	3.00000	1.00000
476	7	1.50	1.00	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
477	7	1.50	1.00	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
478	7	1.50	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
479	7	1.50	1.00	0.85	5.00000	3.00000	1.00000	2.00000	4.00000
480	7	1.50	1.00	0.99	5.00000	4.00000	2.00000	3.00000	1.00000
481	7	1.50	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
482	7	1.50	0.80	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
483	7	1.50	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
484	7	1.50	0.80	0.85	5.00000	4.00000	2.00000	1.00000	3.00000

485	7	1.50	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
486	7	1.50	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
487	7	1.50	0.60	0.40	5.00000	3.00000	2.00000	1.00000	4.00000
488	7	1.50	0.60	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
489	7	1.50	0.60	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
490	7	1.50	0.60	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
491	7	1.50	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
492	7	1.50	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
493	7	1.50	0.40	0.70	5.00000	3.00000	4.00000	1.00000	2.00000
494	7	1.50	0.40	0.85	5.00000	4.00000	3.00000	1.00000	2.00000
495	7	1.50	0.40	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
496	7	1.50	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
497	7	1.50	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
498	7	1.50	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
499	7	1.50	0.20	0.85	5.00000	2.00000	4.00000	1.00000	3.00000
500	7	1.50	0.20	0.99	5.00000	3.00000	4.00000	1 00000	2.00000
501	7	2.00	1.00	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
502	7	2.00	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
503	7	2.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
504	7	2.00	1.00	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
505	7	2.00	1.00	0.99	5.00000	4.00000	3.00000	2 00000	1.00000
506	7	2.00	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
507	7	2.00	0.80	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
508	7	2.00	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
509	7	2.00	0.80	0.85	5.00000	4.00000	2.00000	1.00000	3.00000
510	7	2.00	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
511	7	2.00	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
512	7	2.00	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
513	7	2.00	0.60	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
514	7	2.00	0.60	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
515	7	2.00	0.60	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
516	7	2.00	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
517	7	2.00	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
518	7	2.00	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
519	7	2.00	0.40	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
520	7	2.00	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
521	7	2.00	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
522	7	2.00	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
523	7	2.00	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
524	7	2.00	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
525	7	2.00	0.20	0.99	5.00000	2.00000	3.00000	1.00000	4.00000
526	10	0.00	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
527	10	0.00	1.00	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
528	10	0.00	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
529	10	0.00	1.00	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
530	10	0.00	1.00	0.39	1.00000	3.00000	2.00000	4.00000	5.00000
531	10	0.00	0.80	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
532	10	0.00	0.80	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
533	10	0.00	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
534	10	0.00	0.80	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
535	10	0.00	0.80	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
536	10	0.00	0.60	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
537	10	0.00	0.60	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
538	10	0.00	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
539	10	0.00	0.60	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
540	10	0.00	0.60	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
541	10	0.00	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
542	10	0.00	0.40	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
543	10	0.00	0.40	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
544	10	0.00	0.40	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
545	10	0.00	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
546	10	0.00	0.20	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
547	10	0.00	0.20	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
548	10	0.00	0.20	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
549	10	0.00	0.20	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
550	10	0.00	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
551	10	0.25	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
552	10	0.25	1.00	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
553	10	0.25	1.00	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
554	10	0.25	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
555	10	0.25	1.00	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
556	10	0.25	0.80	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
557	10	0.25	0.80	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
558	10	0.25	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
559	10	0.25	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
560	10	0.25	0.80	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
561	10	0.25	0.60	0.00	2.00000	2.00000	1.00000	4.00000	5.00000
562	10	0.25	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
563	10	0.25	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
564	10	0.25	0.60	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
565	10	0.25	0.60	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
566	10	0.25	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
567	10	0.25	0.40	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
568	10	0.25	0.40	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
569	10	0.25	0.40	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
570	10	0.25	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
571	10	0.25	0.20	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
572	10	0.25	0.20	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
573	10	0.25	0.20	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
574	10	0.25	0.20	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
575	10	0.25	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
576	10	0.50	1.00	0.00	1.00000	4.00000	3.00000	2.00000	5.00000

577	10	0.50	1.00	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
578	10	0.50	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
579	10	0.50	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
580	10	0.50	1.00	0.99	1.00000	3.00000	2.00000	5.00000	4.00000
581	10	0.50	0.80	0.00	3.00000	4.00000	1.00000	2.00000	5.00000
582	10	0.50	0.80	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
583	10	0.50	0.80	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
584	10	0.50	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
585	10	0.50	0.80	0.99	2.00000	3.00000	1.00000	5.00000	4.00000
586	10	0.50	0.60	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
587	10	0.50	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
588	10	0.50	0.60	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
589	10	0.50	0.60	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
590	10	0.50	0.60	0.99	2.00000	3.00000	1.00000	5.00000	4.00000
591	10	0.50	0.40	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
592	10	0.50	0.40	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
593	10	0.50	0.40	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
594	10	0.50	0.40	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
595	10	0.50	0.40	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
596	10	0.50	0.20	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
597	10	0.50	0.20	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
598	10	0.50	0.20	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
599	10	0.50	0.20	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
600	10	0.50	0.20	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
601	10	0.75	1.00	0.00	2.00000	3.00000	4.00000	1.00000	5.00000
602	10	0.75	1.00	0.40	2.00000	4.00000	3.00000	1.00000	5.00000
603	10	0.75	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
604	10	0.75	1.00	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
605	10	0.75	1.00	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
606	10	0.75	0.80	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
607	10	0.75	0.80	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
608	10	0.75	0.80	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
609	10	0.75	0.80	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
610	10	0.75	0.80	0.99	3.00000	4.00000	1.00000	5.00000	2.00000
611	10	0.75	0.60	0.00	4.00000	3.00000	1.00000	2.00000	5.00000
612	10	0.75	0.60	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
613	10	0.75	0.60	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
614	10	0.75	0.60	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
615	10	0.75	0.60	0.99	4.00000	3.00000	1.00000	5.00000	2.00000
616	10	0.75	0.40	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
617	10	0.75	0.40	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
618	10	0.75	0.40	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
619	10	0.75	0.40	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
620	10	0.75	0.40	0.99	4.00000	2.00000	1.00000	5.00000	3.00000
621	10	0.75	0.20	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
622	10	0.75	0.20	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
623	10	0.75	0.20	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
624	10	0.75	0.20	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
625	10	0.75	0.20	0.99	3.00000	2.00000	1.00000	4.00000	5.00000
626	10	1.00	1.00	0.00	2.00000	3.00000	4.00000	1.00000	5.00000
627	10	1.00	1.00	0.40	2.00000	3.00000	4.00000	1.00000	5.00000
628	10	1.00	1.00	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
629	10	1.00	1.00	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
630	10	1.00	1.00	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
631	10	1.00	0.80	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
632	10	1.00	0.80	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
633	10	1.00	0.80	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
634	10	1.00	0.80	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
635	10	1.00	0.80	0.99	2.00000	3.00000	1.00000	5.00000	4.00000
636	10	1.00	0.60	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
637	10	1.00	0.60	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
638	10	1.00	0.60	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
639	10	1.00	0.60	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
640	10	1.00	0.60	0.99	4.00000	3.00000	2.00000	5.00000	1.00000
641	10	1.00	0.40	0.00	4.00000	3.00000	1.00000	2.00000	5.00000
642	10	1.00	0.40	0.40	4.00000	3.00000	1.00000	2.00000	5.00000
643	10	1.00	0.40	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
644	10	1.00	0.40	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
645	10	1.00	0.40	0.99	4.00000	3.00000	2.00000	5.00000	1.00000
646	10	1.00	0.20	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
647	10	1.00	0.20	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
648	10	1.00	0.20	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
649	10	1.00	0.20	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
650	10	1.00	0.20	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
651	10	1.50	1.00	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
652	10	1.50	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
653	10	1.50	1.00	0.70	5.00000	3.00000	[illegible]	1.00000	4.00000
654	10	1.50	1.00	0.85	5.00000	3.00000	1.00000	2.00000	4.00000
655	10	1.50	1.00	0.99	5.00000	3.00000	1.00000	2.00000	4.00000
656	10	1.50	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
657	10	1.50	0.80	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
658	10	1.50	0.80	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
659	10	1.50	0.80	0.85	5.00000	3.00000	1.00000	2.00000	4.00000
660	10	1.50	0.80	0.99	5.00000	3.00000	1.00000	2.00000	4.00000
661	10	1.50	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
662	10	1.50	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
663	10	1.50	0.60	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
664	10	1.50	0.60	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
665	10	1.50	0.60	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
666	10	1.50	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
667	10	1.50	[illegible]40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
668	10	1.50	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000

669	10	1.50	0.40	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
670	10	1.50	0.40	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
671	10	1.50	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
672	10	1.50	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
673	10	1.50	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
674	10	1.50	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
675	10	1.50	0.20	0.99	5.00000	2.00000	3.00000	1.00000	4.00000
676	10	2.00	1.00	0.00	5.00000	1.00000	3.00000	2.00000	4.00000
677	10	2.00	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
678	10	2.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
679	10	2.00	1.00	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
680	10	2.00	1.00	0.99	5.00000	3.00000	2.00000	1.00000	4.00000
681	10	2.00	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
682	10	2.00	0.80	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
683	10	2.00	0.80	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
684	10	2.00	0.80	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
685	10	2.00	0.60	0.99	5.00000	3.00000	2.00000	1.00000	4.00000
686	10	2.00	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
687	10	2.00	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
688	10	2.00	0.60	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
689	10	2.00	0.60	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
690	10	2.00	0.60	0.99	5.00000	2.00000	3.00000	1.00000	4.00000
691	10	2.00	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
692	10	2.00	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
693	10	2.00	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
694	10	2.00	0.40	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
695	10	2.00	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
696	10	2.00	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
697	10	2.00	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
698	10	2.00	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
699	10	2.00	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
700	10	2.00	0.20	0.99	5.00000	2.00000	3.00000	1.00000	4.00000
701	15	0.00	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
702	15	0.00	1.00	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
703	15	0.00	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
704	15	0.00	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
705	15	0.00	1.00	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
706	15	0.00	0.80	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
707	15	0.00	0.80	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
708	15	0.00	0.80	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
709	15	0.00	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
710	15	0.00	0.80	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
711	15	0.00	0.60	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
712	15	0.00	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
713	15	0.00	0.60	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
714	15	0.00	0.60	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
715	15	0.00	0.60	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
716	15	0.00	0.40	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
717	15	0.00	0.40	0.40	2.00000	3.00000	1.00000	4.00000	5.00000
718	15	0.00	0.40	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
719	15	0.00	0.40	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
720	15	0.00	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
721	15	0.00	0.20	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
722	15	0.00	0.20	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
723	15	0.00	0.20	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
724	15	0.00	0.20	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
725	15	0.00	0.20	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
726	15	0.25	1.00	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
727	15	0.25	1.00	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
728	15	0.25	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
729	15	0.25	1.00	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
730	15	0.25	1.00	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
731	15	0.25	0.80	0.00	2.00000	3.00000	1.00000	4.00000	5.00000
732	15	0.25	0.80	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
733	15	0.25	0.80	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
734	15	0.25	0.80	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
735	15	0.25	0.80	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
736	15	0.25	0.60	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
737	15	0.25	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
738	15	0.25	0.60	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
739	15	0.25	0.60	0.85	2.00000	3.00000	1.00000	4.00000	5.00000
740	15	0.25	0.60	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
741	15	0.25	0.40	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
742	15	0.25	0.40	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
743	15	0.25	0.40	0.70	2.00000	3.00000	1.00000	4.00000	5.00000
744	15	0.25	0.40	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
745	15	0.25	0.40	0.99	1.00000	3.00000	2.00000	4.00000	5.00000
746	15	0.25	0.20	0.00	1.00000	3.00000	2.00000	4.00000	5.00000
747	15	0.25	0.20	0.40	1.00000	3.00000	2.00000	4.00000	5.00000
748	15	0.25	0.20	0.70	1.00000	3.00000	2.00000	4.00000	5.00000
749	15	0.25	0.20	0.85	1.00000	3.00000	2.00000	4.00000	5.00000
750	15	0.25	0.20	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
751	15	0.50	1.00	0.00	1.00000	4.00000	3.00000	2.00000	5.00000
752	15	0.50	1.00	0.40	2.00000	2.00000	1.00000	4.00000	5.00000
753	15	0.50	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
754	15	0.50	1.00	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
755	15	0.50	1.00	0.99	2.00000	3.00000	1.00000	5.00000	4.00000
756	15	0.50	0.80	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
757	15	0.50	0.80	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
758	15	0.50	0.80	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
759	15	0.50	0.80	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
760	15	0.50	0.80	0.99	2.00000	3.00000	1.00000	5.00000	4.00000

761	15	0.50	0.60	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
762	15	0.50	0.60	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
763	15	0.50	0.60	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
764	15	0.50	0.60	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
765	15	0.50	0.60	0.99	3.00000	2.00000	1.00000	5.00000	4.00000
766	15	0.50	0.40	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
767	15	0.50	0.40	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
768	15	0.50	0.40	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
769	15	0.50	0.40	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
770	15	0.50	0.40	0.99	3.00000	2.00000	1.00000	5.00000	4.00000
771	15	0.50	0.20	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
772	15	0.50	0.20	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
773	15	0.50	0.20	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
774	15	0.50	0.20	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
775	15	0.50	0.20	0.99	3.00000	2.00000	1.00000	4.00000	5.00000
776	15	0.75	1.00	0.00	2.00000	3.00000	4.00000	1.00000	5.00000
777	15	0.75	1.00	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
778	15	0.75	1.00	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
779	15	0.75	1.00	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
780	15	0.75	1.00	0.99	3.00000	2.00000	1.00000	5.00000	4.00000
781	15	0.75	0.80	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
782	15	0.75	0.80	0.40	4.00000	3.00000	1.00000	2.00000	5.00000
783	15	0.75	0.80	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
784	15	0.75	0.80	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
785	15	0.75	0.80	0.99	4.00000	2.00000	1.00000	5.00000	3.00000
786	15	0.75	0.60	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
787	15	0.75	0.60	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
788	15	0.75	0.60	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
789	15	0.75	0.60	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
790	15	0.75	0.60	0.99	4.00000	2.00000	1.00000	5.00000	3.00000
791	15	0.75	0.40	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
792	15	0.75	0.40	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
793	15	0.75	0.40	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
794	15	0.75	0.40	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
795	15	0.75	0.40	0.99	4.00000	2.00000	1.00000	5.00000	3.00000
796	15	0.75	0.20	0.00	3.00000	2.00000	1.00000	4.00000	5.00000
797	15	0.75	0.20	0.40	3.00000	2.00000	1.00000	4.00000	5.00000
798	15	0.75	0.20	0.70	3.00000	2.00000	1.00000	4.00000	5.00000
799	15	0.75	0.20	0.85	3.00000	2.00000	1.00000	4.00000	5.00000
800	15	0.75	0.20	0.99	3.00000	2.00000	1.00000	4.00000	5.00000
801	15	1.00	1.00	0.00	2.00000	3.00000	4.00000	1.00000	5.00000
802	15	1.00	1.00	0.40	3.00000	2.00000	4.00000	1.00000	5.00000
803	15	1.00	1.00	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
804	15	1.00	1.00	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
805	15	1.00	1.00	0.99	4.00000	3.00000	1.00000	5.00000	2.00000
806	15	1.00	0.80	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
807	15	1.00	0.80	0.40	4.00000	3.00000	2.00000	1.00000	5.00000
808	15	1.00	0.80	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
809	15	1.00	0.80	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
810	15	1.00	0.80	0.99	4.00000	3.00000	1.00000	5.00000	2.00000
811	15	1.00	0.60	0.00	4.00000	3.00000	2.00000	1.00000	5.00000
812	15	1.00	0.60	0.40	4.00000	3.00000	1.00000	2.00000	5.00000
813	15	1.00	0.60	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
814	15	1.00	0.60	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
815	15	1.00	0.60	0.99	4.00000	3.00000	2.00000	5.00000	1.00000
816	15	1.00	0.40	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
817	15	1.00	0.40	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
818	15	1.00	0.40	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
819	15	1.00	0.40	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
820	15	1.00	0.40	0.99	4.00000	3.00000	2.00000	5.00000	1.00000
821	15	1.00	0.20	0.00	4.00000	2.00000	1.00000	3.00000	5.00000
822	15	1.00	0.20	0.40	4.00000	2.00000	1.00000	3.00000	5.00000
823	15	1.00	0.20	0.70	4.00000	2.00000	1.00000	3.00000	5.00000
824	15	1.00	0.20	0.85	4.00000	2.00000	1.00000	3.00000	5.00000
825	15	1.00	0.20	0.99	5.00000	2.00000	1.00000	4.00000	3.00000
826	15	1.50	1.00	0.00	2.00000	3.00000	4.00000	1.00000	5.00000
827	15	1.50	1.00	0.40	3.00000	2.00000	4.00000	1.00000	5.00000
828	15	1.50	1.00	0.70	4.00000	3.00000	2.00000	1.00000	5.00000
829	15	1.50	1.00	0.85	4.00000	3.00000	1.00000	2.00000	5.00000
830	15	1.50	1.00	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
831	15	1.50	0.80	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
832	15	1.50	0.80	0.40	4.00000	2.00000	3.00000	1.00000	5.00000
833	15	1.50	0.80	0.70	4.00000	3.00000	2.00000	1.00000	5.00000
834	15	1.50	0.80	0.85	4.00000	3.00000	1.00000	2.00000	5.00000
835	15	1.50	0.80	0.99	2.00000	3.00000	1.00000	4.00000	5.00000
836	15	1.50	0.60	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
837	15	1.50	0.60	0.40	4.00000	2.00000	3.00000	1.00000	5.00000
838	15	1.50	0.30	0.70	4.00000	3.00000	2.00000	1.00000	5.00000
839	15	1.50	0.60	0.85	4.00000	3.00000	2.00000	1.00000	5.00000
840	15	1.50	0.60	0.99	2.00000	5.00000	3.00000	4.00000	1.00000
841	15	1.50	0.40	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
842	15	1.50	0.40	0.40	4.00000	2.00000	3.00000	1.00000	5.00000
843	15	1.50	0.40	0.70	4.00000	2.00000	3.00000	1.00000	5.00000
844	15	1.50	0.40	0.85	4.00000	2.00000	3.00000	1.00000	5.00000
845	15	1.50	0.40	0.99	2.00000	4.00000	5.00000	3.00000	1.00000
846	15	1.50	0.20	0.00	4.00000	2.00000	3.00000	1.00000	5.00000
847	15	1.50	0.20	0.40	4.00000	2.00000	3.00000	1.00000	5.00000
848	15	1.50	0.20	0.70	4.00000	2.00000	3.00000	1.00000	5.00000
849	15	1.50	0.20	0.85	2.00000	3.00000	4.00000	1.00000	5.00000
850	15	1.50	0.20	0.99	2.00000	3.00000	4.00000	1.00000	5.00000
851	15	2.00	1.00	0.00	5.00000	1.00000	3.00000	2.00000	4.00000
852	15	2.00	1.00	0.40	5.00000	2.00000	3.00000	1.00000	4.00000

853	15	2.00	1.00	0.70	5.00000	3.00000	2.00000	1.00000	4.00000
854	15	2.00	1.00	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
855	15	2.00	1.00	0.99	5.00000	3.00000	1.00000	2.00000	4.00000
856	15	2.00	0.80	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
857	15	2.00	0.80	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
858	15	2.00	0.80	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
859	15	2.00	0.80	0.85	5.00000	3.00000	2.00000	1.00000	4.00000
860	15	2.00	0.80	0.99	5.00000	4.00000	3.00000	2.00000	1.00000
861	15	2.00	0.60	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
862	15	2.00	0.60	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
863	15	2.00	0.60	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
864	15	2.00	0.60	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
865	15	2.00	0.60	0.99	5.00000	3.00000	4.00000	2.00000	1.00000
866	15	2.00	0.40	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
867	15	2.00	0.40	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
868	15	2.00	0.40	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
869	15	2.00	0.40	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
870	15	2.00	0.40	0.99	5.00000	3.00000	4.00000	1.00000	2.00000
871	15	2.00	0.20	0.00	5.00000	2.00000	3.00000	1.00000	4.00000
872	15	2.00	0.20	0.40	5.00000	2.00000	3.00000	1.00000	4.00000
873	15	2.00	0.20	0.70	5.00000	2.00000	3.00000	1.00000	4.00000
874	15	2.00	0.20	0.85	5.00000	2.00000	3.00000	1.00000	4.00000
875	15	2.00	0.20	0.99	5.00000	2.00000	3.00000	1.00000	4.00000

Appendix O. SAS Code for Least Squares Analysis

This Appendix contains the SAS code necessary to generate the coefficients used in modelling the CBN technique's $\overline{RE}'$. That model was then applied to the CBN technique to correct its $\overline{RE}'$.

```
options ls=75;
TITLE 'Regression  Analysis of CBN Mean Relative Error';
FILENAME NEW 'RE2';
DATA EXAMPLE;
 INFILE NEW;
INPUT  DP SS BIAS STDR CORR R234  GRUBBS  CBN RAYLEIGH  ETHRIDGE;
DROP DP;
DROP R234;
DROP RAYLEIGH;
DROP GRUBBS;
DROP ETHRIDGE;

SS1 = SS*BIAS;
 SS2 = SS*STDR;
 SS3 = SS*CORR;
BIAS1 = BIAS*STDR;
 BIAS2 = BIAS*CORR;
 STDR1 = STDR*CORR;
 BIAS3 = BIAS*STDR*CORR;
STDR2 = STDR*CORR*SS;
 STDR3 = SS*BIAS*STDR*CORR;
BIAS4 = BIAS*STDR*SS;
BIAS5 = BIAS*CORR*SS;

SS_SQR =  SS*SS;
 BIAS_SQR = BIAS*BIAS;
 STDR_SQR = STDR*STDR;
 CORR_SQR = CORR*CORR;
 SS_CUB =  SS*SS*SS;
BIAS_CUB = BIAS*BIAS*BIAS;
STDR_CUB = STDR*STDR*STDR;
CORR_CUB = CORR*CORR*CORR;


proc reg;
     model CBN =SS BIAS STDR  BIAS1 BIAS2 STDR1 SS1
           SS2 SS3 BIAS3  STDR2  BIAS4  BIAS5
               STDR3  SS_SQR BIAS_SQR STDR_SQR
                  CORR_SQR SS_CUB   CORR
                 BIAS_CUB STDR_CUB CORR_CUB   / vif;

proc reg;
     model CBN = SS BIAS STDR  BIAS1 BIAS2 STDR1 SS1
           SS2 SS3 BIAS3  STDR2  BIAS4  BIAS5
               STDR3  SS_SQR BIAS_SQR STDR_SQR
                  CORR_SQR SS_CUB   CORR
                 BIAS_CUB STDR_CUB CORR_CUB   /  vif
                                   selection=cp;

proc reg;
     model CBN= SS BIAS STDR  BIAS1 BIAS2 STDR1 SS1
           SS2 SS3 BIAS3  STDR2  BIAS4  BIAS5
               STDR3  SS_SQR BIAS_SQR STDR_SQR
                  CORR_SQR SS_CUB   CORR
                 BIAS_CUB STDR_CUB CORR_CUB   / selection=stepwise
                                        sle=0.15  sls=0.15
                                        details;
```

Appendix P. Raw Mean Relative Error Data for MCBN Analysis

This Appendix lists the $\overline{RE}^i$ for each of the 875 test design points used in analysing the MCBN technique. The names of the four parameters and the names of the four CEP estimation methods for this experiment are abbreviated in the table headings as follows:

<u>Index</u>

Design Point - DP

<u>Parameters</u>

Sample Size - SS

Bias - BIAS

Ratio of Standard Deviations - STDR

Correlation - CORR

<u>Estimation Methods</u>

RAND-234 - R234

Modified CBN - MCBN

CBN - CBN

Rayleigh method - RAYL

DP	SS	BIAS	STDR	CORR	R234	MCBN	CBN	RAYL
1	3	0.00	1.00	0.00	0.0028	-0.0862	0.0312	-0.0021
2	3	0.00	1.00	0.40	0.0101	-0.0569	0.0425	0.0122
3	3	0.00	1.00	0.70	0.0432	-0.0079	0.0801	0.0586
4	3	0.00	1.00	0.85	0.0702	0.0275	0.1134	0.0998
5	3	0.00	1.00	0.99	0.0557	0.0353	0.1354	0.1217
6	3	0.00	0.80	0.00	0.0087	-0.0811	0.0372	0.0046
7	3	0.00	0.80	0.40	0.0148	-0.0511	0.0491	0.0198
8	3	0.00	0.80	0.70	0.0472	-0.0021	0.0849	0.0644
9	3	0.00	0.80	0.65	0.0704	0.0333	0.1163	0.1031
10	3	0.00	0.80	0.99	0.0562	0.0502	0.1375	0.1238
11	3	0.00	0.60	0.00	0.0238	-0.0654	0.0547	0.0259
12	3	0.00	0.60	0.40	0.0337	-0.0321	0.0673	0.0417
13	3	0.00	0.60	0.70	0.0584	0.0177	0.0996	0.0817
14	3	0.00	0.60	0.85	0.0742	0.0522	0.1257	0.1131
15	3	0.00	0.60	0.99	0.0567	0.0714	0.1382	0.1234
16	3	0.00	0.40	0.00	0.0479	-0.0314	0.0925	0.0718
17	3	0.00	0.40	0.40	0.0576	0.0062	0.1026	0.0845
18	3	0.00	0.40	0.70	0.0695	0.0519	0.1237	0.1104
19	3	0.00	0.40	0.85	0.0714	0.0770	0.1349	0.1236
20	3	0.00	0.40	0.99	0.0543	0.0911	0.1369	0.1210
21	3	0.00	0.20	0.00	0.0723	0.0093	0.1361	0.1241
22	3	0.00	0.20	0.40	0.0710	0.0460	0.1364	0.1241
23	3	0.00	0.20	0.70	0.0648	0.0816	0.1385	0.1270
24	3	0.00	0.20	0.85	0.0578	0.0996	0.1386	0.1259
25	3	0.00	0.20	0.99	0.0450	0.1156	0.1401	0.1224
26	3	0.25	1.00	0.00	0.0019	-0.0831	0.0329	-0.0040
27	3	0.25	1.00	0.40	0.0088	-0.0547	0.0433	0.0100

28	3	0.25	1.00	0.70	0.0369	-0.0088	0.0776	0.0531
29	3	0.25	1.00	0.85	0.0636	0.0250	0.1090	0.0933
30	3	0.25	1.00	0.99	0.0641	0.0399	0.1381	0.1287
31	3	0.25	0.80	0.00	0.0076	-0.0769	0.0400	0.0038
32	3	0.25	0.80	0.40	0.0178	-0.0477	0.0511	0.0184
33	3	0.25	0.80	0.70	0.0439	-0.0002	0.0852	0.0615
34	3	0.25	0.80	0.85	0.0703	0.0331	0.1143	0.0990
35	3	0.25	0.80	0.99	0.0626	0.0517	0.1381	0.1258
36	3	0.25	0.60	0.00	0.0229	-0.0588	0.0598	0.0268
37	3	0.25	0.60	0.40	0.0327	-0.0277	0.0702	0.0418
38	3	0.25	0.60	0.70	0.0606	0.0201	0.1005	0.0799
39	3	0.25	0.60	0.85	0.0831	0.0542	0.1259	0.1109
40	3	0.25	0.60	0.99	0.0571	0.0761	0.1420	0.1278
41	3	0.25	0.40	0.00	0.0578	-0.0252	0.0969	0.0726
42	3	0.25	0.40	0.40	0.0652	0.0103	0.1050	0.0840
43	3	0.25	0.40	0.70	0.0799	0.0553	0.1254	0.1090
44	3	0.25	0.40	0.85	0.0736	0.0812	0.1375	0.1232
45	3	0.25	0.40	0.99	0.0510	0.0950	0.1392	0.1235
46	3	0.25	0.20	0.00	0.0707	0.0155	0.1395	0.1234
47	3	0.25	0.20	0.40	0.0695	0.0521	0.1391	0.1241
48	3	0.25	0.20	0.70	0.0615	0.0875	0.1422	0.1257
49	3	0.25	0.20	0.85	0.0570	0.1080	0.1451	0.1270
50	3	0.25	0.20	0.99	0.0447	0.1162	0.1398	0.1186
51	3	0.50	1.00	0.00	1.0000	-0.0760	0.0358	-0.0059
52	3	0.50	1.00	0.40	1.0000	-0.0505	0.0435	0.0051
53	3	0.50	1.00	0.70	1.0000	-0.0124	0.0695	0.0407
54	3	0.50	1.00	0.85	1.0000	0.0181	0.0974	0.0785
55	3	0.50	1.00	0.99	1.0000	0.0431	0.1377	0.1326
56	3	0.50	0.80	0.00	1.0000	-0.0673	0.0453	0.0041
57	3	0.50	0.80	0.40	1.0000	-0.0412	0.0538	0.0167
58	3	0.50	0.80	0.70	1.0000	-0.0002	0.0810	0.0533
59	3	0.50	0.80	0.85	1.0000	0.0302	0.1070	0.0877
60	3	0.50	0.80	0.99	1.0000	0.0576	0.1401	0.1335
61	3	0.50	0.60	0.00	1.0000	-0.0483	0.0660	0.0297
62	3	0.50	0.60	0.40	1.0000	-0.0181	0.0762	0.0428
63	3	0.50	0.60	0.70	1.0000	0.0244	0.1008	0.0757
64	3	0.50	0.60	0.85	1.0000	0.0539	0.1224	0.1038
65	3	0.50	0.60	0.99	1.0000	0.0797	0.1423	0.1296
66	3	0.50	0.40	0.00	1.0000	-0.0120	0.1051	0.0755
67	3	0.50	0.40	0.40	1.0000	0.0221	0.1124	0.0860
68	3	0.50	0.40	0.70	1.0000	0.0630	0.1290	0.1076
69	3	0.50	0.40	0.85	1.0000	0.0876	0.1399	0.1204
70	3	0.50	0.40	0.99	1.0000	0.1026	0.1444	0.1273
71	3	0.50	0.20	0.00	1.0000	0.0265	0.1434	0.1209
72	3	0.50	0.20	0.40	1.0000	0.0656	0.1472	0.1235
73	3	0.50	0.20	0.70	1.0000	0.0953	0.1453	0.1237
74	3	0.50	0.20	0.85	1.0000	0.1133	0.1462	0.1231
75	3	0.50	0.20	0.99	1.0000	0.1289	0.1476	0.1214
76	3	0.75	1.00	0.00	1.0000	-0.0663	0.0388	-0.0104
77	3	0.75	1.00	0.40	1.0000	-0.0475	0.0403	-0.0033
78	3	0.75	1.00	0.70	1.0000	-0.0161	0.0597	0.0259
79	3	0.75	1.00	0.85	1.0000	0.0114	0.0846	0.0614
80	3	0.75	1.00	0.99	1.0000	0.0501	0.1379	0.1275
81	3	0.75	0.80	0.00	1.0000	-0.0567	0.0495	0.0036
82	3	0.75	0.80	0.40	1.0000	-0.0340	0.0549	0.0124
83	3	0.75	0.80	0.70	1.0000	-0.0009	0.0743	0.0414
84	3	0.75	0.80	0.85	1.0000	0.0259	0.0976	0.0737
85	3	0.75	0.80	0.99	1.0000	0.0577	0.1359	0.1273
86	3	0.75	0.60	0.00	1.0000	-0.0345	0.0728	0.0308
87	3	0.75	0.60	0.40	1.0000	-0.0078	0.0800	0.0398
88	3	0.75	0.60	0.70	1.0000	0.0280	0.0985	0.0670
89	3	0.75	0.60	0.85	1.0000	0.0563	0.1184	0.0939
90	3	0.75	0.60	0.99	1.0000	0.0804	0.1385	0.1260
91	3	0.75	0.40	0.00	1.0000	0.0013	0.1106	0.0756
92	3	0.75	0.40	0.40	1.0000	0.0331	0.1168	0.0835
93	3	0.75	0.40	0.70	1.0000	0.0676	0.1284	0.1000
94	3	0.75	0.40	0.85	1.0000	0.0885	0.1363	0.1113
95	3	0.75	0.40	0.99	1.0000	0.1043	0.1423	0.1193
96	3	0.75	0.20	0.00	1.0000	0.0372	0.1445	0.1138
97	3	0.75	0.20	0.40	1.0000	0.0731	0.1466	0.1143
98	3	0.75	0.20	0.70	1.0000	0.1035	0.1465	0.1161
99	3	0.75	0.20	0.85	1.0000	0.1208	0.1474	0.1173
100	3	0.75	0.20	0.99	1.0000	0.1277	0.1434	0.1134
101	3	1.00	1.00	0.00	1.0000	-0.0650	0.0313	-0.0188
102	3	1.00	1.00	0.40	1.0000	-0.0463	0.0339	-0.0132
103	3	1.00	1.00	0.70	1.0000	-0.0186	0.0500	0.0124
104	3	1.00	1.00	0.85	1.0000	0.0069	0.0741	0.0469
105	3	1.00	1.00	0.99	1.0000	0.0391	0.1225	0.1132
106	3	1.00	0.80	0.00	1.0000	-0.0500	0.0472	-0.0029
107	3	1.00	0.80	0.40	1.0000	-0.0308	0.0505	0.0042
108	3	1.00	0.80	0.70	1.0000	-0.0017	0.0663	0.0288
109	3	1.00	0.80	0.85	1.0000	0.0258	0.0899	0.0617
110	3	1.00	0.80	0.99	1.0000	0.0543	0.1271	0.1162
111	3	1.00	0.60	0.00	1.0000	-0.0236	0.0748	0.0264
112	3	1.00	0.60	0.40	1.0000	-0.0038	0.0760	0.0326
113	3	1.00	0.60	0.70	1.0000	0.0287	0.0918	0.0555
114	3	1.00	0.60	0.85	1.0000	0.0531	0.1094	0.0803
115	3	1.00	0.60	0.99	1.0000	0.0789	0.1311	0.1149
116	3	1.00	0.40	0.00	1.0000	0.0093	0.1082	0.0675
117	3	1.00	0.40	0.40	1.0000	0.0383	0.1131	0.0731
118	3	1.00	0.40	0.70	1.0000	0.0678	0.1212	0.0856
119	3	1.00	0.40	0.85	1.0000	0.0889	0.1299	0.0973

120	3	1.00	0.40	0.99	1.0000	0.1028	0.1344	0.1075
121	3	1.00	0.20	0.00	1.0000	0.0388	0.1345	0.0943
122	3	1.00	0.20	0.40	1.0000	0.0752	0.1380	0.0964
123	3	1.00	0.20	0.70	1.0000	0.1005	0.1364	0.0962
124	3	1.00	0.20	0.85	1.0000	0.1160	0.1367	0.0968
125	3	1.00	0.20	0.99	1.0000	0.1197	0.1314	0.0933
126	3	1.50	1.00	0.00	1.0000	-0.0626	0.0141	-0.0404
127	3	1.50	1.00	0.40	1.0000	-0.0471	0.0163	-0.0341
128	3	1.50	1.00	0.70	1.0000	-0.0185	0.0350	-0.0071
129	3	1.50	1.00	0.85	1.0000	0.0037	0.0570	0.0237
130	3	1.50	1.00	0.99	1.0000	0.0239	0.0961	0.0817
131	3	1.50	0.80	0.00	1.0000	-0.0490	0.0279	-0.0265
132	3	1.50	0.80	0.40	1.0000	-0.0304	0.0332	-0.0186
133	3	1.50	0.80	0.70	1.0000	-0.0035	0.0489	0.0065
134	3	1.50	0.80	0.85	1.0000	0.0204	0.0709	0.0362
135	3	1.50	0.80	0.99	1.0000	0.0410	0.1004	0.0817
136	3	1.50	0.60	0.00	1.0000	-0.0256	0.0502	-0.0017
137	3	1.50	0.60	0.40	1.0000	-0.0065	0.0544	0.0045
138	3	1.50	0.60	0.70	1.0000	0.0203	0.0682	0.0250
139	3	1.50	0.60	0.85	1.0000	0.0433	0.0860	0.0474
140	3	1.50	0.60	0.99	1.0000	0.0623	0.1035	0.0774
141	3	1.50	0.40	0.00	1.0000	-0.0004	0.0736	0.0232
142	3	1.50	0.40	0.40	1.0000	0.0267	0.0804	0.0292
143	3	1.50	0.40	0.70	1.0000	0.0504	0.0864	0.0414
144	3	1.50	0.40	0.85	1.0000	0.0652	0.0912	0.0503
145	3	1.50	0.40	0.99	1.0000	0.0753	0.0958	0.0613
146	3	1.50	0.20	0.00	1.0000	0.0209	0.0891	0.0338
147	3	1.50	0.20	0.40	1.0000	0.0542	0.0939	0.0397
148	3	1.50	0.20	0.70	1.0000	0.0794	0.0946	0.0419
149	3	1.50	0.20	0.85	1.0000	0.0834	0.0897	0.0382
150	3	1.50	0.20	0.99	1.0000	0.0837	0.0841	0.0363
151	3	2.00	1.00	0.00	1.0000	-0.0558	0.0012	-0.0544
152	3	2.00	1.00	0.40	1.0000	-0.0389	0.0073	-0.0455
153	3	2.00	1.00	0.70	1.0000	-0.0142	0.0238	-0.0201
154	3	2.00	1.00	0.85	1.0000	0.0027	0.0428	0.0063
155	3	2.00	1.00	0.99	1.0000	0.0103	0.0709	0.0477
156	3	2.00	0.80	0.00	1.0000	-0.0468	0.0099	-0.0442
157	3	2.00	0.80	0.40	1.0000	-0.029[illegible]	0.0160	-0.0368
158	3	2.00	0.80	0.70	1.0000	-0.0059	0.0317	-0.0131
159	3	2.00	0.80	0.85	1.0000	0.0114	0.0482	0.0104
160	3	2.00	0.80	0.99	1.0000	0.0191	0.0693	0.0429
161	3	2.00	0.60	0.00	1.0000	-0.0347	0.0201	-0.0332
162	3	2.00	0.60	0.40	1.0000	-0.0161	0.0267	-0.0262
163	3	2.00	0.60	0.70	1.0000	0.0105	0.0419	-0.0052
164	3	2.00	0.60	0.85	1.0000	0.0248	0.0515	0.0109
165	3	2.00	0.60	0.99	1.0000	0.0301	0.0601	0.0295
166	3	2.00	0.40	0.00	1.0000	-0.0161	0.0333	-0.0232
167	3	2.00	0.40	0.40	1.0000	0.0039	0.0385	-0.0178
168	3	2.00	0.40	0.70	1.0000	0.0278	0.0463	-0.0045
169	3	2.00	0.40	0.85	1.0000	0.0409	0.0512	0.0030
170	3	2.00	0.40	0.99	1.0000	0.0403	0.0506	0.0104
171	3	2.00	0.20	0.00	1.0000	0.0026	0.0448	-0.0198
172	3	2.00	0.20	0.40	1.0000	0.0238	0.0444	-0.0165
173	3	2.00	0.20	0.70	1.0000	0.0397	0.0419	-0.0152
174	3	2.00	0.20	0.85	1.0000	0.0479	0.0402	-0.0151
175	3	2.00	0.20	0.99	1.0000	0.0587	0.0508	-0.0083
176	5	0.00	1.00	0.00	0.0087	-0.0891	0.0194	-0.0025
177	5	0.00	1.00	0.40	0.0159	-0.0673	0.0241	0.0119
178	5	0.00	1.00	0.70	0.0435	-0.0376	0.0447	0.0584
179	5	0.00	1.00	0.85	0.0623	-0.0170	0.0643	0.0997
180	5	0.00	1.00	0.99	0.0256	-0.0128	0.0758	0.1234
181	5	0.00	0.80	0.00	0.0133	-0.0864	0.0228	0.0044
182	5	0.00	0.80	0.40	0.0215	-0.0628	0.0280	0.0196
183	5	0.00	0.80	0.70	0.0472	-0.0327	0.0474	0.0642
184	5	0.00	0.80	0.85	0.0640	-0.0112	0.0661	0.1030
185	5	0.00	0.80	0.99	0.0261	0.0001	0.0764	0.1237
186	5	0.00	0.60	0.00	0.0270	-0.0785	0.0316	0.0257
187	5	0.00	0.60	0.40	0.0357	-0.0503	0.0381	0.0415
188	5	0.00	0.60	0.70	0.0569	-0.0173	0.0562	0.0815
189	5	0.00	0.60	0.85	0.0674	0.0053	0.0718	0.1131
190	5	0.00	0.60	0.99	0.0249	0.0179	0.0768	0.1234
191	5	0.00	0.40	0.00	0.0541	-0.0594	0.0530	0.0717
192	5	0.00	0.40	0.40	0.0604	-0.0252	0.0589	0.0843
193	5	0.00	0.40	0.70	0.0683	0.0082	0.0712	0.1104
194	5	0.00	0.40	0.85	0.0592	0.0245	0.0765	0.1235
195	5	0.00	0.40	0.99	0.0192	0.0374	0.0789	0.1232
196	5	0.00	0.20	0.00	0.0629	-0.0370	0.0784	0.1241
197	5	0.00	0.20	0.40	0.0567	-0.0011	0.0770	0.1241
198	5	0.00	0.20	0.70	0.0479	0.0278	0.0783	0.1270
199	5	0.00	0.20	0.85	0.0364	0.0405	0.0775	0.1259
200	5	0.00	0.20	0.99	0.0094	0.0550	0.0792	0.1235
201	5	0.25	1.00	0.00	0.0104	-0.0866	0.0205	-0.0043
202	5	0.25	1.00	0.40	0.0168	-0.0649	0.0254	0.0096
203	5	0.25	1.00	0.70	0.0397	-0.0376	0.0437	0.0529
204	5	0.25	1.00	0.85	0.0586	-0.0183	0.0620	0.0932
205	5	0.25	1.00	0.99	0.0279	-0.0106	0.0773	0.1291
206	5	0.25	0.80	0.00	0.0166	-0.0832	0.0246	0.0036
207	5	0.25	0.80	0.40	0.0238	-0.0601	0.0298	0.0181
208	5	0.25	0.80	0.70	0.0471	-0.0306	0.0485	0.0613
209	5	0.25	0.80	0.85	0.0642	-0.0108	0.0656	0.0989
210	5	0.25	0.80	0.99	0.0293	0.0025	0.0782	0.1280
211	5	0.25	0.60	0.00	0.0313	-0.0737	0.0352	0.0266

212	5	0.25	0.60	0.40	0.0397	-0.0464	0.0411	0.0415
213	5	0.25	0.60	0.70	0.0591	-0.0148	0.0579	0.0797
214	5	0.25	0.60	0.85	0.0666	0.0072	0.0729	0.1109
215	5	0.25	0.60	0.99	0.0309	0.0223	0.0808	0.1282
216	5	0.25	0.40	0.00	0.0593	-0.0543	0.0569	0.0724
217	5	0.25	0.40	0.40	0.0637	-0.0215	0.0616	0.0838
218	5	0.25	0.40	0.70	0.0701	0.0112	0.0731	0.1089
219	5	0.25	0.40	0.85	0.0662	0.0281	0.0795	0.1231
220	5	0.25	0.40	0.99	0.0251	0.0402	0.0811	0.1263
221	5	0.25	0.20	0.00	0.0708	-0.0319	0.0820	0.1238
222	5	0.25	0.20	0.40	0.0660	0.0040	0.0810	0.1240
223	5	0.25	0.20	0.70	0.0553	0.0313	0.0811	0.1256
224	5	0.25	0.20	0.85	0.0434	0.0461	0.0824	0.1270
225	5	0.25	0.20	0.99	0.0134	0.0590	0.0826	0.1243
226	5	0.50	1.00	0.00	0.0151	-0.0794	0.0241	-0.0063
227	5	0.50	1.00	0.40	0.0178	-0.0604	0.0269	0.0047
228	5	0.50	1.00	0.70	0.0327	-0.0384	0.0401	0.0405
229	5	0.50	1.00	0.85	0.0427	-0.0210	0.0565	0.0783
230	5	0.50	1.00	0.99	0.0248	-0.0065	0.0798	0.1330
231	5	0.50	0.80	0.00	0.0243	-0.0743	0.0300	0.0043
232	5	0.50	0.80	0.40	0.0296	-0.0533	0.0336	0.0164
233	5	0.50	0.80	0.70	0.0451	-0.0284	0.0482	0.0531
234	5	0.50	0.80	0.85	0.0523	-0.0108	0.0631	0.0875
235	5	0.50	0.80	0.99	0.0289	0.0084	0.0826	0.1333
236	5	0.50	0.60	0.00	0.0439	-0.0629	0.0426	0.0295
237	5	0.50	0.60	0.40	0.0499	-0.0373	0.0475	0.0426
238	5	0.50	0.60	0.70	0.0612	-0.0092	0.0612	0.0755
239	5	0.50	0.60	0.85	0.0656	0.0109	0.0746	0.1043
240	5	0.50	0.60	0.99	0.0311	0.0260	0.0830	0.1303
241	5	0.50	0.40	0.00	0.0704	-0.0418	0.0656	0.0754
242	5	0.50	0.40	0.40	0.0742	-0.0103	0.0699	0.0858
243	5	0.50	0.40	0.70	0.0779	0.0198	0.0796	0.1075
244	5	0.50	0.40	0.85	0.0725	0.0354	0.0849	0.1202
245	5	0.50	0.40	0.99	0.0308	0.0479	0.0874	0.1285
246	5	0.50	0.20	0.00	0.0808	-0.0214	0.0881	0.1208
247	5	0.50	0.20	0.40	0.0780	0.0157	0.0896	0.1234
248	5	0.50	0.20	0.70	0.0666	0.0416	0.0889	0.1242
249	5	0.50	0.20	0.85	0.0511	0.0545	0.0889	0.1248
250	5	0.50	0.20	0.99	0.0206	0.0675	0.0896	0.1249
251	5	0.75	1.00	0.00	0.0170	-0.0716	0.0262	-0.0111
252	5	0.75	1.00	0.40	0.0170	-0.0562	0.0265	-0.0037
253	5	0.75	1.00	0.70	0.0223	-0.0388	0.0357	0.0256
254	5	0.75	1.00	0.85	0.0291	-0.0233	0.0508	0.0612
255	5	0.75	1.00	0.99	0.0221	-0.0049	0.0790	0.1273
256	5	0.75	0.80	0.00	0.0327	-0.0635	0.0353	0.0033
257	5	0.75	0.80	0.40	0.0333	-0.0459	0.0367	0.0121
258	5	0.75	0.80	0.70	0.0392	-0.0266	0.0463	0.0411
259	5	0.75	0.80	0.85	0.0453	-0.0100	0.0608	0.0742
260	5	0.75	0.80	0.99	0.0263	0.0115	0.0834	0.1283
261	5	0.75	0.60	0.00	0.0549	-0.0498	0.0503	0.0307
262	5	0.75	0.60	0.40	0.0544	-0.0284	0.0521	0.0395
263	5	0.75	0.60	0.70	0.0617	-0.0043	0.0625	0.0668
264	5	0.75	0.60	0.85	0.0606	0.0143	0.0749	0.0938
265	5	0.75	0.60	0.99	0.0268	0.0334	0.0881	0.1289
266	5	0.75	0.40	0.00	0.0830	-0.0275	0.0741	0.0754
267	5	0.75	0.40	0.40	0.0853	0.0012	0.0770	0.0833
268	5	0.75	0.40	0.70	0.0804	0.0276	0.0839	0.1005
269	5	0.75	0.40	0.85	0.0701	0.0421	0.0887	0.1126
270	5	0.75	0.40	0.99	0.0224	0.0571	0.0943	0.1249
271	5	0.75	0.20	0.00	0.0798	-0.0085	0.0942	0.1142
272	5	0.75	0.20	0.40	0.0753	0.0258	0.0949	0.1153
273	5	0.75	0.20	0.70	0.0595	0.0501	0.0939	0.1160
274	5	0.75	0.20	0.85	0.0455	0.0630	0.0945	0.1179
275	5	0.75	0.20	0.99	0.0131	0.0749	0.0945	0.1183
276	5	1.00	1.00	0.00	1.0000	-0.0669	0.0238	-0.0195
277	5	1.00	1.00	0.40	1.0000	-0.0537	0.0234	-0.0136
278	5	1.00	1.00	0.70	1.0000	-0.0387	0.0314	0.0121
279	5	1.00	1.00	0.85	1.0000	-0.0235	0.0468	0.0473
280	5	1.00	1.00	0.99	1.0000	-0.0032	0.0779	0.1152
281	5	1.00	0.80	0.00	1.0000	-0.0568	0.0349	-0.0029
282	5	1.00	0.80	0.40	1.0000	-0.0418	0.0353	0.0038
283	5	1.00	0.80	0.70	1.0000	-0.0256	0.0429	0.0285
284	5	1.00	0.80	0.85	1.0000	-0.0089	0.0582	0.0615
285	5	1.00	0.80	0.99	1.0000	0.0130	0.0822	0.1180
286	5	1.00	0.60	0.00	1.0000	-0.0402	[illegible]	0.0261
287	5	1.00	0.60	0.40	1.0000	-0.0221	0.0529	0.0323
288	5	1.00	0.60	0.70	1.0000	-0.0013	0.0613	0.0552
289	5	1.00	0.60	0.85	1.0000	0.0162	0.0732	0.0811
290	5	1.00	0.60	0.99	1.0000	0.0357	0.0877	0.1184
291	5	1.00	0.40	0.00	1.0000	-0.0174	0.0765	0.0672
292	5	1.00	0.40	0.40	1.0000	0.0080	0.0780	0.0727
293	5	1.00	0.40	0.70	1.0000	0.0304	0.0822	0.0862
294	5	1.00	0.40	0.85	1.0000	0.0449	0.0879	0.0986
295	5	1.00	0.40	0.99	1.0000	0.0569	0.0913	0.1129
296	5	1.00	0.20	0.00	1.0000	-0.0019	0.0919	0.0962
297	5	1.00	0.20	0.40	1.0000	0.0294	0.0919	0.0961
298	5	1.00	0.20	0.70	1.0000	0.0532	0.0924	0.0982
299	5	1.00	0.20	0.85	1.0000	0.0644	0.0921	0.0998
300	5	1.00	0.20	0.99	1.0000	0.0741	0.0910	0.1007
301	5	1.50	1.00	0.00	1.0000	-0.0628	0.0122	-0.0398
302	5	1.50	1.00	0.40	1.0000	-0.0526	0.0125	-0.0341
303	5	1.50	1.00	0.70	1.0000	-0.0362	0.0245	-0.0074

304	5	1.50	1.00	0.85	1.0000	-0.0231	0.0391	0.0250
305	5	1.50	1.00	0.99	1.0000	-0.0097	0.0651	0.0830
306	5	1.50	0.80	0.00	1.0000	-0.0537	0.0219	-0.0252
307	5	1.50	0.80	0.40	1.0000	-0.0415	0.0231	-0.0190
308	5	1.50	0.80	0.70	1.0000	-0.0244	0.0345	0.0062
309	5	1.50	0.80	0.85	1.0000	-0.0099	0.0490	0.0366
310	5	1.50	0.80	0.99	1.0000	0.0063	0.0690	0.0838
311	5	1.50	0.60	0.00	1.0000	-0.0391	0.0366	-0.0020
312	5	1.50	0.60	0.40	1.0000	-0.0235	0.0384	0.0042
313	5	1.50	0.60	0.70	1.0000	-0.0047	0.0479	0.0255
314	5	1.50	0.60	0.85	1.0000	0.0111	0.0597	0.0491
315	5	1.50	0.60	0.99	1.0000	0.0258	0.0713	0.0798
316	5	1.50	0.40	0.00	1.0000	-0.0218	0.0531	0.0250
317	5	1.50	0.40	0.40	1.0000	-0.0015	0.0543	0.0289
318	5	1.50	0.40	0.70	1.0000	0.0193	0.0607	0.0419
319	5	1.50	0.40	0.85	1.0000	0.0284	0.0626	0.0519
320	5	1.50	0.40	0.99	1.0000	0.0431	0.0709	0.0677
321	5	1.50	0.20	0.00	1.0000	-0.0124	0.0606	0.0373
322	5	1.50	0.20	0.40	1.0000	0.0141	0.0617	0.0391
323	5	1.50	0.20	0.70	1.0000	0.0352	0.0636	0.0413
324	5	1.50	0.20	0.85	1.0000	0.0473	0.0662	0.0452
325	5	1.50	0.20	0.99	1.0000	0.0554	0.0659	0.0508
326	5	2.00	1.00	0.00	1.0000	-0.0568	0.0028	-0.0528
327	5	2.00	1.00	0.40	1.0000	-0.0481	0.0050	-0.0458
328	5	2.00	1.00	0.70	1.0000	-0.0344	0.0168	-0.0203
329	5	2.00	1.00	0.85	1.0000	-0.0231	0.0307	0.0073
330	5	2.00	1.00	0.99	1.0000	-0.0183	0.0493	0.0496
331	5	2.00	0.80	0.00	1.0000	-0.0524	0.0071	-0.0447
332	5	2.00	0.80	0.40	1.0000	-0.0413	0.0109	-0.0372
333	5	2.00	0.80	0.70	1.0000	-0.0259	0.0230	-0.0124
334	5	2.00	0.80	0.85	1.0000	-0.0151	0.0350	0.0121
335	5	2.00	0.80	0.99	1.0000	-0.0077	0.0481	0.0448
336	5	2.00	0.60	0.00	1.0000	-0.0445	0.0140	-0.0326
337	5	2.00	0.60	0.40	1.0000	-0.0306	0.0182	-0.0257
338	5	2.00	0.60	0.70	1.0000	-0.0136	0.0287	-0.0050
339	5	2.00	0.60	0.85	1.0000	-0.0028	0.0370	0.0125
340	5	2.00	0.60	0.99	1.0000	0.0056	0.0442	0.0344
341	5	2.00	0.40	0.00	1.0000	-0.0360	0.0203	-0.0215
342	5	2.00	0.40	0.40	1.0000	-0.0181	0.0237	-0.0165
343	5	2.00	0.40	0.70	1.0000	-0.0016	0.0290	-0.0044
344	5	2.00	0.40	0.85	1.0000	0.0064	0.0318	0.0053
345	5	2.00	0.40	0.99	1.0000	0.0182	0.0393	0.0176
346	5	2.00	0.20	0.00	1.0000	-0.0282	0.0253	-0.0166
347	5	2.00	0.20	0.40	1.0000	-0.0064	0.0267	-0.0149
348	5	2.00	0.20	0.70	1.0000	0.0131	0.0308	-0.0113
349	5	2.00	0.20	0.85	1.0000	0.0242	0.0344	-0.0077
350	5	2.00	0.20	0.99	1.0000	0.0311	0.0355	-0.0004
351	7	0.00	1.00	0.00	0.0012	-0.0844	0.0089	-0.0028
352	7	0.00	1.00	0.40	0.0058	-0.0682	0.0109	0.0115
353	7	0.00	1.00	0.70	0.0272	-0.0447	0.0256	0.0579
354	7	0.00	1.00	0.85	0.0404	-0.0274	0.0410	0.0991
355	7	0.00	1.00	0.99	-0.0087	-0.0207	0.0521	0.1227
356	7	0.00	0.80	0.00	0.0051	-0.0819	0.0116	0.0041
357	7	0.00	0.80	0.40	0.0108	-0.0636	0.0145	0.0191
358	7	0.00	0.80	0.70	0.0305	-0.0392	0.0285	0.0637
359	7	0.00	0.80	0.85	0.0418	-0.0208	0.0432	0.1024
360	7	0.00	0.80	0.99	-0.0083	-0.0088	0.0530	0.1230
361	7	0.00	0.60	0.00	0.0160	-0.0762	0.0183	0.0253
362	7	0.00	0.60	0.40	0.0226	-0.0528	0.0226	0.0411
363	7	0.00	0.60	0.70	0.0385	-0.0248	0.0361	0.0809
364	7	0.00	0.60	0.85	0.0439	-0.0052	0.0487	0.1124
365	7	0.00	0.60	0.99	-0.0111	0.0061	0.0536	0.1227
366	7	0.00	0.40	0.00	0.0363	-0.0615	0.0351	0.0712
367	7	0.00	0.40	0.40	0.0418	-0.0323	0.0393	0.0838
368	7	0.00	0.40	0.70	0.0442	-0.0030	0.0489	0.1097
369	7	0.00	0.40	0.85	0.0348	0.0111	0.0532	0.1228
370	7	0.00	0.40	0.99	-0.0173	0.0214	0.0546	0.1224
371	7	0.00	0.20	0.00	0.0390	-0.0435	0.0556	0.1235
372	7	0.00	0.20	0.40	0.0330	-0.0130	0.0540	0.1234
373	7	0.00	0.20	0.70	0.0197	0.0131	0.0552	0.1263
374	7	0.00	0.20	0.85	0.0041	0.0243	0.0542	0.1252
375	7	0.00	0.20	0.99	-0.0281	0.0359	0.0550	0.1222
376	7	0.25	1.00	0.00	0.0035	-0.0804	0.0118	-0.0044
377	7	0.25	1.00	0.40	0.0075	-0.0651	0.0132	0.0096
378	7	0.25	1.00	0.70	0.0253	-0.0439	0.0256	0.0527
379	7	0.25	1.00	0.85	0.0370	-0.0276	0.0401	0.0929
380	7	0.25	1.00	0.99	-0.0060	-0.0175	0.0550	0.1286
381	7	0.25	0.80	0.00	0.0091	-0.0777	0.0148	0.0034
382	7	0.25	0.80	0.40	0.0140	-0.0602	0.0170	0.0180
383	7	0.25	0.80	0.70	0.0322	-0.0366	0.0304	0.0611
384	7	0.25	0.80	0.85	0.0400	-0.0194	0.0439	0.0986
385	7	0.25	0.80	0.99	-0.0045	-0.0056	0.0559	0.1276
386	7	0.25	0.60	0.00	0.0210	-0.0707	0.0228	0.0264
387	7	0.25	0.60	0.40	0.0285	-0.0484	0.0262	0.0414
388	7	0.25	0.60	0.70	0.0407	-0.0217	0.0386	0.0794
389	7	0.25	0.60	0.85	0.0453	-0.0025	0.0510	0.1106
390	7	0.25	0.60	0.99	-0.0040	0.0113	0.0586	0.1279
391	7	0.25	0.40	0.00	0.0438	-0.0559	0.0396	0.0723
392	7	0.25	0.40	0.40	0.0467	-0.0281	0.0427	0.0836
393	7	0.25	0.40	0.70	0.0498	0.0005	0.0519	0.1086
394	7	0.25	0.40	0.85	0.0397	0.0154	0.0572	0.1228
395	7	0.25	0.40	0.99	-0.0089	0.0264	0.0593	0.1259

396	7	0.25	0.20	0.00	0.0461	-0.0376	0.0601	0.1236
397	7	0.25	0.20	0.40	0.0403	-0.0073	0.0589	0.1237
398	7	0.25	0.20	0.70	0.0279	0.0174	0.0590	0.1253
399	7	0.25	0.20	0.85	0.0152	0.0305	0.0601	0.1266
400	7	0.25	0.20	0.99	-0.0200	0.0415	0.0604	0.1235
401	7	0.50	1.00	0.00	0.0075	-0.0721	0.0167	-0.0061
402	7	0.50	1.00	0.40	0.0102	-0.0590	0.0159	0.0049
403	7	0.50	1.00	0.70	0.0206	-0.0435	0.0239	0.0406
404	7	0.50	1.00	0.85	0.0275	-0.0290	0.0370	0.0783
405	7	0.50	1.00	0.99	0.0006	-0.0137	0.0580	0.1330
406	7	0.50	0.80	0.00	0.0175	-0.0682	0.0211	0.0045
407	7	0.50	0.80	0.40	0.0204	-0.0533	0.0216	0.0166
408	7	0.50	0.80	0.70	0.0321	-0.0338	0.0314	0.0531
409	7	0.50	0.80	0.85	0.0368	-0.0187	0.0432	0.0877
410	7	0.50	0.80	0.99	0.0011	0.0001	0.0611	0.1332
411	7	0.50	0.60	0.00	0.0357	-0.0598	0.0306	0.0297
412	7	0.50	0.60	0.40	0.0401	-0.0395	0.0329	0.0427
413	7	0.50	0.60	0.70	0.0494	-0.0161	0.0426	0.0757
414	7	0.50	0.60	0.85	0.0504	0.0014	0.0537	0.1043
415	7	0.50	0.60	0.99	0.0035	0.0164	0.0630	0.1314
416	7	0.50	0.40	0.00	0.0625	-0.0437	0.0486	0.0755
417	7	0.50	0.40	0.40	0.0649	-0.0173	0.0513	0.0860
418	7	0.50	0.40	0.70	0.0640	0.0089	0.0598	0.1077
419	7	0.50	0.40	0.85	0.0540	0.0223	0.0629	0.1204
420	7	0.50	0.40	0.99	0.0027	0.0336	0.0659	0.1286
421	7	0.50	0.20	0.00	0.0659	-0.0271	0.0669	0.1210
422	7	0.50	0.20	0.40	0.0609	0.0041	0.0680	0.1235
423	7	0.50	0.20	0.70	0.0431	0.0276	0.0676	0.1244
424	7	0.50	0.20	0.85	0.0264	0.0392	0.0676	0.1249
425	7	0.50	0.20	0.99	-0.0066	0.0490	0.0670	0.1245
426	7	0.75	1.00	0.00	0.0122	-0.0640	0.0200	-0.0106
427	7	0.75	1.00	0.40	0.0106	-0.0551	0.0169	-0.0032
428	7	0.75	1.00	0.70	0.0150	-0.0427	0.0221	0.0261
429	7	0.75	1.00	0.85	0.0206	-0.0300	0.0338	0.0616
430	7	0.75	1.00	0.99	0.0021	-0.0116	0.0590	0.1275
431	7	0.75	0.80	0.00	0.0290	-0.0575	0.0271	0.0037
432	7	0.75	0.80	0.40	0.0287	-0.0459	0.0255	0.0125
433	7	0.75	0.80	0.70	0.0340	-0.0314	0.0311	0.0416
434	7	0.75	0.80	0.85	0.0355	-0.0173	0.0426	0.0746
435	7	0.75	0.80	0.99	0.0076	0.0029	0.0628	0.1287
436	7	0.75	0.60	0.00	0.0528	-0.0471	0.0387	0.0312
437	7	0.75	0.60	0.40	0.0536	-0.0309	0.0380	0.0401
438	7	0.75	0.60	0.70	0.0568	-0.0111	0.0451	0.0673
439	7	0.75	0.60	0.85	0.0514	0.0048	0.0552	0.0942
440	7	0.75	0.60	0.99	0.0121	0.0217	0.0673	0.1293
441	7	0.75	0.40	0.00	0.0812	-0.0297	0.0575	0.0759
442	7	0.75	0.40	0.40	0.0786	-0.0062	0.0588	0.0838
443	7	0.75	0.40	0.70	0.0730	0.0164	0.0639	0.1011
444	7	0.75	0.40	0.85	0.0620	0.0285	0.0673	0.1131
445	7	0.75	0.40	0.99	0.0158	0.0405	0.0717	0.1255
446	7	0.75	0.20	0.00	0.0721	-0.0143	0.0741	0.1148
447	7	0.75	0.20	0.40	0.0680	0.0143	0.0742	0.1160
448	7	0.75	0.20	0.70	0.0537	0.0362	0.0737	0.1167
449	7	0.75	0.20	0.85	0.0399	0.0477	0.0743	0.1186
450	7	0.75	0.20	0.99	0.0112	0.0580	0.0749	0.1190
451	7	1.00	1.00	0.00	0.0126	-0.0593	0.0186	-0.0189
452	7	1.00	1.00	0.40	0.0103	-0.0521	0.0155	-0.0129
453	7	1.00	1.00	0.70	0.0111	-0.0416	0.0200	0.0127
454	7	1.00	1.00	0.85	0.0127	-0.0293	0.0322	0.0479
455	7	1.00	1.00	0.99	0.0038	-0.0109	0.0582	0.1157
456	7	1.00	0.80	0.00	0.0335	-0.0512	0.0274	-0.0022
457	7	1.00	0.80	0.40	0.0334	-0.0417	0.0253	0.0045
458	7	1.00	0.80	0.70	0.0292	-0.0297	0.0297	0.0293
459	7	1.00	0.80	0.85	0.0310	-0.0157	0.0420	0.0622
460	7	1.00	0.80	0.99	0.0123	0.0045	0.0629	0.1186
461	7	1.00	0.60	0.00	0.0594	-0.0380	0.0417	0.0268
462	7	1.00	0.60	0.40	0.0578	-0.0247	0.0398	0.0330
463	7	1.00	0.60	0.70	0.0546	-0.0078	0.0455	0.0560
464	7	1.00	0.60	0.85	0.0506	0.0069	0.0551	0.0819
465	7	1.00	0.60	0.99	0.0195	0.0239	0.0680	0.1192
466	7	1.00	0.40	0.00	0.0880	-0.0200	0.0609	0.0680
467	7	1.00	0.40	0.40	0.0852	0.0005	0.0610	0.0737
468	7	1.00	0.40	0.70	0.0730	0.0195	0.0640	0.0871
469	7	1.00	0.40	0.85	0.0546	0.0311	0.0678	0.0995
470	7	1.00	0.40	0.99	0.0240	0.0421	0.0719	0.1138
471	7	1.00	0.20	0.00	0.0719	-0.0075	0.0737	0.0972
472	7	1.00	0.20	0.40	0.0654	0.0182	0.0732	0.0972
473	7	1.00	0.20	0.70	0.0564	0.0396	0.0739	0.0993
474	7	1.00	0.20	0.85	0.0441	0.0494	0.0736	0.1009
475	7	1.00	0.20	0.99	0.0107	0.0599	0.0753	0.1033
476	7	1.50	1.00	0.00	1.0000	-0.0559	0.0089	-0.0390
477	7	1.50	1.00	0.40	1.0000	-0.0503	0.0080	-0.0334
478	7	1.50	1.00	0.70	1.0000	-0.0389	0.0163	-0.0067
479	7	1.50	1.00	0.85	1.0000	-0.0282	0.0284	0.0256
480	7	1.50	1.00	0.99	1.0000	-0.0153	0.0505	0.0838
481	7	1.50	0.80	0.00	1.0000	-0.0483	0.0169	-0.0243
482	7	1.50	0.80	0.40	1.0000	-0.0406	0.0168	-0.0181
483	7	1.50	0.80	0.70	1.0000	-0.0279	0.0251	0.0071
484	7	1.50	0.80	0.85	1.0000	-0.0156	0.0371	0.0374
485	7	1.50	0.80	0.99	1.0000	-0.0016	0.0535	0.0846
486	7	1.50	0.60	0.00	1.0000	-0.0366	0.0290	-0.0010
487	7	1.50	0.60	0.40	1.0000	-0.0250	0.0296	0.0052

488	7	1.50	0.60	0.70	1.0000	-0.0094	0.0371	0.0264
489	7	1.50	0.60	0.85	1.0000	0.0033	0.0465	0.0501
490	7	1.50	0.60	0.99	1.0000	0.0152	0.0559	0.0807
491	7	1.50	0.40	0.00	1.0000	-0.0231	0.0425	0.0262
492	7	1.50	0.40	0.40	1.0000	-0.0068	0.0429	0.0301
493	7	1.50	0.40	0.70	1.0000	0.0105	0.0478	0.0431
494	7	1.50	0.40	0.85	1.0000	0.0191	0.0504	0.0540
495	7	1.50	0.40	0.99	1.0000	0.0277	0.0541	0.0689
496	7	1.50	0.20	0.00	1.0000	-0.0160	0.0488	0.0387
497	7	1.50	0.20	0.40	1.0000	0.0061	0.0497	0.0405
498	7	1.50	0.20	0.70	1.0000	0.0233	0.0502	0.0427
499	7	1.50	0.20	0.85	1.0000	0.0337	0.0525	0.0466
500	7	1.50	0.20	0.99	1.0000	0.0433	0.0564	0.0537
501	7	2.00	1.00	0.00	1.0000	-0.0606	0.0012	-0.0520
502	7	2.00	1.00	0.40	1.0000	-0.0459	0.0030	-0.0451
503	7	2.00	1.00	0.70	1.0000	-0.0366	0.0122	-0.0197
504	7	2.00	1.00	0.85	1.0000	-0.0284	0.0232	0.0080
505	7	2.00	1.00	0.99	1.0000	-0.0239	0.0383	0.0502
506	7	2.00	0.80	0.00	1.0000	-0.0467	0.0051	-0.0438
507	7	2.00	0.80	0.40	1.0000	-0.0400	0.0078	-0.0364
508	7	2.00	0.80	0.70	1.0000	-0.0287	0.0175	-0.0116
509	7	2.00	0.80	0.85	1.0000	-0.0204	0.0270	0.0129
510	7	2.00	0.80	0.99	1.0000	-0.0142	0.0373	0.0456
511	7	2.00	0.60	0.00	1.0000	-0.0408	0.0107	-0.0316
512	7	2.00	0.60	0.40	1.0000	-0.0308	0.0136	-0.0248
513	7	2.00	0.60	0.70	1.0000	-0.0175	0.0220	-0.0042
514	7	2.00	0.60	0.85	1.0000	-0.0096	0.0279	0.0134
515	7	2.00	0.60	0.99	1.0000	-0.0031	0.0341	0.0353
516	7	2.00	0.40	0.00	1.0000	-0.0351	0.0154	-0.0204
517	7	2.00	0.40	0.40	1.0000	-0.0208	0.0182	-0.0154
518	7	2.00	0.40	0.70	1.0000	-0.0069	0.0230	-0.0033
519	7	2.00	0.40	0.85	1.0000	0.0004	0.0261	0.0064
520	7	2.00	0.40	0.99	1.0000	0.0065	0.0292	0.0186
521	7	2.00	0.20	0.00	1.0000	-0.0294	0.0197	-0.0153
522	7	2.00	0.20	0.40	1.0000	-0.0118	0.0207	-0.0137
523	7	2.00	0.20	0.70	1.0000	0.0038	0.0233	-0.0100
524	7	2.00	0.20	0.85	1.0000	0.0127	0.0261	-0.0064
525	7	2.00	0.20	0.99	1.0000	0.0202	0.0290	0 0013
526	10	0.00	1.00	0.00	-0.0020	-0.0630	0.0045	-0.0025
527	10	0.00	1.00	0.40	0.0012	-0.0506	0.0055	0.0119
528	10	0.00	1.00	0.70	0.0178	-0.0330	0.0157	0.0585
529	10	0.00	1.00	0.85	0.0254	-0.0201	0.0265	0.0998
530	10	0.00	1.00	0.99	-0.0339	-0.0144	0.0338	0.1235
531	10	0.00	0.80	0.00	0.0013	-0.0612	0.0065	0.0044
532	10	0.00	0.80	0.40	0.0055	-0.0469	0.0082	0.0196
533	10	0.00	0.80	0.70	0.0202	-0.0290	0.0175	0.0643
534	10	0.00	0.80	0.85	0.0262	-0.0149	0.0279	0.1031
535	10	0.00	0.80	0.99	-0.0336	-0.0053	0.0345	0.1238
536	10	0.00	0.60	0.00	0.0099	-0.0573	0.0109	0.0258
537	10	0.00	0.60	0.40	0.0149	-0.0389	0.0138	0.0415
538	10	0.00	0.60	0.70	0.0261	-0.0179	0.0230	0.0816
539	10	0.00	0.60	0.85	0.0264	-0.0030	0.0322	0.1131
540	10	0.00	0.60	0.99	-0.0366	0.0052	0.0351	0.1235
541	10	0.00	0.40	0.00	0.0267	-0.0468	0.0227	0.0718
542	10	0.00	0.40	0.40	0.0291	-0.0239	0.0258	0.0844
543	10	0.00	0.40	0.70	0.0291	-0.0019	0.0325	0.1103
544	10	0.00	0.40	0.85	0.0160	0.0086	0.0354	0.1236
545	10	0.00	0.40	0.99	-0.0443	0.0169	0.0359	0.1233
546	10	0.00	0.20	0.00	0.0208	-0.0334	0.0375	0.1242
547	10	0.00	0.20	0.40	0.0139	-0.0104	0.0358	0.1241
548	10	0.00	0.20	0.70	-0.0008	0.0091	0.0366	0.1271
549	10	0.00	0.20	0.85	-0.0188	0.0175	0.0359	0.1259
550	10	0.00	0.20	0.99	-0.0576	0.0270	0.0371	0.1235
551	10	0.25	1.00	0.00	-0.0008	-0.0603	0.0062	-0.0042
552	10	0.25	1.00	0.40	0.0019	-0.0483	0.0071	0.0097
553	10	0.25	1.00	0.70	0.0151	-0.0327	0.0157	0.0530
554	10	0.25	1.00	0.85	0.0213	-0.0206	0.0258	0.0933
555	10	0.25	1.00	0.99	-0.0296	-0.0125	0.0358	0.1291
556	10	0.25	0.80	0.00	0.0042	-0.0584	0.0082	0.0036
557	10	0.25	0.80	0.40	0.0078	-0.0448	0.0097	0.0182
558	10	0.25	0.80	0.70	0.0212	-0.0273	0.0189	0.0614
559	10	0.25	0.80	0.85	0.0258	-0.0143	0.0285	0.0989
560	10	0.25	0.80	0.99	-0.0279	-0.0037	0.0364	0.1281
561	10	0.25	0.60	0.00	0.0156	-0.0536	0.0137	0.0267
562	10	0.25	0.60	0.40	0.0198	-0.0360	0.0161	0.0416
563	10	0.25	0.60	0.70	0.0296	-0.0161	0.0246	0.0798
564	10	0.25	0.60	0.85	0.0298	-0.0015	0.0337	0.1109
565	10	0.25	0.60	0.99	-0.0271	0.0085	0.0387	0.1283
566	10	0.25	0.40	0.00	0.0340	-0.0430	0.0254	0.0724
567	10	0.25	0.40	0.40	0.0355	-0.0215	0.0275	0.0840
568	10	0.25	0.40	0.70	0.0352	-0.0001	0.0341	0.1089
569	10	0.25	0.40	0.85	0.0236	0.0112	0.0378	0.1232
570	10	0.25	0.40	0.99	-0.0328	0.0192	0.0393	0.1263
571	10	0.25	0.20	0.00	0.0304	-0.0295	0.0402	0.1239
572	10	0.25	0.20	0.40	0.0240	-0.0067	0.0388	0.1241
573	10	0.25	0.20	0.70	0.0086	0.0112	0.0385	0.1257
574	10	0.25	0.20	0.85	-0.0065	0.0215	0.0398	0.1270
575	10	0.25	0.20	0.99	-0.0447	0.0294	0.0397	0.1238
576	10	0.50	1.00	0.00	0.0039	-0.0535	0.0102	-0.0062
577	10	0.50	1.00	0.40	0.0038	-0.0440	0.0097	0.0047
578	10	0.50	1.00	0.70	0.0100	-0.0324	0.0151	0.0405
579	10	0.50	1.00	0.85	0.0148	-0.0219	0.0242	0.0783

580	10	0.50	1.00	0.99	-0.0176	-0.0099	0.0388	0.1332
581	10	0.50	0.80	0.00	0.0136	-0.0509	0.0131	0.0043
582	10	0.50	0.80	0.40	0.0150	-0.0393	0.0135	0.0165
583	10	0.50	0.80	0.70	0.0230	-0.0251	0.0203	0.0531
584	10	0.50	0.80	0.85	0.0259	-0.0140	0.0285	0.0876
585	10	0.50	0.80	0.99	-0.0113	0.0005	0.0411	0.1333
586	10	0.50	0.60	0.00	0.0301	-0.0449	0.0198	0.0296
587	10	0.50	0.60	0.40	0.0331	-0.0291	0.0216	0.0426
588	10	0.50	0.60	0.70	0.0392	-0.0117	0.0283	0.0755
589	10	0.50	0.60	0.85	0.0387	0.0013	0.0364	0.1043
590	10	0.50	0.60	0.99	-0.0076	0.0119	0.0425	0.1314
591	10	0.50	0.40	0.00	0.0537	-0.0333	0.0324	0.0754
592	10	0.50	0.40	0.40	0.0549	-0.0129	0.0346	0.0859
593	10	0.50	0.40	0.70	0.0533	0.0066	0.0401	0.1076
594	10	0.50	0.40	0.85	0.0420	0.0164	0.0430	0.1203
595	10	0.50	0.40	0.99	-0.0054	0.0239	0.0444	0.1286
596	10	0.50	0.20	0.00	0.0532	-0.0212	0.0457	0.1209
597	10	0.50	0.20	0.40	0.0494	0.0025	0.0465	0.1234
598	10	0.50	0.20	0.70	0.0343	0.0191	0.0458	0.1243
599	10	0.50	0.20	0.85	0.0198	0.0279	0.0461	0.1250
600	10	0.50	0.20	0.99	-0.0123	0.0359	0.0465	0.1245
601	10	0.75	1.00	0.00	0.0081	-0.0469	0.0130	-0.0111
602	10	0.75	1.00	0.40	0.0053	-0.0404	0.0110	-0.0036
603	10	0.75	1.00	0.70	0.0068	-0.0320	0.0143	0.0257
604	10	0.75	1.00	0.85	0.0114	-0.0232	0.0224	0.0612
605	10	0.75	1.00	0.99	0.0013	-0.0087	0.0404	0.1273
606	10	0.75	0.80	0.00	0.0249	-0.0421	0.0183	0.0033
607	10	0.75	0.80	0.40	0.0239	-0.0334	0.0174	0.0121
608	10	0.75	0.80	0.70	0.0261	-0.0235	0.0208	0.0411
609	10	0.75	0.80	0.85	0.0293	-0.0131	0.0291	0.0742
610	10	0.75	0.80	0.99	0.0060	0.0022	0.0432	0.1284
611	10	0.75	0.60	0.00	0.0481	-0.0344	0.0266	0.0308
612	10	0.75	0.60	0.40	0.0479	-0.0223	0.0261	0.0396
613	10	0.75	0.60	0.70	0.0505	-0.0080	0.0312	0.0668
614	10	0.75	0.60	0.85	0.0499	0.0038	0.0385	0.0938
615	10	0.75	0.60	0.99	0.0139	0.0161	0.0471	0.1290
616	10	0.75	0.40	0.00	0.0774	-0.0217	0.0402	0.0754
617	10	0.75	0.40	0.40	0.0766	-0.0038	0.0416	0.0834
618	10	0.75	0.40	0.70	0.0731	0.0128	0.0455	0.1006
619	10	0.75	0.40	0.85	0.0633	0.0215	0.0480	0.1127
620	10	0.75	0.40	0.99	0.0199	0.0285	0.0495	0.1249
621	10	0.75	0.20	0.00	0.0804	-0.0101	0.0528	0.1144
622	10	0.75	0.20	0.40	0.0765	0.0109	0.0527	0.1154
623	10	0.75	0.20	0.70	0.0609	0.0260	0.0518	0.1160
624	10	0.75	0.20	0.85	0.0463	0.0348	0.0529	0.1179
625	10	0.75	0.20	0.99	0.0132	0.0416	0.0527	0.1184
626	10	1.00	1.00	0.00	0.0091	-0.0434	0.0120	-0.0195
627	10	1.00	1.00	0.40	0.0046	-0.0387	0.0100	-0.0136
628	10	1.00	1.00	0.70	0.0045	-0.0320	0.0131	0.0122
629	10	1.00	1.00	0.85	0.0126	-0.0232	0.0219	0.0473
630	10	1.00	1.00	0.99	0.0060	-0.0087	0.0409	0.1153
631	10	1.00	0.80	0.00	0.0312	-0.0371	0.0187	-0.0029
632	10	1.00	0.80	0.40	0.0279	-0.0306	0.0174	0.0038
633	10	1.00	0.80	0.70	0.0275	-0.0229	0.0203	0.0285
634	10	1.00	0.80	0.85	0.0346	-0.0123	0.0295	0.0616
635	10	1.00	0.80	0.99	0.0147	0.0032	0.0448	0.1181
636	10	1.00	0.60	0.00	0.0603	-0.0270	0.0295	0.0261
637	10	1.00	0.60	0.40	0.0570	-0.0176	0.0282	0.0323
638	10	1.00	0.60	0.70	0.0584	-0.0057	0.0323	0.0553
639	10	1.00	0.60	0.85	0.0570	0.0052	0.0396	0.0811
640	10	1.00	0.60	0.99	0.0237	0.0174	0.0489	0.1185
641	10	1.00	0.40	0.00	0.0919	-0.0133	0.0441	0.0673
642	10	1.00	0.40	0.40	0.0912	0.0019	0.0445	0.0729
643	10	1.00	0.40	0.70	0.0827	0.0151	0.0466	0.0861
644	10	1.00	0.40	0.85	0.0682	0.0236	0.0497	0.0987
645	10	1.00	0.40	0.99	0.0226	0.0303	0.0518	0.1130
646	10	1.00	0.20	0.00	0.0857	-0.0037	0.0541	0.0963
647	10	1.00	0.20	0.40	0.0812	0.0142	0.0532	0.0962
648	10	1.00	0.20	0.70	0.0713	0.0287	0.0534	0.0983
649	10	1.00	0.20	0.85	0.0528	0.0360	0.0536	0.0999
650	10	1.00	0.20	0.99	0.0139	0.0422	0.0537	0.1024
651	10	1.50	1.00	0.00	1.0000	-0.0414	0.0045	-0.0397
652	10	1.50	1.00	0.40	1.0000	-0.0395	0.0034	-0.0341
653	10	1.50	1.00	0.70	1.0000	-0.0322	0.0102	-0.0074
654	10	1.50	1.00	0.85	1.0000	-0.0245	0.0196	0.0250
655	10	1.50	1.00	0.99	1.0000	-0.0134	0.0367	0.0831
656	10	1.50	0.80	0.00	1.0000	-0.0356	0.0106	-0.0252
657	10	1.50	0.80	0.40	1.0000	-0.0320	0.0102	-0.0189
658	10	1.50	0.80	0.70	1.0000	-0.0237	0.0167	0.0062
659	10	1.50	0.80	0.85	1.0000	-0.0143	0.0264	0.0366
660	10	1.50	0.80	0.99	1.0000	-0.0029	0.0393	0.0838
661	10	1.50	0.60	0.00	1.0000	-0.0264	0.0199	-0.0020
662	10	1.50	0.60	0.40	1.0000	-0.0196	0.0201	0.0042
663	10	1.50	0.60	0.70	1.0000	-0.0090	0.0262	0.0254
664	10	1.50	0.60	0.85	1.0000	0.0005	0.0339	0.0491
665	10	1.50	0.60	0.99	1.0000	0.0089	0.0411	0.0799
666	10	1.50	0.40	0.00	1.0000	-0.0160	0.0306	0.0250
667	10	1.50	0.40	0.40	1.0000	-0.0056	0.0306	0.0290
668	10	1.50	0.40	0.70	1.0000	0.0059	0.0344	0.0419
669	10	1.50	0.40	0.85	1.0000	0.0112	0.0361	0.0528
670	10	1.50	0.40	0.99	1.0000	0.0189	0.0411	0.0677
671	10	1.50	0.20	0.00	1.0000	-0.0110	0.0354	0.0374

672	10	1.50	0.20	0.40	1.0000	0.0041	0.0363	0.0391
673	10	1.50	0.20	0.70	1.0000	0.0150	0.0365	0.0413
674	10	1.50	0.20	0.85	1.0000	0.0222	0.0387	0.0452
675	10	1.50	0.20	0.99	1.0000	0.0288	0.0410	0.0524
676	10	2.00	1.00	0.00	1.0000	-0.0375	-0.0010	-0.0528
677	10	2.00	1.00	0.40	1.0000	-0.0376	-0.0004	-0.0457
678	10	2.00	1.00	0.70	1.0000	-0.0327	0.0070	-0.0202
679	10	2.00	1.00	0.85	1.0000	-0.0271	0.0158	0.0073
680	10	2.00	1.00	0.99	1.0000	-0.0224	0.0281	0.0496
681	10	2.00	0.80	0.00	1.0000	-0.0349	0.0017	-0.0447
682	10	2.00	0.80	0.40	1.0000	-0.0331	0.0032	-0.0372
683	10	2.00	0.80	0.70	1.0000	-0.0266	0.0110	-0.0123
684	10	2.00	0.80	0.85	1.0000	-0.0208	0.0186	0.0121
685	10	2.00	0.80	0.99	1.0000	-0.0155	0.0270	0.0449
686	10	2.00	0.60	0.00	1.0000	-0.0304	0.0059	-0.0325
687	10	2.00	0.60	0.40	1.0000	-0.0260	0.0077	-0.0258
688	10	2.00	0.60	0.70	1.0000	-0.0179	0.0142	-0.0051
689	10	2.00	0.60	0.85	1.0000	-0.0132	0.0186	0.0125
690	10	2.00	0.60	0.99	1.0000	-0.0078	0.0246	0.0344
691	10	2.00	0.40	0.00	1.0000	-0.0267	0.0092	-0.0215
692	10	2.00	0.40	0.40	1.0000	-0.0188	0.0110	-0.0164
693	10	2.00	0.40	0.70	1.0000	-0.0107	0.0146	-0.0043
694	10	2.00	0.40	0.85	1.0000	-0.0069	0.0165	0.0053
695	10	2.00	0.40	0.99	1.0000	-0.0032	0.0192	0.0176
696	10	2.00	0.20	0.00	1.0000	-0.0231	0.0123	-0.0166
697	10	2.00	0.20	0.40	1.0000	-0.0121	0.0135	-0.0149
698	10	2.00	0.20	0.70	1.0000	-0.0032	0.0152	-0.0113
699	10	2.00	0.20	0.85	1.0000	0.0025	0.0176	-0.0076
700	10	2.00	0.20	0.99	1.0000	0.0109	0.0236	0.0001
701	15	0.00	1.00	0.00	-0.0039	-0.0209	0.0022	-0.0027
702	15	0.00	1.00	0.40	-0.0016	-0.0137	0.0019	0.0115
703	15	0.00	1.00	0.70	0.0124	-0.0012	0.0090	0.0579
704	15	0.00	1.00	0.85	0.0172	0.0093	0.0170	0.0991
705	15	0.00	1.00	0.99	-0.0502	0.0172	0.0236	0.1227
706	15	0.00	0.80	0.00	-0.0009	-0.0190	0.0042	0.0041
707	15	0.00	0.80	0.40	0.0025	-0.0106	0.0046	0.0191
708	15	0.00	0.80	0.70	0.0148	0.0016	0.0107	0.0636
709	15	0.00	0.80	0.85	0.0177	0.0120	0.0183	0.1024
710	15	0.00	0.80	0.99	-0.0500	0.0207	0.0245	0.1230
711	15	0.00	0.60	0.00	0.0064	-0.0158	0.0075	0.0253
712	15	0.00	0.60	0.40	0.0106	-0.0051	0.0092	0.0410
713	15	0.00	0.60	0.70	0.0195	0.0080	0.0152	0.0810
714	15	0.00	0.60	0.85	0.0169	0.0184	0.0222	0.1123
715	15	0.00	0.60	0.99	-0.0535	0.0243	0.0250	0.1226
716	15	0.00	0.40	0.00	0.0204	-0.0076	0.0160	0.0711
717	15	0.00	0.40	0.40	0.0222	0.0049	0.0181	0.0838
718	15	0.00	0.40	0.70	0.0199	0.0177	0.0227	0.1096
719	15	0.00	0.40	0.85	0.0042	0.0238	0.0248	0.1228
720	15	0.00	0.40	0.99	-0.0616	0.0283	0.0257	0.1226
721	15	0.00	0.20	0.00	0.0092	0.0028	0.0268	0.1235
722	15	0.00	0.20	0.40	0.0017	0.0130	0.0250	0.1233
723	15	0.00	0.20	0.70	-0.0144	0.0232	0.0261	0.1264
724	15	0.00	0.20	0.85	-0.0339	0.0270	0.0256	0.1251
725	15	0.00	0.20	0.99	-0.0761	0.0325	0.0269	0.1226
726	15	0.25	1.00	0.00	-0.0032	-0.0196	0.0031	-0.0044
727	15	0.25	1.00	0.40	-0.0014	-0.0128	0.0027	0.0095
728	15	0.25	1.00	0.70	0.0092	-0.0022	0.0083	0.0527
729	15	0.25	1.00	0.85	0.0127	0.0073	0.0157	0.0928
730	15	0.25	1.00	0.99	-0.0460	0.0171	0.0247	0.1286
731	15	0.25	0.80	0.00	0.0017	-0.0177	0.0050	0.0035
732	15	0.25	0.80	0.40	0.0042	-0.0101	0.0051	0.0180
733	15	0.25	0.80	0.70	0.0153	0.0017	0.0114	0.0611
734	15	0.25	0.80	0.85	0.0169	0.0111	0.0181	0.0986
735	15	0.25	0.80	0.99	-0.0445	0.0204	0.0252	0.1276
736	15	0.25	0.60	0.00	0.0117	-0.0137	0.0091	0.0265
737	15	0.25	0.60	0.40	0.0152	-0.0040	0.0103	0.0413
738	15	0.25	0.60	0.70	0.0224	0.0080	0.0157	0.0795
739	15	0.25	0.60	0.85	0.0200	0.0181	0.0225	0.1105
740	15	0.25	0.60	0.99	-0.0445	0.0257	0.0272	0.1279
741	15	0.25	0.40	0.00	0.0274	-0.0058	0.0174	0.0722
742	15	0.25	0.40	0.40	0.0281	0.0053	0.0185	0.0836
743	15	0.25	0.40	0.70	0.0257	0.0175	0.0230	0.1086
744	15	0.25	0.40	0.85	0.0115	0.0243	0.0260	0.1227
745	15	0.25	0.40	0.99	-0.0504	0.0294	0.0277	0.1260
746	15	0.25	0.20	0.00	0.0187	0.0047	0.0283	0.1236
747	15	0.25	0.20	0.40	0.0115	0.0147	0.0268	0.1237
748	15	0.25	0.20	0.70	-0.0051	0.0233	0.0265	0.1254
749	15	0.25	0.20	0.85	-0.0218	0.0291	0.0281	0.1266
750	15	0.25	0.20	0.99	-0.0634	0.0328	0.0280	0.1234
751	15	0.50	1.00	0.00	0.0004	-0.0154	0.0060	-0.0060
752	15	0.50	1.00	0.40	-0.0005	-0.0111	0.0045	0.0049
753	15	0.50	1.00	0.70	0.0037	-0.0041	0.0076	0.0406
754	15	0.50	1.00	0.85	0.0059	0.0041	0.0143	0.0784
755	15	0.50	1.00	0.99	-0.0332	0.0166	0.0266	0.1330
756	15	0.50	0.80	0.00	0.0100	-0.0132	0.0082	0.0045
757	15	0.50	0.80	0.40	0.0107	-0.0076	0.0076	0.0166
758	15	0.50	0.80	0.70	0.0166	0.0013	0.0120	0.0532
759	15	0.50	0.80	0.85	0.0167	0.0089	0.0177	0.0877
760	15	0.50	0.80	0.99	-0.0267	0.0214	0.0285	0.1333
761	15	0.50	0.60	0.00	0.0256	-0.0085	0.0131	0.0297
762	15	0.50	0.60	0.40	0.0278	-0.0004	0.0139	0.0427
763	15	0.50	0.60	0.70	0.0317	0.0093	0.0180	0.0756

764	15	0.50	0.60	0.85	0.0288	0.0180	0.0241	0.1044
765	15	0.50	0.60	0.99	-0.0233	0.0255	0.0294	0.1314
766	15	0.50	0.40	0.00	0.0466	0.0001	0.0220	0.0756
767	15	0.50	0.40	0.40	0.0472	0.0102	0.0233	0.0860
768	15	0.50	0.40	0.70	0.0436	0.0205	0.0271	0.1076
769	15	0.50	0.40	0.85	0.0302	0.0259	0.0293	0.1204
770	15	0.50	0.40	0.99	-0.0233	0.0302	0.0309	0.1285
771	15	0.50	0.20	0.00	0.0416	0.0094	0.0316	0.1210
772	15	0.50	0.20	0.40	0.0372	0.0203	0.0323	0.1235
773	15	0.50	0.20	0.70	0.0218	0.0273	0.0317	0.1244
774	15	0.50	0.20	0.85	0.0060	0.0314	0.0320	0.1249
775	15	0.50	0.20	0.99	-0.0297	0.0352	0.0327	0.1245
776	15	0.75	1.00	0.00	0.0042	-0.0111	0.0085	-0.0107
777	15	0.75	1.00	0.40	0.0008	-0.0098	0.0057	-0.0032
778	15	0.75	1.00	0.70	0.0007	-0.0056	0.0074	0.0260
779	15	0.75	1.00	0.85	0.0034	0.0009	0.0132	0.0616
780	15	0.75	1.00	0.99	-0.0147	0.0151	0.0278	0.1276
781	15	0.75	0.80	0.00	0.0208	-0.0075	0.0123	0.0038
782	15	0.75	0.80	0.40	0.0193	-0.0046	0.0106	0.0125
783	15	0.75	0.80	0.70	0.0198	0.0002	0.0124	0.0413
784	15	0.75	0.80	0.85	0.0214	0.0074	0.0183	0.0746
785	15	0.75	0.80	0.99	-0.0047	0.0199	0.0299	0.1287
786	15	0.75	0.60	0.00	0.0433	-0.0018	0.0182	0.0312
787	15	0.75	0.60	0.40	0.0425	0.0026	0.0169	0.0400
788	15	0.75	0.60	0.70	0.0435	0.0098	0.0200	0.0673
789	15	0.75	0.60	0.85	0.0418	0.0174	0.0256	0.0942
790	15	0.75	0.60	0.99	0.0060	0.0261	0.0330	0.1293
791	15	0.75	0.40	0.00	0.0706	0.0075	0.0277	0.0760
792	15	0.75	0.40	0.40	0.0702	0.0152	0.0284	0.0839
793	15	0.75	0.40	0.70	0.0652	0.0230	0.0311	0.1011
794	15	0.75	0.40	0.85	0.0540	0.0273	0.0329	0.1132
795	15	0.75	0.40	0.99	0.0078	0.0306	0.0342	0.1254
796	15	0.75	0.20	0.00	0.0713	0.0165	0.0370	0.1148
797	15	0.75	0.20	0.40	0.0669	0.0247	0.0368	0.1161
798	15	0.75	0.20	0.70	0.0527	0.0300	0.0359	0.1166
799	15	0.75	0.20	0.85	0.0407	0.0339	0.0369	0.1186
800	15	0.75	0.20	0.99	0.0068	0.0363	0.0367	0.1190
801	15	1.00	1.00	0.00	0.0050	-0.0096	0.0081	-0.0188
802	15	1.00	1.00	0.40	0.0015	-0.0100	0.0056	-0.0129
803	15	1.00	1.00	0.70	0.0011	-0.0074	0.0070	0.0127
804	15	1.00	1.00	0.85	0.0068	-0.0010	0.0135	0.0478
805	15	1.00	1.00	0.99	0.0013	0.0128	0.0286	0.1168
806	15	1.00	0.80	0.00	0.0272	-0.0050	0.0128	-0.0023
807	15	1.00	0.80	0.40	0.0249	-0.0041	0.0110	0.0045
808	15	1.00	0.80	0.70	0.0244	-0.0013	0.0123	0.0292
809	15	1.00	0.80	0.85	0.0291	0.0061	0.0193	0.0622
810	15	1.00	0.80	0.99	0.0141	0.0185	0.0316	0.1186
811	15	1.00	0.60	0.00	0.0566	0.0027	0.0206	0.0268
812	15	1.00	0.60	0.40	0.0546	0.0045	0.0187	0.0330
813	15	1.00	0.60	0.70	0.0546	0.0096	0.0214	0.0560
814	15	1.00	0.60	0.85	0.0548	0.0162	0.0270	0.0819
815	15	1.00	0.60	0.99	0.0270	0.0246	0.0346	0.1193
816	15	1.00	0.40	0.00	0.0891	0.0128	0.0311	0.0681
817	15	1.00	0.40	0.40	0.0877	0.0178	0.0311	0.0736
818	15	1.00	0.40	0.70	0.0814	0.0226	0.0323	0.0870
819	15	1.00	0.40	0.85	0.0697	0.0267	0.0347	0.0996
820	15	1.00	0.40	0.99	0.0312	0.0292	0.0358	0.1138
821	15	1.00	0.20	0.00	0.0881	0.0200	0.0383	0.0972
822	15	1.00	0.20	0.40	0.0835	0.0253	0.0373	0.0972
823	15	1.00	0.20	0.70	0.0715	0.0299	0.0374	0.0992
824	15	1.00	0.20	0.85	0.0608	0.0322	0.0376	0.1008
825	15	1.00	0.20	0.99	0.0316	0.0339	0.0376	0.1033
826	15	1.50	1.00	0.00	0.0020	-0.0107	0.0031	-0.0390
827	15	1.50	1.00	0.40	0.0003	-0.0137	0.0017	-0.0334
828	15	1.50	1.00	0.70	0.0020	-0.0110	0.0064	-0.0067
829	15	1.50	1.00	0.85	0.0118	-0.0059	0.0132	0.0257
830	15	1.50	1.00	0.99	0.0074	0.0044	0.0264	0.0637
831	15	1.50	0.80	0.00	0.0259	-0.0064	0.0075	-0.0243
832	15	1.50	0.80	0.40	0.0243	-0.0084	0.0067	-0.0181
833	15	1.50	0.80	0.70	0.0257	-0.0053	0.0113	0.0071
834	15	1.50	0.80	0.85	0.0293	0.0007	0.0185	0.0375
835	15	1.50	0.80	0.99	0.0094	0.0088	0.0282	0.0846
836	15	1.50	0.60	0.00	0.0524	0.0005	0.0143	-0.0010
837	15	1.50	0.60	0.40	0.0517	0.0000	0.0142	0.0052
838	15	1.50	0.60	0.70	0.0509	0.0037	0.0185	0.0264
839	15	1.50	0.60	0.85	0.0460	0.0090	0.0243	0.0501
840	15	1.50	0.60	0.99	0.0111	0.0132	0.0295	0.0807
841	15	1.50	0.40	0.00	0.0779	0.0082	0.0221	0.0261
842	15	1.50	0.40	0.40	0.0727	0.0089	0.0219	0.0301
843	15	1.50	0.40	0.70	0.0591	0.0123	0.0249	0.0430
844	15	1.50	0.40	0.85	0.0512	0.0139	0.0267	0.0539
845	15	1.50	0.40	0.99	0.0093	0.0164	0.0296	0.0689
846	15	1.50	0.20	0.00	0.0587	0.0118	0.0257	0.0387
847	15	1.50	0.20	0.40	0.0556	0.0145	0.0264	0.0405
848	15	1.50	0.20	0.70	0.0422	0.0155	0.0261	0.0427
849	15	1.50	0.20	0.85	0.0270	0.0179	0.0281	0.0465
850	15	1.50	0.20	0.99	-0.0015	0.0217	0.0318	0.0537
851	15	2.00	1.00	0.00	1.0000	-0.0110	-0.0010	-0.0521
852	15	2.00	1.00	0.40	1.0000	-0.0158	-0.0005	-0.0451
853	15	2.00	1.00	0.70	1.0000	-0.0154	0.0048	-0.0197
854	15	2.00	1.00	0.85	1.0000	-0.0122	0.0114	0.0079
855	15	2.00	1.00	0.99	1.0000	-0.0076	0.0208	0.0502

856	15	2.00	0.80	0.00	1.0000	-0.0089	0.0011	-0.0439
857	15	2.00	0.80	0.40	1.0000	-0.0126	0.0024	-0.0364
858	15	2.00	0.80	0.70	1.0000	-0.0113	0.0082	-0.0116
859	15	2.00	0.80	0.85	1.0000	-0.0086	0.0138	0.0129
860	15	2.00	0.80	0.99	1.0000	-0.0057	0.0197	0.0456
861	15	2.00	0.60	0.00	1.0000	-0.0056	0.0043	-0.0315
862	15	2.00	0.60	0.40	1.0000	-0.0082	0.0058	-0.0248
863	15	2.00	0.60	0.70	1.0000	-0.0068	0.0108	-0.0042
864	15	2.00	0.60	0.85	1.0000	-0.0057	0.0141	0.0134
865	15	2.00	0.60	0.99	1.0000	-0.0044	0.0180	0.0353
866	15	2.00	0.40	0.00	1.0000	-0.0031	0.0067	-0.0204
867	15	2.00	0.40	0.40	1.0000	-0.0045	0.0083	-0.0154
868	15	2.00	0.40	0.70	1.0000	-0.0045	0.0110	-0.0033
869	15	2.00	0.40	0.85	1.0000	-0.0042	0.0130	0.0063
870	15	2.00	0.40	0.99	1.0000	-0.0042	0.0151	0.0187
871	15	2.00	0.20	0.00	1.0000	-0.0002	0.0095	-0.0154
872	15	2.00	0.20	0.40	1.0000	-0.0014	0.0102	-0.0137
873	15	2.00	0.20	0.70	1.0000	-0.0023	0.0111	-0.0101
874	15	2.00	0.20	0.85	1.0000	-0.0017	0.0130	-0.0064
875	15	2.00	0.20	0.99	1.0000	0.0035	0.0198	0.0013

Appendix Q. Rank of Mean Relative Error Data for MCBN Analysis

This Appendix has the rankings associated with the analysis of the MCBN technique.

<u>Index</u>

Design Point - DP

<u>Parameters</u>

Sample Size - SS

Bias - BIAS

Ratio of Standard Deviations - STDR

Correlation - CORR

<u>Estimation Methods</u>

RAND-234 - R234

Modified CBN - MCBN

CBN - CBN

Rayleigh method - RAYL

TP	SS	BIAS	STDR	CORR	R234	MCBN	CBN	RAYL
1	3	0.00	1.00	0.00	1.0000	4.0000	3.0000	1.0000
2	3	0.00	1.00	0.40	1.0000	4.0000	3.0000	2.0000
3	3	0.00	1.00	0.70	2.0000	1.0000	4.0000	3.0000
4	3	0.00	1.00	0.85	2.0000	1.0000	4.0000	3.0000
5	3	0.00	1.00	0.99	2.0000	1.0000	4.0000	3.0000
6	3	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000
7	3	0.00	0.80	0.40	1.0000	4.0000	3.0000	2.0000
8	3	0.00	0.80	0.70	2.0000	1.0000	4.0000	3.0000
9	3	0.00	0.80	0.85	2.0000	1.0000	4.0000	3.0000
10	3	0.00	0.80	0.99	2.0000	1.0000	4.0000	3.0000
11	3	0.00	0.60	0.00	1.0000	4.0000	3.0000	2.0000
12	3	0.00	0.60	0.40	2.0000	1.0000	4.0000	3.0000
13	3	0.00	0.60	0.70	2.0000	1.0000	4.0000	3.0000
14	3	0.00	0.60	0.85	2.0000	1.0000	4.0000	3.0000
15	3	0.00	0.60	0.99	1.0000	2.0000	4.0000	3.0000
16	3	0.00	0.40	0.00	2.0000	1.0000	4.0000	3.0000
17	3	0.00	0.40	0.40	2.0000	1.0000	4.0000	3.0000
18	3	0.00	0.40	0.70	2.0000	1.0000	4.0000	3.0000
19	3	0.00	0.40	0.85	1.0000	2.0000	4.0000	3.0000
20	3	0.00	0.40	0.99	1.0000	2.0000	4.0000	3.0000
21	3	0.00	0.20	0.00	2.0000	1.0000	4.0000	3.0000
22	3	0.00	0.20	0.40	2.0000	1.0000	4.0000	3.0000
23	3	0.00	0.20	0.70	1.0000	2.0000	4.0000	3.0000
24	3	0.00	0.20	0.85	1.0000	2.0000	4.0000	3.0000
25	3	0.00	0.20	0.99	1.0000	2.0000	4.0000	3.0000
26	3	0.25	1.00	0.00	1.0000	4.0000	3.0000	2.0000
27	3	0.25	1.00	0.40	1.0000	4.0000	3.0000	2.0000
28	3	0.25	1.00	0.70	2.0000	1.0000	4.0000	3.0000
29	3	0.25	1.00	0.85	2.0000	1.0000	4.0000	3.0000
30	3	0.25	1.00	0.99	2.0000	1.0000	4.0000	3.0000
31	3	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000
32	3	0.25	0.80	0.40	1.0000	3.0000	4.0000	1.0000
33	3	0.25	0.80	0.70	2.0000	1.0000	4.0000	3.0000
34	3	0.25	0.80	0.85	2.0000	1.0000	4.0000	3.0000

35	3	0.25	0.80	0.99	2.0000	1.0000	4.0000	3.0000
36	3	0.25	0.60	0.00	1.0000	3.0000	3.0000	2.0000
37	3	0.25	0.60	0.40	2.0000	1.0000	4.0000	3.0000
38	3	0.25	0.60	0.70	2.0000	1.0000	4.0000	3.0000
39	3	0.25	0.60	0.85	2.0000	1.0000	4.0000	3.0000
40	3	0.25	0.60	0.99	1.0000	2.0000	4.0000	3.0000
41	3	0.25	0.40	0.00	2.0000	1.0000	4.0000	3.0000
42	3	0.25	0.40	0.40	2.0000	1.0000	4.0000	3.0000
43	3	0.25	0.40	0.70	2.0000	1.0000	4.0000	3.0000
44	3	0.25	0.40	0.85	1.0000	2.0000	4.0000	3.0000
45	3	0.25	0.40	0.99	1.0000	2.0000	4.0000	3.0000
46	3	0.25	0.20	0.00	2.0000	1.0000	4.0000	3.0000
47	3	0.25	0.20	0.40	2.0000	1.0000	4.0000	3.0000
48	3	0.25	0.20	0.70	1.0000	2.0000	4.0000	3.0000
49	3	0.25	0.20	0.85	1.0000	2.0000	4.0000	3.0000
50	3	0.25	0.20	0.99	1.0000	2.0000	4.0000	3.0000
51	3	0.50	1.00	0.00	4.0000	3.0000	2.0000	1.0000
52	3	0.50	1.00	0.40	4.0000	3.0000	2.0000	1.0000
53	3	0.50	1.00	0.70	4.0000	1.0000	3.0000	2.0000
54	3	0.50	1.00	0.85	4.0000	1.0000	3.0000	2.0000
55	3	0.50	1.00	0.99	4.0000	1.0000	3.0000	2.0000
56	3	0.50	0.80	0.00	4.0000	3.0000	2.0000	1.0000
57	3	0.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000
58	3	0.50	0.80	0.70	4.0000	1.0000	3.0000	2.0000
59	3	0.50	0.80	0.85	4.0000	1.0000	3.0000	2.0000
60	3	0.50	0.80	0.99	4.0000	1.0000	3.0000	2.0000
61	3	0.50	0.60	0.00	4.0000	2.0000	3.0000	1.0000
62	3	0.50	0.60	0.40	4.0000	1.0000	3.0000	2.0000
63	3	0.50	0.60	0.70	4.0000	1.0000	3.0000	2.0000
64	3	0.50	0.60	0.85	4.0000	1.0000	3.0000	2.0000
65	3	0.50	0.60	0.99	4.0000	1.0000	3.0000	2.0000
66	3	0.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
67	3	0.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
68	3	0.50	0.40	0.70	4.0000	1.0000	3.0000	2.0000
69	3	0.50	0.40	0.85	4.0000	1.0000	3.0000	2.0000
70	3	0.50	0.40	0.99	4.0000	1.0000	3.0000	2.0000
71	3	0.50	0.20	0.00	4.0000	1.0000	3.0000	2.0000
72	3	0.50	0.20	0.40	4.0000	1.0000	3.0000	2.0000
73	3	0.50	0.20	0.70	4.0000	1.0000	3.0000	2.0000
74	3	0.50	0.20	0.85	4.0000	1.0000	3.0000	2.0000
75	3	0.50	0.20	0.99	4.0000	2.0000	3.0000	1.0000
76	3	0.75	1.00	0.00	4.0000	3.0000	2.0000	1.0000
77	3	0.75	1.00	0.40	4.0000	3.0000	2.0000	1.0000
78	3	0.75	1.00	0.70	4.0000	1.0000	3.0000	2.0000
79	3	0.75	1.00	0.85	4.0000	1.0000	3.0000	2.0000
80	3	0.75	1.00	0.99	4.0000	1.0000	3.0000	2.0000
81	3	0.75	0.80	0.00	4.0000	3.0000	2.0000	1.0000
82	3	0.75	0.80	0.40	4.0000	2.0000	3.0000	1.0000
83	3	0.75	0.80	0.70	4.0000	1.0000	3.0000	2.0000
84	3	0.75	0.80	0.85	4.0000	1.0000	3.0000	2.0000
85	3	0.75	0.80	0.99	4.0000	1.0000	3.0000	2.0000
86	3	0.75	0.60	0.00	4.0000	2.0000	3.0000	1.0000
87	3	0.75	0.60	0.40	4.0000	1.0000	3.0000	2.0000
88	3	0.75	0.60	0.70	4.0000	1.0000	3.0000	2.0000
89	3	0.75	0.60	0.85	4.0000	1.0000	3.0000	2.0000
90	3	0.75	0.60	0.99	4.0000	1.0000	3.0000	2.0000
91	3	0.75	0.40	0.00	4.0000	1.0000	3.0000	2.0000
92	3	0.75	0.40	0.40	4.0000	1.0000	3.0000	2.0000
93	3	0.75	0.40	0.70	4.0000	1.0000	3.0000	2.0000
94	3	0.75	0.40	0.85	4.0000	1.0000	3.0000	2.0000
95	3	0.75	0.40	0.99	4.0000	1.0000	3.0000	2.0000
96	3	0.75	0.20	0.00	4.0000	1.0000	3.0000	2.0000
97	3	0.75	0.20	0.40	4.0000	1.0000	3.0000	2.0000
98	3	0.75	0.20	0.70	4.0000	1.0000	3.0000	2.0000
99	3	0.75	0.20	0.85	4.0000	2.0000	3.0000	1.0000
100	3	0.75	0.20	0.99	4.0000	2.0000	3.0000	1.0000
101	3	1.00	1.00	0.00	4.0000	3.0000	2.0000	1.0000
102	3	1.00	1.00	0.40	4.0000	3.0000	2.0000	1.0000
103	3	1.00	1.00	0.70	4.0000	2.0000	3.0000	1.0000
104	3	1.00	1.00	0.85	4.0000	1.0000	3.0000	2.0000
105	3	1.00	1.00	0.99	4.0000	1.0000	3.0000	2.0000
106	3	1.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000
107	3	1.00	0.80	0.40	4.0000	2.0000	3.0000	1.0000
108	3	1.00	0.80	0.70	4.0000	1.0000	3.0000	2.0000
109	3	1.00	0.80	0.85	4.0000	1.0000	3.0000	2.0000
110	3	1.00	0.80	0.99	4.0000	1.0000	3.0000	2.0000
111	3	1.00	0.60	0.00	4.0000	1.0000	3.0000	2.0000
112	3	1.00	0.60	0.40	4.0000	1.0000	3.0000	2.0000
113	3	1.00	0.60	0.70	4.0000	1.0000	3.0000	2.0000
114	3	1.00	0.60	0.85	4.0000	1.0000	3.0000	2.0000
115	3	1.00	0.60	0.99	4.0000	1.0000	3.0000	2.0000
116	3	1.00	0.40	0.00	4.0000	1.0000	3.0000	2.0000
117	3	1.00	0.40	0.40	4.0000	1.0000	3.0000	2.0000
118	3	1.00	0.40	0.70	4.0000	1.0000	3.0000	2.0000
119	3	1.00	0.40	0.85	4.0000	1.0000	3.0000	2.0000
120	3	1.00	0.40	0.99	4.0000	1.0000	3.0000	2.0000
121	3	1.00	0.20	0.00	4.0000	1.0000	3.0000	2.0000
122	3	1.00	0.20	0.40	4.0000	1.0000	3.0000	2.0000
123	3	1.00	0.20	0.70	4.0000	2.0000	3.0000	1.0000
124	3	1.00	0.20	0.85	4.0000	2.0000	3.0000	1.0000
125	3	1.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000
126	3	1.50	1.00	0.00	4.0000	3.0000	1.0000	2.0000

127	3	1.50	1.00	0.40	4.0000	3.0000	1.0000	2.0000
128	3	1.50	1.00	0.70	4.0000	2.0000	3.0000	1.0000
129	3	1.50	1.00	0.85	4.0000	1.0000	3.0000	2.0000
130	3	1.50	1.00	0.99	4.0000	1.0000	3.0000	2.0000
131	3	1.50	0.80	0.00	4.0000	3.0000	2.0000	1.0000
132	3	1.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000
133	3	1.50	0.80	0.70	4.0000	1.0000	3.0000	2.0000
134	3	1.50	0.80	0.85	4.0000	1.0000	3.0000	2.0000
135	3	1.50	0.80	0.99	4.0000	1.0000	3.0000	2.0000
136	3	1.50	0.60	0.00	4.0000	2.0000	3.0000	1.0000
137	3	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
138	3	1.50	0.60	0.70	4.0000	1.0000	3.0000	2.0000
139	3	1.50	0.60	0.85	4.0000	1.0000	3.0000	2.0000
140	3	1.50	0.60	0.99	4.0000	1.0000	3.0000	2.0000
141	3	1.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
142	3	1.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
143	3	1.50	0.40	0.70	4.0000	2.0000	3.0000	1.0000
144	3	1.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000
145	3	1.50	0.40	0.99	4.0000	2.0000	3.0000	1.0000
146	3	1.50	0.20	0.00	4.0000	1.0000	3.0000	2.0000
147	3	1.50	0.20	0.40	4.0000	2.0000	3.0000	1.0000
148	3	1.50	0.20	0.70	4.0000	2.0000	3.0000	1.0000
149	3	1.50	0.20	0.85	4.0000	2.0000	3.0000	1.0000
150	3	1.50	0.20	0.99	4.0000	2.0000	2.0000	1.0000
151	3	2.00	1.00	0.00	4.0000	3.0000	1.0000	2.0000
152	3	2.00	1.00	0.40	4.0000	2.0000	1.0000	3.0000
153	3	2.00	1.00	0.70	4.0000	1.0000	3.0000	2.0000
154	3	2.00	1.00	0.85	4.0000	1.0000	3.0000	2.0000
155	3	2.00	1.00	0.99	4.0000	1.0000	3.0000	2.0000
156	3	2.00	0.80	0.00	4.0000	3.0000	1.0000	2.0000
157	3	2.00	0.80	0.40	4.0000	2.0000	1.0000	3.0000
158	3	2.00	0.80	0.70	4.0000	1.0000	3.0000	2.0000
159	3	2.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
160	3	2.00	0.80	0.99	4.0000	1.0000	3.0000	2.0000
161	3	2.00	0.60	0.00	4.0000	3.0000	1.0000	2.0000
162	3	2.00	0.60	0.40	4.0000	1.0000	2.0000	2.0000
163	3	2.00	0.60	0.70	4.0000	2.0000	3.0000	1.0000
164	3	2.00	0.60	0.85	4.0000	2.0000	3.0000	1.0000
165	3	2.00	0.60	0.99	4.0000	1.0000	3.0000	1.0000
166	3	2.00	0.40	0.00	4.0000	1.0000	3.0000	2.0000
167	3	2.00	0.40	0.40	4.0000	1.0000	3.0000	2.0000
168	3	2.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
169	3	2.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
170	3	2.00	0.40	0.99	4.0000	2.0000	3.0000	1.0000
171	3	2.00	0.20	0.00	4.0000	1.0000	3.0000	2.0000
172	3	2.00	0.20	0.40	4.0000	2.0000	3.0000	1.0000
173	3	2.00	0.20	0.70	4.0000	2.0000	3.0000	1.0000
174	3	2.00	0.20	0.85	4.0000	3.0000	2.0000	1.0000
175	3	2.00	0.20	0.99	4.0000	3.0000	2.0000	1.0000
176	5	0.00	1.00	0.00	2.0000	4.0000	3.0000	1.0000
177	5	0.00	1.00	0.40	2.0000	4.0000	3.0000	1.0000
178	5	0.00	1.00	0.70	2.0000	1.0000	3.0000	4.0000
179	5	0.00	1.00	0.85	2.0000	1.0000	3.0000	4.0000
180	5	0.00	1.00	0.99	2.0000	1.0000	3.0000	4.0000
181	5	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000
182	5	0.00	0.80	0.40	2.0000	4.0000	3.0000	1.0000
183	5	0.00	0.80	0.70	2.0000	1.0000	2.0000	4.0000
184	5	0.00	0.80	0.85	2.0000	1.0000	3.0000	4.0000
185	5	0.00	0.80	0.99	2.0000	1.0000	3.0000	4.0000
186	5	0.00	0.60	0.00	2.0000	4.0000	3.0000	1.0000
187	5	0.00	0.60	0.40	1.0000	4.0000	2.0000	3.0000
188	5	0.00	0.60	0.70	2.0000	1.0000	2.0000	4.0000
189	5	0.00	0.60	0.85	2.0000	1.0000	3.0000	4.0000
190	5	0.00	0.60	0.99	2.0000	1.0000	3.0000	4.0000
191	5	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000
192	5	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
193	5	0.00	0.40	0.70	2.0000	1.0000	3.0000	4.0000
194	5	0.00	0.40	0.85	2.0000	1.0000	3.0000	4.0000
195	5	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
196	5	0.00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
197	5	0.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
198	5	0.00	0.20	0.70	2.0000	1.0000	3.0000	4.0000
199	5	0.00	[illegible]	0.85	1.0000	2.0000	3.0000	4.0000
200	5	0.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
201	5	0.25	1.00	0.00	2.0000	4.0000	3.0000	1.0000
202	5	0.25	1.00	0.40	2.0000	4.0000	3.0000	1.0000
203	5	0.25	1.00	0.70	2.0000	1.0000	3.0000	4.0000
204	5	0.25	1.00	0.85	2.0000	1.0000	3.0000	4.0000
205	5	0.25	1.00	0.99	2.0000	1.0000	3.0000	4.0000
206	5	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000
207	5	0.25	0.80	0.40	2.0000	4.0000	3.0000	1.0000
208	5	0.25	0.80	0.70	2.0000	1.0000	3.0000	4.0000
209	5	0.25	0.80	0.85	2.0000	1.0000	3.0000	4.0000
210	5	0.25	0.80	0.99	2.0000	1.0000	3.0000	4.0000
211	5	0.25	0.60	0.00	2.0000	4.0000	3.0000	1.0000
212	5	0.25	0.60	0.40	1.0000	4.0000	2.0000	2.0000
213	5	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
214	5	0.25	0.60	0.85	2.0000	1.0000	3.0000	4.0000
215	5	0.25	0.60	0.99	2.0000	1.0000	3.0000	4.0000
216	5	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
217	5	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
218	5	0.25	0.40	0.70	2.0000	1.0000	3.0000	4.0000

219	5	0.25	0.40	0.85	2.0000	1.0000	3.0000	4.0000
220	5	0.25	0.40	0.99	1.0000	2.0000	3.0000	4.0000
221	5	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
222	5	0.25	0.20	0.40	2.0000	1.0000	3.0000	4.0000
223	5	0.25	0.20	0.70	2.0000	1.0000	3.0000	4.0000
224	5	0.25	0.20	0.85	1.0000	2.0000	3.0000	4.0000
225	5	0.25	0.20	0.99	1.0000	2.0000	3.0000	4.0000
226	5	0.50	1.00	0.00	2.0000	4.0000	3.0000	1.0000
227	5	0.50	1.00	0.40	2.0000	4.0000	3.0000	1.0000
228	5	0.50	1.00	0.70	1.0000	2.0000	3.0000	3.0000
229	5	0.50	1.00	0.85	2.0000	1.0000	3.0000	4.0000
230	5	0.50	1.00	0.99	2.0000	1.0000	3.0000	4.0000
231	5	0.50	0.80	0.00	2.0000	4.0000	3.0000	1.0000
232	5	0.50	0.80	0.40	2.0000	4.0000	3.0000	1.0000
233	5	0.50	0.80	0.70	2.0000	1.0000	3.0000	4.0000
234	5	0.50	0.80	0.85	2.0000	1.0000	3.0000	4.0000
235	5	0.50	0.80	0.99	2.0000	1.0000	3.0000	4.0000
236	5	0.50	0.60	0.00	3.0000	4.0000	2.0000	1.0000
237	5	0.50	0.60	0.40	4.0000	1.0000	3.0000	2.0000
238	5	0.50	0.60	0.70	2.0000	1.0000	2.0000	4.0000
239	5	0.50	0.60	0.85	2.0000	1.0000	3.0000	4.0000
240	5	0.50	0.60	0.99	2.0000	1.0000	3.0000	4.0000
241	5	0.50	0.40	0.00	3.0000	1.0000	2.0000	1.0000
242	5	0.50	0.40	0.40	3.0000	1.0000	2.0000	[illegible]
243	5	0.50	0.40	0.70	2.0000	1.0000	3.0000	4.0000
244	5	0.50	0.40	0.85	2.0000	1.0000	3.0000	4.0000
245	5	0.50	0.40	0.99	1.0000	2.0000	3.0000	4.0000
246	5	0.50	0.20	0.00	2.0000	1.0000	3.0000	4.0000
247	5	0.50	0.20	0.40	2.0000	1.0000	3.0000	4.0000
248	5	0.50	0.20	0.70	2.0000	1.0000	3.0000	4.0000
249	5	0.50	0.20	0.85	1.0000	2.0000	3.0000	4.0000
250	5	0.50	0.20	0.99	1.0000	2.0000	3.0000	4.0000
251	5	0.75	1.00	0.00	2.0000	4.0000	3.0000	1.0000
252	5	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000
253	5	0.75	1.00	0.70	1.0000	4.0000	3.0000	2.0000
254	5	0.75	1.00	0.85	2.0000	1.0000	3.0000	4.0000
255	5	0.75	1.00	0.99	2.0000	1.0000	3.0000	4.0000
256	5	0.75	0.80	0.00	2.0000	4.0000	3.0000	1.0000
257	5	0.75	0.80	0.40	2.0000	4.0000	3.0000	1.0000
258	5	0.75	0.80	0.70	2.0000	1.0000	4.0000	3.0000
259	5	0.75	0.80	0.85	2.0000	1.0000	3.0000	4.0000
260	5	0.75	0.80	0.99	2.0000	1.0000	3.0000	4.0000
261	5	0.75	0.60	0.00	4.0000	2.0000	2.0000	1.0000
262	5	0.75	0.60	0.40	4.0000	1.0000	3.0000	2.0000
263	5	0.75	0.60	0.70	2.0000	1.0000	2.0000	4.0000
264	5	0.75	0.60	0.85	2.0000	1.0000	3.0000	4.0000
265	5	0.75	0.60	0.99	1.0000	2.0000	3.0000	4.0000
266	5	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
267	5	0.75	0.40	0.40	4.0000	1.0000	2.0000	3.0000
268	5	0.75	0.40	0.70	2.0000	1.0000	3.0000	4.0000
269	5	0.75	0.40	0.85	2.0000	1.0000	3.0000	4.0000
270	5	0.75	0.40	0.99	1.0000	2.0000	3.0000	4.0000
271	5	0.75	0.20	0.00	2.0000	1.0000	3.0000	4.0000
272	5	0.75	0.20	0.40	2.0000	1.0000	3.0000	4.0000
273	5	0.75	0.20	0.70	2.0000	1.0000	3.0000	4.0000
274	5	0.75	0.20	0.85	1.0000	2.0000	3.0000	4.0000
275	5	0.75	0.20	0.99	1.0000	2.0000	3.0000	4.0000
276	5	1.00	1.00	0.00	4.0000	3.0000	2.0000	1.0000
277	5	1.00	1.00	0.40	4.0000	3.0000	2.0000	1.0000
278	5	1.00	1.00	0.70	4.0000	3.0000	2.0000	1.0000
279	5	1.00	1.00	0.85	4.0000	1.0000	2.0000	2.0000
280	5	1.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
281	5	1.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000
282	5	1.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000
203	5	1.00	0.80	0.70	4.0000	1.0000	3.0000	2.0000
284	5	1.00	0.80	0.85	4.0000	1.0000	2.0000	3.0000
285	5	1.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
286	5	1.00	0.60	0.00	4.0000	2.0000	3.0000	1.0000
287	5	1.00	0.60	0.40	4.0000	1.0000	3.0000	2.0000
288	5	1.00	0.60	0.70	4.0000	1.0000	3.0000	2.0000
289	5	1.00	0.60	0.85	4.0000	1.0000	2.0000	3.0000
290	5	1.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
291	5	1.00	0.40	0.00	4.0000	1.0000	3.0000	2.0000
292	5	1.00	0.40	0.40	4.0000	1.0000	3.0000	2.0000
293	5	1.00	0.40	0.70	4.0000	1.0000	2.0000	3.0000
294	5	1.00	0.40	0.85	4.0000	1.0000	2.0000	3.0000
295	5	1.00	0.40	0.99	4.0000	1.0000	2.0000	3.0000
296	5	1.00	0.20	0.00	4.0000	1.0000	2.0000	3.0000
297	5	1.00	0.20	0.40	4.0000	1.0000	2.0000	3.0000
298	5	1.00	0.20	0.70	4.0000	1.0000	2.0000	3.0000
299	5	1.00	0.20	0.85	4.0000	1.0000	2.0000	3.0000
300	5	1.00	0.20	0.99	4.0000	1.0000	2.0000	3.0000
301	5	1.50	1.00	0.00	4.0000	3.0000	1.0000	2.0000
302	5	1.50	1.00	0.40	4.0000	3.0000	1.0000	2.0000
303	5	1.50	1.00	0.70	4.0000	3.0000	2.0000	1.0000
304	5	1.50	1.00	0.85	4.0000	1.0000	3.0000	2.0000
305	5	1.50	1.00	0.99	4.0000	1.0000	2.0000	3.0000
306	5	1.50	0.80	0.00	4.0000	3.0000	1.0000	2.0000
307	5	1.50	0.80	0.40	4.0000	3.0000	2.0000	1.0000
308	5	1.50	0.80	0.70	4.0000	2.0000	3.0000	1.0000
309	5	1.50	0.80	0.85	4.0000	1.0000	3.0000	2.0000
310	5	1.50	0.80	0.99	4.0000	1.0000	2.0000	3.0000

311	5	1.50	0.60	0.00	4.0000	3.0000	2.0000	1.0000
312	5	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
313	5	1.50	0.60	0.70	4.0000	1.0000	3.0000	2.0000
314	5	1.50	0.60	0.85	4.0000	1.0000	3.0000	2.0000
315	5	1.50	0.60	0.99	4.0000	1.0000	2.0000	3.0000
316	5	1.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
317	5	1.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
318	5	1.50	0.40	0.70	4.0000	1.0000	3.0000	2.0000
319	5	1.50	0.40	0.85	4.0000	1.0000	3.0000	2.0000
320	5	1.50	0.40	0.99	4.0000	1.0000	3.0000	2.0000
321	5	1.50	0.20	0.00	4.0000	1.0000	3.0000	2.0000
322	5	1.50	0.20	0.40	4.0000	1.0000	3.0000	2.0000
323	5	1.50	0.20	0.70	4.0000	1.0000	3.0000	2.0000
324	5	1.50	0.20	0.85	4.0000	2.0000	3.0000	1.0000
325	5	1.50	0.20	0.96	4.0000	2.0000	3.0000	1.0000
326	5	2.00	1.00	0.00	4.0000	3.0000	1.0000	2.0000
327	5	2.00	1.00	0.40	4.0000	3.0000	1.0000	2.0000
328	5	2.00	1.00	0.70	4.0000	3.0000	1.0000	2.0000
329	5	2.00	1.00	0.85	4.0000	2.0000	3.0000	1.0000
330	5	2.00	1.00	0.99	4.0000	1.0000	2.0000	2.0000
331	5	2.00	0.80	0.00	4.0000	3.0000	1.0000	2.0000
332	5	2.00	0.80	0.40	4.0000	3.0000	1.0000	2.0000
333	5	2.00	0.80	0.70	4.0000	3.0000	2.0000	1.0000
334	5	2.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
335	5	2.00	0.80	0.99	4.0000	1.0000	3.0000	2.0000
336	5	2.00	0.60	0.00	4.0000	3.0000	1.0000	2.0000
337	5	2.00	0.60	0.40	4.0000	3.0000	1.0000	2.0000
338	5	2.00	0.60	0.70	4.0000	2.0000	3.0000	1.0000
339	5	2.00	0.60	0.85	4.0000	1.0000	3.0000	2.0000
340	5	2.00	0.60	0.99	4.0000	1.0000	3.0000	2.0000
341	5	2.00	0.40	0.00	4.0000	3.0000	1.0000	2.0000
342	5	2.00	0.40	0.40	4.0000	2.0000	3.0000	1.0000
343	5	2.00	0.40	0.70	4.0000	1.0000	3.0000	2.0000
344	5	2.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
345	5	2.00	0.40	0.99	4.0000	1.0000	3.0000	1.0000
346	5	2.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
347	5	2.00	0.20	0.40	4.0000	1.0000	3.0000	2.0000
348	5	2.00	0.20	0.70	4.0000	2.0000	3.0000	1.0000
349	5	2.00	0.20	0.85	4.0000	2.0000	3.0000	1.0000
350	5	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000
351	7	0.00	1.00	0.00	1.0000	4.0000	3.0000	2.0000
352	7	0.00	1.00	0.40	1.0000	4.0000	2.0000	2.0000
353	7	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000
354	7	0.00	1.00	0.85	2.0000	1.0000	2.0000	4.0000
355	7	0.00	1.00	0.99	1.0000	2.0000	3.0000	4.0000
356	7	0.00	0.80	0.00	2.0000	4.0000	3.0000	1.0000
357	7	0.00	0.80	0.40	1.0000	4.0000	2.0000	3.0000
358	7	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000
359	7	0.00	0.80	0.85	2.0000	1.0000	3.0000	4.0000
360	7	0.00	0.80	0.99	1.0000	1.0000	3.0000	4.0000
361	7	0.00	0.60	0.00	1.0000	4.0000	2.0000	3.0000
362	7	0.00	0.60	0.40	1.0000	4.0000	1.0000	3.0000
363	7	0.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
364	7	0.00	0.60	0.85	2.0000	1.0000	3.0000	4.0000
365	7	0.00	0.60	0.96	2.0000	1.0000	3.0000	4.0000
366	7	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000
367	7	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
368	7	0.00	0.40	0.70	2.0000	1.0000	3.0000	4.0000
369	7	0.00	0.40	0.85	2.0000	1.0000	3.0000	4.0000
370	7	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
371	7	0.00	0.20	0.00	1.0000	2.0000	3.0000	4.0000
372	7	0.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
373	7	0.00	0.20	0.70	2.0000	1.0000	3.0000	4.0000
374	7	0.00	0.20	0.85	1.0000	2.0000	3.0000	4.0000
375	7	0.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
376	7	0.25	1.00	0.00	1.0000	4.0000	3.0000	1.0000
377	7	0.25	1.00	0.40	1.0000	4.0000	3.0000	2.0000
378	7	0.25	1.00	0.70	1.0000	3.0000	1.0000	4.0000
379	7	0.25	1.00	0.85	2.0000	1.0000	3.0000	4.0000
380	7	0.25	1.00	0.99	1.0000	2.0000	3.0000	4.0000
381	7	0.25	0.80	0.00	2.0000	4.0000	3.0000	1.0000
382	7	0.25	0.80	0.40	1.0000	4.0000	2.0000	2.0000
383	7	0.25	0.80	0.70	2.0000	3.0000	1.0000	4.0000
384	7	0.25	0.80	0.85	2.0000	1.0000	3.0000	4.0000
385	7	0.25	0.80	0.99	1.0000	2.0000	3.0000	4.0000
386	7	0.25	0.60	0.00	1.0000	4.0000	2.0000	3.0000
387	7	0.25	0.60	0.40	2.0000	4.0000	1.0000	3.0000
388	7	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
389	7	0.25	0.60	0.85	2.0000	1.0000	3.0000	4.0000
390	7	0.25	0.60	0.99	1.0000	2.0000	3.0000	4.0000
391	7	0.25	0.40	0.00	2.0000	3.0000	1.0000	4.0000
392	7	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
393	7	0.25	0.40	0.70	2.0000	1.0000	3.0000	4.0000
394	7	0.25	0.40	0.85	2.0000	1.0000	3.0000	4.0000
395	7	0.25	0.40	0.99	1.0000	2.0000	3.0000	4.0000
396	7	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
397	7	0.25	0.20	0.40	2.0000	1.0000	3.0000	4.0000
398	7	0.25	0.20	0.70	2.0000	1.0000	3.0000	4.0000
399	7	0.25	0.20	0.85	1.0000	2.0000	3.0000	4.0000
400	7	0.25	0.20	0.99	1.0000	2.0000	3.0000	4.0000
401	7	0.50	1.00	0.00	2.0000	4.0000	3.0000	1.0000
402	7	0.50	1.00	0.40	2.0000	4.0000	3.0000	1.0000

403	7	0.50	1.00	0.70	1.0000	4.0000	2.0000	3.0000
404	7	0.50	1.00	0.85	1.0000	2.0000	3.0000	4.0000
405	7	0.50	1.00	0.99	1.0000	2.0000	3.0000	4.0000
406	7	0.50	0.80	0.00	2.0000	4.0000	3.0000	1.0000
407	7	0.50	0.80	0.40	2.0000	4.0000	3.0000	1.0000
408	7	0.50	0.80	0.70	1.0000	3.0000	1.0000	4.0000
409	7	0.50	0.80	0.85	2.0000	1.0000	3.0000	4.0000
410	7	0.50	0.80	0.99	1.0000	1.0000	3.0000	4.0000
411	7	0.50	0.60	0.00	3.0000	4.0000	1.0000	1.0000
412	7	0.50	0.60	0.40	2.0000	2.0000	1.0000	4.0000
413	7	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
414	7	0.50	0.60	0.85	2.0000	1.0000	3.0000	4.0000
415	7	0.50	0.60	0.99	1.0000	2.0000	3.0000	4.0000
416	7	0.50	0.40	0.00	3.0000	1.0000	2.0000	4.0000
417	7	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
418	7	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
419	7	0.50	0.40	0.85	2.0000	1.0000	3.0000	4.0000
420	7	0.50	0.40	0.99	1.0000	2.0000	3.0000	4.0000
421	7	0.50	0.20	0.00	2.0000	1.0000	3.0000	4.0000
422	7	0.50	0.20	0.40	2.0000	1.0000	3.0000	4.0000
423	7	0.50	0.20	0.70	2.0000	1.0000	3.0000	4.0000
424	7	0.50	0.20	0.85	1.0000	2.0000	3.0000	4.0000
425	7	0.50	0.20	0.99	1.0000	2.0000	3.0000	4.0000
426	7	0.75	1.00	0.00	2.0000	4.0000	3.0000	1.0000
427	7	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000
428	7	0.75	1.00	0.70	1.0000	4.0000	2.0000	3.0000
429	7	0.75	1.00	0.85	1.0000	2.0000	3.0000	4.0000
430	7	0.75	1.00	0.99	1.0000	2.0000	3.0000	4.0000
431	7	0.75	0.80	0.00	3.0000	4.0000	2.0000	1.0000
432	7	0.75	0.80	0.40	3.0000	4.0000	2.0000	1.0000
433	7	0.75	0.80	0.70	3.0000	1.0000	1.0000	4.0000
434	7	0.75	0.80	0.85	2.0000	1.0000	3.0000	4.0000
435	7	0.75	0.80	0.99	2.0000	1.0000	3.0000	4.0000
436	7	0.75	0.60	0.00	4.0000	3.0000	2.0000	1.0000
437	7	0.75	0.60	0.40	4.0000	1.0000	2.0000	3.0000
438	7	0.75	0.60	0.70	3.0000	1.0000	2.0000	4.0000
439	7	0.75	0.60	0.85	2.0000	1.0000	3.0000	4.0000
440	7	0.75	0.60	0.99	1.0000	2.0000	3.0000	4.0000
441	7	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
442	7	0.75	0.40	0.40	3.0000	1.0000	2.0000	4.0000
443	7	0.75	0.40	0.70	3.0000	1.0000	2.0000	4.0000
444	7	0.75	0.40	0.85	2.0000	1.0000	3.0000	4.0000
445	7	0.75	0.40	0.99	1.0000	2.0000	3.0000	4.0000
446	7	0.75	0.20	0.00	2.0000	1.0000	3.0000	4.0000
447	7	0.75	0.20	0.40	2.0000	1.0000	3.0000	4.0000
448	7	0.75	0.20	0.70	2.0000	1.0000	3.0000	4.0000
449	7	0.75	0.20	0.85	1.0000	2.0000	3.0000	4.0000
450	7	0.75	0.20	0.99	1.0000	2.0000	3.0000	4.0000
451	7	1.00	1.00	0.00	1.0000	4.0000	2.0000	2.0000
452	7	1.00	1.00	0.40	1.0000	4.0000	3.0000	2.0000
453	7	1.00	1.00	0.70	1.0000	4.0000	3.0000	2.0000
454	7	1.00	1.00	0.85	1.0000	2.0000	3.0000	4.0000
455	7	1.00	1.00	0.99	1.0000	2.0000	3.0000	4.0000
456	7	1.00	0.80	0.00	3.0000	4.0000	2.0000	1.0000
457	7	1.00	0.80	0.40	3.0000	4.0000	2.0000	1.0000
458	7	1.00	0.80	0.70	1.0000	1.0000	1.0000	1.0000
459	7	1.00	0.80	0.85	2.0000	1.0000	3.0000	4.0000
460	7	1.00	0.80	0.99	2.0000	1.0000	3.0000	4.0000
461	7	1.00	0.60	0.00	4.0000	2.0000	3.0000	1.0000
462	7	1.00	0.60	0.40	4.0000	1.0000	3.0000	2.0000
463	7	1.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
464	7	1.00	0.60	0.85	2.0000	1.0000	3.0000	4.0000
465	7	1.00	0.60	0.99	1.0000	2.0000	3.0000	4.0000
466	7	1.00	0.40	0.00	4.0000	1.0000	2.0000	3.0000
467	7	1.00	0.40	0.40	4.0000	1.0000	2.0000	3.0000
468	7	1.00	0.40	0.70	3.0000	1.0000	2.0000	4.0000
469	7	1.00	0.40	0.85	2.0000	1.0000	3.0000	4.0000
470	7	1.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
471	7	1.00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
472	7	1.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
473	7	1.00	0.20	0.70	2.0000	1.0000	3.0000	4.0000
474	7	1.00	0.20	0.85	1.0000	2.0000	3.0000	4.0000
475	7	1.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
476	7	1.50	1.00	0.00	4.0000	3.0000	1.0000	2.0000
477	7	1.50	1.00	0.40	4.0000	3.0000	1.0000	2.0000
478	7	1.50	1.00	0.70	4.0000	3.0000	2.0000	1.0000
479	7	1.50	1.00	0.85	4.0000	2.0000	2.0000	1.0000
480	7	1.50	1.00	0.99	4.0000	1.0000	2.0000	3.0000
481	7	1.50	0.80	0.00	4.0000	3.0000	1.0000	2.0000
482	7	1.50	0.80	0.40	4.0000	3.0000	1.0000	2.0000
483	7	1.50	0.80	0.70	4.0000	3.0000	2.0000	1.0000
484	7	1.50	0.80	0.85	4.0000	1.0000	2.0000	2.0000
485	7	1.50	0.80	0.99	4.0000	1.0000	2.0000	3.0000
486	7	1.50	0.60	0.00	4.0000	3.0000	2.0000	1.0000
487	7	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
488	7	1.50	0.60	0.70	4.0000	1.0000	3.0000	2.0000
489	7	1.50	0.60	0.85	4.0000	1.0000	2.0000	3.0000
490	7	1.50	0.60	0.99	4.0000	1.0000	2.0000	3.0000
491	7	1.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
492	7	1.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
493	7	1.50	0.40	0.70	4.0000	1.0000	3.0000	2.0000
494	7	1.50	0.40	0.85	4.0000	1.0000	2.0000	3.0000

495	7	1.50	0.40	0.99	4.0000	1.0000	2.0000	3.0000
496	7	1.50	0.20	0.00	4.0000	1.0000	3.0000	2.0000
497	7	1.50	0.20	0.40	4.0000	1.0000	3.0000	2.0000
498	7	1.50	0.20	0.70	4.0000	1.0000	3.0000	2.0000
499	7	1.50	0.20	0.85	4.0000	1.0000	3.0000	2.0000
500	7	1.50	0.20	0.99	4.0000	1.0000	3.0000	2.0000
501	7	2.00	1.00	0.00	4.0000	2.0000	1.0000	3.0000
502	7	2.00	1.00	0.40	4.0000	2.0000	1.0000	2.0000
503	7	2.00	1.00	0.70	4.0000	3.0000	1.0000	2.0000
504	7	2.00	1.00	0.85	4.0000	3.0000	2.0000	1.0000
505	7	2.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
506	7	2.00	0.80	0.00	4.0000	3.0000	1.0000	2.0000
507	7	2.00	0.80	0.40	4.0000	3.0000	1.0000	2.0000
508	7	2.00	0.80	0.70	4.0000	3.0000	2.0000	1.0000
509	7	2.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
510	7	2.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
511	7	2.00	0.60	0.00	4.0000	3.0000	1.0000	2.0000
512	7	2.00	0.60	0.40	4.0000	3.0000	1.0000	2.0000
513	7	2.00	0.60	0.70	4.0000	2.0000	3.0000	1.0000
514	7	2.00	0.60	0.85	4.0000	1.0000	3.0000	2.0000
515	7	2.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
516	7	2.00	0.40	0.00	4.0000	3.0000	1.0000	2.0000
517	7	2.00	0.40	0.40	4.0000	3.0000	2.0000	1.0000
518	7	2.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
519	7	2.00	0.40	0.85	4.0000	1.0000	3.0000	2.0000
520	7	2.00	0.40	0.99	4.0000	1.0000	3.0000	2.0000
521	7	2.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
522	7	2.00	0.20	0.40	4.0000	1.0000	3.0000	2.0000
523	7	2.00	0.20	0.70	4.0000	1.0000	3.0000	2.0000
524	7	2.00	0.20	0.85	4.0000	2.0000	3.0000	1.0000
525	7	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000
526	10	0.00	1.00	0.00	1.0000	4.0000	3.0000	1.0000
527	10	0.00	1.00	0.40	1.0000	4.0000	2.0000	3.0000
528	10	0.00	1.00	0.70	2.0000	3.0000	1.0000	4.0000
529	10	0.00	1.00	0.85	2.0000	1.0000	3.0000	4.0000
530	10	0.00	1.00	0.99	2.0000	1.0000	2.0000	4.0000
531	10	0.00	0.80	0.00	1.0000	4.0000	3.0000	2.0000
532	10	0.00	0.80	0.40	1.0000	4.0000	2.0000	3.0000
533	10	0.00	0.80	0.70	2.0000	3.0000	1.0000	4.0000
534	10	0.00	0.80	0.85	2.0000	1.0000	3.0000	4.0000
535	10	0.00	0.80	0.99	2.0000	1.0000	2.0000	4.0000
536	10	0.00	0.60	0.00	1.0000	4.0000	2.0000	3.0000
537	10	0.00	0.60	0.40	2.0000	3.0000	1.0000	4.0000
538	10	0.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
539	10	0.00	0.60	0.85	2.0000	1.0000	3.0000	4.0000
540	10	0.00	0.60	0.99	3.0000	1.0000	2.0000	4.0000
541	10	0.00	0.40	0.00	2.0000	3.0000	1.0000	4.0000
542	10	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
543	10	0.00	0.40	0.70	2.0000	1.0000	3.0000	4.0000
544	10	0.00	0.40	0.85	2.0000	1.0000	3.0000	4.0000
545	10	0.00	0.40	0.99	3.0000	1.0000	2.0000	4.0000
546	10	0.00	0.20	0.00	1.0000	2.0000	3.0000	4.0000
547	10	0.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
548	10	0.00	0.20	0.70	1.0000	2.0000	3.0000	4.0000
549	10	0.00	0.20	0.85	2.0000	1.0000	3.0000	4.0000
550	10	0.00	0.20	0.99	3.0000	1.0000	2.0000	4.0000
551	10	0.25	1.00	0.00	1.0000	4.0000	3.0000	2.0000
552	10	0.25	1.00	0.40	1.0000	4.0000	2.0000	3.0000
553	10	0.25	1.00	0.70	1.0000	3.0000	1.0000	4.0000
554	10	0.25	1.00	0.85	1.0000	1.0000	3.0000	4.0000
555	10	0.25	1.00	0.99	2.0000	1.0000	3.0000	4.0000
556	10	0.25	0.80	0.00	1.0000	4.0000	3.0000	1.0000
557	10	0.25	0.80	0.40	1.0000	4.0000	2.0000	3.0000
558	10	0.25	0.80	0.70	2.0000	3.0000	1.0000	4.0000
559	10	0.25	0.80	0.85	2.0000	1.0000	3.0000	4.0000
560	10	0.25	0.80	0.99	2.0000	1.0000	3.0000	4.0000
561	10	0.25	0.60	0.00	2.0000	4.0000	1.0000	3.0000
562	10	0.25	0.60	0.40	2.0000	3.0000	1.0000	4.0000
563	10	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
564	10	0.25	0.60	0.85	2.0000	1.0000	3.0000	4.0000
565	10	0.25	0.60	0.99	2.0000	1.0000	3.0000	4.0000
566	10	0.25	0.40	0.00	2.0000	3.0000	1.0000	4.0000
567	10	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
568	10	0.25	0.40	0.70	3.0000	1.0000	2.0000	4.0000
569	10	0.25	0.40	0.85	2.0000	1.0000	3.0000	4.0000
570	10	0.25	0.40	0.99	2.0000	1.0000	3.0000	4.0000
571	10	0.25	0.20	0.00	1.0000	1.0000	3.0000	4.0000
572	10	0.25	0.20	0.40	2.0000	1.0000	3.0000	4.0000
573	10	0.25	0.20	0.70	1.0000	2.0000	3.0000	4.0000
574	10	0.25	0.20	0.85	1.0000	2.0000	3.0000	4.0000
575	10	0.25	0.20	0.99	3.0000	1.0000	2.0000	4.0000
576	10	0.50	1.00	0.00	1.0000	4.0000	3.0000	2.0000
577	10	0.50	1.00	0.40	1.0000	4.0000	3.0000	1.0000
578	10	0.50	1.00	0.70	1.0000	3.0000	2.0000	4.0000
579	10	0.50	1.00	0.85	1.0000	2.0000	3.0000	4.0000
580	10	0.50	1.00	0.99	2.0000	1.0000	3.0000	4.0000
581	10	0.50	0.80	0.00	2.0000	4.0000	2.0000	1.0000
582	10	0.50	0.80	0.40	2.0000	4.0000	1.0000	3.0000
583	10	0.50	0.80	0.70	2.0000	3.0000	1.0000	4.0000
584	10	0.50	0.80	0.85	2.0000	1.0000	3.0000	4.0000
585	10	0.50	0.80	0.99	2.0000	1.0000	3.0000	4.0000
586	10	0.50	0.60	0.00	2.0000	4.0000	1.0000	2.0000

587	10	0.50	0.60	0.40	3.0000	2.0000	1.0000	4.0000
588	10	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
589	10	0.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
590	10	0.50	0.60	0.99	1.0000	2.0000	3.0000	4.0000
591	10	0.50	0.40	0.00	3.0000	1.0000	1.0000	4.0000
592	10	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
593	10	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
594	10	0.50	0.40	0.85	2.0000	1.0000	3.0000	4.0000
595	10	0.50	0.40	0.99	1.0000	2.0000	3.0000	4.0000
596	10	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
597	10	0.50	0.20	0.40	3.0000	1.0000	2.0000	4.0000
598	10	0.50	0.20	0.70	2.0000	1.0000	3.0000	4.0000
599	10	0.50	0.20	0.85	1.0000	2.0000	3.0000	4.0000
600	10	0.50	0.20	0.99	1.0000	2.0000	3.0000	4.0000
601	10	0.75	1.00	0.00	1.0000	4.0000	3.0000	2.0000
602	10	0.75	1.00	0.40	2.0000	4.0000	3.0000	1.0000
603	10	0.75	1.00	0.70	1.0000	4.0000	2.0000	3.0000
604	10	0.75	1.00	0.85	1.0000	2.0000	2.0000	4.0000
605	10	0.75	1.00	0.99	1.0000	2.0000	3.0000	4.0000
606	10	0.75	0.80	0.00	3.0000	4.0000	2.0000	1.0000
607	10	0.75	0.80	0.40	3.0000	4.0000	2.0000	1.0000
608	10	0.75	0.80	0.70	3.0000	2.0000	1.0000	4.0000
609	10	0.75	0.80	0.85	2.0000	1.0000	2.0000	4.0000
610	10	0.75	0.80	0.99	2.0000	1.0000	3.0000	4.0000
611	10	0.75	0.60	0.00	4.0000	3.0000	1.0000	2.0000
612	10	0.75	0.60	0.40	4.0000	1.0000	2.0000	3.0000
613	10	0.75	0.60	0.70	3.0000	1.0000	2.0000	4.0000
614	10	0.75	0.60	0.85	3.0000	1.0000	2.0000	4.0000
615	10	0.75	0.60	0.99	1.0000	2.0000	3.0000	4.0000
616	10	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
617	10	0.75	0.40	0.40	3.0000	1.0000	2.0000	4.0000
618	10	0.75	0.40	0.70	3.0000	1.0000	2.0000	4.0000
619	10	0.75	0.40	0.85	3.0000	1.0000	2.0000	4.0000
620	10	0.75	0.40	0.99	1.0000	2.0000	3.0000	4.0000
621	10	0.75	0.20	0.00	3.0000	1.0000	2.0000	4.0000
622	10	0.75	0.20	0.40	3.0000	1.0000	2.0000	4.0000
623	10	0.75	0.20	0.70	3.0000	1.0000	2.0000	4.0000
624	10	0.75	0.20	0.85	2.0000	1.0000	3.0000	4.0000
625	10	0.75	0.20	0.99	1.0000	2.0000	3.0000	4.0000
626	10	1.00	1.00	0.00	1.0000	4.0000	2.0000	3.0000
627	10	1.00	1.00	0.40	1.0000	4.0000	2.0000	3.0000
628	10	1.00	1.00	0.70	1.0000	4.0000	2.0000	2.0000
629	10	1.00	1.00	0.85	1.0000	3.0000	2.0000	4.0000
630	10	1.00	1.00	0.99	1.0000	2.0000	3.0000	4.0000
631	10	1.00	0.80	0.00	3.0000	4.0000	2.0000	1.0000
632	10	1.00	0.80	0.40	3.0000	4.0000	2.0000	1.0000
633	10	1.00	0.80	0.70	3.0000	2.0000	1.0000	4.0000
634	10	1.00	0.80	0.85	3.0000	1.0000	2.0000	4.0000
635	10	1.00	0.80	0.99	2.0000	1.0000	3.0000	4.0000
636	10	1.00	0.60	0.00	4.0000	1.0000	3.0000	1.0000
637	10	1.00	0.60	0.40	4.0000	1.0000	2.0000	3.0000
638	10	1.00	0.60	0.70	4.0000	1.0000	2.0000	3.0000
639	10	1.00	0.60	0.85	3.0000	1.0000	2.0000	4.0000
640	10	1.00	0.60	0.99	2.0000	1.0000	3.0000	4.0000
641	10	1.00	0.40	0.00	4.0000	1.0000	2.0000	3.0000
642	10	1.00	0.40	0.40	4.0000	1.0000	2.0000	3.0000
643	10	1.00	0.40	0.70	3.0000	1.0000	2.0000	4.0000
644	10	1.00	0.40	0.85	3.0000	1.0000	2.0000	4.0000
645	10	1.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
646	10	1.00	0.20	0.00	3.0000	1.0000	2.0000	4.0000
647	10	1.00	0.20	0.40	3.0000	1.0000	2.0000	4.0000
648	10	1.00	0.20	0.70	3.0000	1.0000	2.0000	4.0000
649	10	1.00	0.20	0.85	2.0000	1.0000	2.0000	4.0000
650	10	1.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
651	10	1.50	1.00	0.00	4.0000	3.0000	1.0000	2.0000
652	10	1.50	1.00	0.40	4.0000	3.0000	1.0000	2.0000
653	10	1.50	1.00	0.70	4.0000	3.0000	2.0000	1.0000
654	10	1.50	1.00	0.85	4.0000	2.0000	1.0000	2.0000
655	10	1.50	1.00	0.99	4.0000	1.0000	2.0000	3.0000
656	10	1.50	0.80	0.00	4.0000	3.0000	1.0000	2.0000
657	10	1.50	0.80	0.40	4.0000	3.0000	1.0000	2.0000
658	10	1.50	0.80	0.70	4.0000	3.0000	2.0000	1.0000
659	10	1.50	0.80	0.85	4.0000	1.0000	2.0000	3.0000
660	10	1.50	0.80	0.99	4.0000	1.0000	2.0000	3.0000
661	10	1.50	0.60	0.00	4.0000	3.0000	2.0000	1.0000
662	10	1.50	0.60	0.40	4.0000	2.0000	2.0000	1.0000
663	10	1.50	0.60	0.70	4.0000	1.0000	2.0000	2.0000
664	10	1.50	0.60	0.85	4.0000	1.0000	2.0000	3.0000
665	10	1.50	0.60	0.99	4.0000	1.0000	2.0000	3.0000
666	10	1.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
667	10	1.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
668	10	1.50	0.40	0.70	4.0000	1.0000	2.0000	3.0000
669	10	1.50	0.40	0.85	4.0000	1.0000	2.0000	3.0000
670	10	1.50	0.40	0.99	4.0000	1.0000	2.0000	3.0000
671	10	1.50	0.20	0.00	4.0000	1.0000	2.0000	3.0000
672	10	1.50	0.20	0.40	4.0000	1.0000	2.0000	3.0000
673	10	1.50	0.20	0.70	4.0000	1.0000	2.0000	3.0000
674	10	1.50	0.20	0.85	4.0000	1.0000	2.0000	3.0000
675	10	1.50	0.20	0.99	4.0000	1.0000	2.0000	3.0000
676	10	2.00	1.00	0.00	4.0000	2.0000	1.0000	3.0000
677	10	2.00	1.00	0.40	4.0000	2.0000	1.0000	3.0000
678	10	2.00	1.00	0.70	4.0000	3.0000	1.0000	2.0000

679	10	2.00	1.00	0.85	4.0000	3.0000	2.0000	1.0000
680	10	2.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
681	10	2.00	0.80	0.00	4.0000	2.0000	1.0000	3.0000
682	10	2.00	0.80	0.40	4.0000	2.0000	1.0000	3.0000
683	10	2.00	0.80	0.70	4.0000	3.0000	1.0000	2.0000
684	10	2.00	0.80	0.85	4.0000	3.0000	2.0000	1.0000
685	10	2.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
686	10	2.00	0.60	0.00	4.0000	2.0000	1.0000	3.0000
687	10	2.00	0.60	0.40	4.0000	2.0000	1.0000	2.0000
688	10	2.00	0.60	0.70	4.0000	3.0000	2.0000	1.0000
689	10	2.00	0.60	0.85	4.0000	1.0000	3.0000	1.0000
690	10	2.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
691	10	2.00	0.40	0.00	4.0000	3.0000	1.0000	2.0000
692	10	2.00	0.40	0.40	4.0000	3.0000	1.0000	2.0000
693	10	2.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
694	10	2.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
695	10	2.00	0.40	0.99	4.0000	1.0000	3.0000	2.0000
696	10	2.00	0.20	0.00	4.0000	3.0000	1.0000	2.0000
697	10	2.00	0.20	0.40	4.0000	1.0000	2.0000	3.0000
698	10	2.00	0.20	0.70	4.0000	1.0000	3.0000	2.0000
699	10	2.00	0.20	0.85	4.0000	1.0000	3.0000	2.0000
700	10	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000
701	15	0.00	1.00	0.00	3.0000	4.0000	1.0000	1.0000
702	15	0.00	1.00	0.40	1.0000	4.0000	1.0000	3.0000
703	15	0.00	1.00	0.70	3.0000	1.0000	2.0000	4.0000
704	15	0.00	1.00	0.85	2.0000	1.0000	2.0000	4.0000
705	15	0.00	1.00	0.99	3.0000	1.0000	2.0000	4.0000
706	15	0.00	0.80	0.00	1.0000	4.0000	2.0000	2.0000
707	15	0.00	0.80	0.40	1.0000	3.0000	2.0000	4.0000
708	15	0.00	0.80	0.70	3.0000	1.0000	2.0000	4.0000
709	15	0.00	0.80	0.85	2.0000	1.0000	2.0000	4.0000
710	15	0.00	0.80	0.99	3.0000	1.0000	2.0000	4.0000
711	15	0.00	0.60	0.00	1.0000	3.0000	2.0000	4.0000
712	15	0.00	0.60	0.40	3.0000	1.0000	2.0000	4.0000
713	15	0.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
714	15	0.00	0.60	0.85	1.0000	2.0000	3.0000	4.0000
715	15	0.00	0.60	0.99	3.0000	1.0000	1.0000	4.0000
716	15	0.00	0.40	0.00	3.0000	1.0000	2.0000	4.0000
717	15	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
718	15	0.00	0.40	0.70	2.0000	1.0000	3.0000	4.0000
719	15	0.00	0.40	0.85	1.0000	2.0000	3.0000	4.0000
720	15	0.00	0.40	0.99	3.0000	2.0000	1.0000	4.0000
721	15	0.00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
722	15	0.00	0.20	0.40	1.0000	2.0000	3.0000	4.0000
723	15	0.00	0.20	0.70	1.0000	2.0000	3.0000	4.0000
724	15	0.00	0.20	0.85	3.0000	2.0000	1.0000	4.0000
725	15	0.00	0.20	0.99	3.0000	2.0000	1.0000	4.0000
726	15	0.25	1.00	0.00	1.0000	4.0000	1.0000	3.0000
727	15	0.25	1.00	0.40	1.0000	4.0000	2.0000	3.0000
728	15	0.25	1.00	0.70	2.0000	1.0000	2.0000	4.0000
729	15	0.25	1.00	0.85	2.0000	1.0000	3.0000	4.0000
730	15	0.25	1.00	0.99	3.0000	1.0000	2.0000	4.0000
731	15	0.25	0.80	0.00	1.0000	4.0000	3.0000	2.0000
732	15	0.25	0.80	0.40	1.0000	3.0000	1.0000	4.0000
733	15	0.25	0.80	0.70	3.0000	1.0000	2.0000	4.0000
734	15	0.25	0.80	0.85	2.0000	1.0000	3.0000	4.0000
735	15	0.25	0.80	0.99	3.0000	1.0000	2.0000	4.0000
736	15	0.25	0.60	0.00	2.0000	3.0000	1.0000	4.0000
737	15	0.25	0.60	0.40	3.0000	1.0000	2.0000	4.0000
738	15	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
739	15	0.25	0.60	0.85	2.0000	1.0000	3.0000	4.0000
740	15	0.25	0.60	0.99	3.0000	1.0000	2.0000	4.0000
741	15	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
742	15	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
743	15	0.25	0.40	0.70	3.0000	1.0000	2.0000	4.0000
744	15	0.25	0.40	0.85	1.0000	2.0000	3.0000	4.0000
745	15	0.25	0.40	0.99	3.0000	2.0000	1.0000	4.0000
746	15	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
747	15	0.25	0.20	0.40	1.0000	2.0000	3.0000	4.0000
748	15	0.25	0.20	0.70	1.0000	2.0000	3.0000	4.0000
749	15	0.25	0.20	0.85	1.0000	3.0000	2.0000	4.0000
750	15	0.25	0.20	0.99	3.0000	2.0000	1.0000	4.0000
751	15	0.50	1.00	0.00	1.0000	4.0000	2.0000	2.0000
752	15	0.50	1.00	0.40	1.0000	4.0000	2.0000	2.0000
753	15	0.50	1.00	0.70	1.0000	1.0000	3.0000	4.0000
754	15	0.50	1.00	0.85	2.0000	1.0000	3.0000	4.0000
755	15	0.50	1.00	0.99	3.0000	1.0000	2.0000	4.0000
756	15	0.50	0.80	0.00	3.0000	4.0000	2.0000	1.0000
757	15	0.50	0.80	0.40	3.0000	1.0000	1.0000	4.0000
758	15	0.50	0.80	0.70	3.0000	1.0000	2.0000	4.0000
759	15	0.50	0.80	0.85	2.0000	1.0000	3.0000	4.0000
760	15	0.50	0.80	0.99	2.0000	1.0000	3.0000	4.0000
761	15	0.50	0.60	0.00	3.0000	1.0000	2.0000	4.0000
762	15	0.50	0.60	0.40	3.0000	1.0000	2.0000	4.0000
763	15	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
764	15	0.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
765	15	0.50	0.60	0.99	1.0000	2.0000	3.0000	4.0000
766	15	0.50	0.40	0.00	3.0000	1.0000	2.0000	4.0000
767	15	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
768	15	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
769	15	0.50	0.40	0.85	2.0000	1.0000	2.0000	4.0000
770	15	0.50	0.40	0.99	1.0000	2.0000	2.0000	4.0000

771	15	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
772	15	0.50	0.20	0.40	3.0000	1.0000	2.0000	4.0000
773	15	0.50	0.20	0.70	1.0000	2.0000	3.0000	4.0000
774	15	0.50	0.20	0.85	1.0000	2.0000	2.0000	4.0000
775	15	0.50	0.20	0.99	1.0000	3.0000	2.0000	4.0000
776	15	0.75	1.00	0.00	1.0000	3.0000	2.0000	3.0000
777	15	0.75	1.00	0.40	1.0000	4.0000	3.0000	2.0000
778	15	0.75	1.00	0.70	1.0000	2.0000	3.0000	4.0000
779	15	0.75	1.00	0.85	2.0000	1.0000	3.0000	4.0000
780	15	0.75	1.00	0.99	1.0000	1.0000	3.0000	4.0000
781	15	0.75	0.80	0.00	4.0000	2.0000	3.0000	1.0000
782	15	0.75	0.80	0.40	4.0000	1.0000	2.0000	3.0000
783	15	0.75	0.80	0.70	3.0000	1.0000	2.0000	4.0000
784	15	0.75	0.80	0.85	3.0000	1.0000	2.0000	4.0000
785	15	0.75	0.80	0.99	1.0000	2.0000	3.0000	4.0000
786	15	0.75	0.60	0.00	4.0000	1.0000	2.0000	3.0000
787	15	0.75	0.60	0.40	4.0000	1.0000	2.0000	3.0000
788	15	0.75	0.60	0.70	3.0000	1.0000	2.0000	4.0000
789	15	0.75	0.60	0.85	3.0000	1.0000	2.0000	4.0000
790	15	0.75	0.60	0.99	1.0000	2.0000	3.0000	4.0000
791	15	0.75	0.40	0.00	3.0000	1.0000	2.0000	4.0000
792	15	0.75	0.40	0.40	3.0000	1.0000	2.0000	4.0000
793	15	0.75	0.40	0.70	3.0000	1.0000	2.0000	4.0000
794	15	0.75	0.40	0.85	3.0000	1.0000	2.0000	4.0000
795	15	0.75	0.40	0.99	1.0000	2.0000	3.0000	4.0000
796	15	0.75	0.20	0.00	3.0000	1.0000	2.0000	4.0000
797	15	0.75	0.20	0.40	3.0000	1.0000	2.0000	4.0000
798	15	0.75	0.20	0.70	3.0000	1.0000	2.0000	4.0000
799	15	0.75	0.20	0.85	3.0000	1.0000	2.0000	4.0000
800	15	0.75	0.20	0.99	1.0000	2.0000	2.0000	4.0000
801	15	1.00	1.00	0.00	1.0000	3.0000	2.0000	4.0000
802	15	1.00	1.00	0.40	1.0000	3.0000	2.0000	4.0000
803	15	1.00	1.00	0.70	1.0000	2.0000	2.0000	4.0000
804	15	1.00	1.00	0.85	2.0000	1.0000	3.0000	4.0000
805	15	1.00	1.00	0.99	1.0000	2.0000	3.0000	4.0000
806	15	1.00	0.80	0.00	4.0000	2.0000	3.0000	1.0000
807	15	1.00	0.80	0.40	4.0000	1.0000	3.0000	1.0000
808	15	1.00	0.80	0.70	3.0000	1.0000	2.0000	4.0000
809	15	1.00	0.80	0.85	3.0000	1.0000	2.0000	4.0000
810	15	1.00	0.80	0.99	1.0000	2.0000	3.0000	4.0000
811	15	1.00	0.60	0.00	4.0000	1.0000	2.0000	3.0000
812	15	1.00	0.60	0.40	4.0000	1.0000	2.0000	3.0000
813	15	1.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
814	15	1.00	0.60	0.85	3.0000	1.0000	2.0000	4.0000
815	15	1.00	0.60	0.99	2.0000	1.0000	3.0000	4.0000
816	15	1.00	0.40	0.00	4.0000	1.0000	2.0000	3.0000
817	15	1.00	0.40	0.40	4.0000	1.0000	2.0000	3.0000
818	15	1.00	0.40	0.70	3.0000	1.0000	2.0000	4.0000
819	15	1.00	0.40	0.85	3.0000	1.0000	2.0000	4.0000
820	15	1.00	0.40	0.99	2.0000	1.0000	3.0000	4.0000
821	15	1.00	0.20	0.00	3.0000	1.0000	2.0000	4.0000
822	15	1.00	0.20	0.40	3.0000	1.0000	2.0000	4.0000
823	15	1.00	0.20	0.70	3.0000	1.0000	2.0000	4.0000
824	15	1.00	0.20	0.85	3.0000	1.0000	2.0000	4.0000
825	15	1.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
826	15	1.50	1.00	0.00	1.0000	3.0000	2.0000	4.0000
827	15	1.50	1.00	0.40	1.0000	3.0000	2.0000	4.0000
828	15	1.50	1.00	0.70	1.0000	4.0000	2.0000	2.0000
829	15	1.50	1.00	0.85	2.0000	1.0000	3.0000	4.0000
830	15	1.50	1.00	0.99	2.0000	1.0000	3.0000	4.0000
831	15	1.50	0.80	0.00	4.0000	1.0000	2.0000	3.0000
832	15	1.50	0.80	0.40	4.0000	2.0000	1.0000	3.0000
833	15	1.50	0.80	0.70	4.0000	1.0000	3.0000	2.0000
834	15	1.50	0.80	0.85	3.0000	1.0000	2.0000	4.0000
835	15	1.50	0.80	0.99	1.0000	1.0000	3.0000	4.0000
836	15	1.50	0.60	0.00	4.0000	1.0000	3.0000	1.0000
837	15	1.50	0.60	0.40	4.0000	1.0000	3.0000	2.0000
838	15	1.50	0.60	0.70	4.0000	1.0000	2.0000	3.0000
839	15	1.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
840	15	1.50	0.60	0.99	1.0000	2.0000	3.0000	4.0000
841	15	1.50	0.40	0.00	4.0000	1.0000	2.0000	3.0000
842	15	1.50	0.40	0.40	4.0000	1.0000	2.0000	3.0000
843	15	1.50	0.40	0.70	4.0000	1.0000	2.0000	3.0000
844	15	1.50	0.40	0.85	3.0000	1.0000	2.0000	4.0000
845	15	1.50	0.40	0.99	1.0000	2.0000	3.0000	4.0000
846	15	1.50	0.20	0.00	4.0000	1.0000	2.0000	3.0000
847	15	1.50	0.20	0.40	4.0000	1.0000	2.0000	3.0000
848	15	1.50	0.20	0.70	3.0000	1.0000	2.0000	3.0000
849	15	1.50	0.20	0.85	2.0000	1.0000	3.0000	4.0000
850	15	1.50	0.20	0.99	1.0000	2.0000	3.0000	4.0000
851	15	2.00	1.00	0.00	4.0000	2.0000	1.0000	3.0000
852	15	2.00	1.00	0.40	4.0000	2.0000	1.0000	3.0000
853	15	2.00	1.00	0.70	4.0000	2.0000	1.0000	3.0000
854	15	2.00	1.00	0.85	4.0000	2.0000	2.0000	1.0000
855	15	2.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
856	15	2.00	0.80	0.00	4.0000	2.0000	1.0000	3.0000
857	15	2.00	0.80	0.40	4.0000	2.0000	1.0000	3.0000
858	15	2.00	0.80	0.70	4.0000	2.0000	1.0000	2.0000
859	15	2.00	0.80	0.85	4.0000	1.0000	2.0000	2.0000
860	15	2.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
861	15	2.00	0.60	0.00	4.0000	2.0000	1.0000	3.0000
862	15	2.00	0.60	0.40	4.0000	2.0000	1.0000	3.0000

863	15	2.00	0.60	0.70	4.0000	2.0000	3.0000	1.0000
864	15	2.00	0.60	0.85	4.0000	1.0000	2.0000	2.0000
865	15	2.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
866	15	2.00	0.40	0.00	4.0000	1.0000	2.0000	3.0000
867	15	2.00	0.40	0.40	4.0000	1.0000	2.0000	3.0000
868	15	2.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
869	15	2.00	0.40	0.85	4.0000	1.0000	3.0000	2.0000
870	15	2.00	0.40	0.99	4.0000	1.0000	2.0000	3.0000
871	15	2.00	0.20	0.00	4.0000	1.0000	2.0000	3.0000
872	15	2.00	0.20	0.40	4.0000	1.0000	2.0000	3.0000
873	15	2.00	0.20	0.70	4.0000	1.0000	3.0000	2.0000
874	15	2.00	0.20	0.85	4.0000	1.0000	3.0000	2.0000
875	15	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000

Appendix R. Raw Variance of Relative Error Data for MCBN Analysis

An unexpected benefit from minimizing the $\overline{RE}^{i}$ was that the $VAR(RE^{i})$ was also reduced, as shown in the following data. With the exception of Rayleigh at higher levels of bias, the MCBN is consistently the least variable of the four estimators.

Index

Design Point - DP

Parameters

Sample Size - SS

Bias - BIAS

Ratio of Standard Deviations - STDR

Correlation - CORR

Estimation Methods

RAND-234 - R234

Modified CBN - MCBN

CBN - CBN

Rayleigh method - RAYL

TP	SS	BIAS	STDR	CORR	R234	MCBN	CBN	RAYL
***	**	****	****	****	****	****	***	****
1	3	0.00	1.00	0.00	0.0990	0.0844	0.1034	0.0956
2	3	0.00	1.00	0.40	0.1024	0.0948	0.1081	0.1041
3	3	0.00	1.00	0.70	0.1262	0.1192	0.1342	0.1376
4	3	0.00	1.00	0.85	0.1536	0.1465	0.1674	0.1730
5	3	0.00	1.00	0.99	0.1852	0.1886	0.2266	0.2273
6	3	0.00	0.80	0.00	0.1033	0.0873	0.1065	0.1000
7	3	0.00	0.80	0.40	0.1065	0.0987	0.1122	0.1092
8	3	0.00	0.80	0.70	0.1300	0.1243	0.1388	0.141[illegible]
9	3	0.00	0.80	0.85	0.1565	0.1519	0.1714	0.1765
10	3	0.00	0.80	0.99	0.1867	0.1968	0.2278	0.2292
11	3	0.00	0.60	0.00	0.1140	0.0974	0.1178	0.1150
12	3	0.00	0.60	0.40	0.1210	0.1127	0.1250	0.1249
13	3	0.00	0.60	0.70	0.1423	0.1405	0.1522	0.1561
14	3	0.00	0.60	0.85	0.1645	0.1684	0.1829	0.1871
15	3	0.00	0.60	0.99	0.1887	0.2071	0.2298	0.2307
16	3	0.00	0.40	0.00	0.1348	0.1238	0.1470	0.1492
17	3	0.00	0.40	0.40	0.1442	0.1454	0.1553	0.1586
18	3	0.00	0.40	0.70	0.1593	0.1734	0.1798	0.1840
19	3	0.00	0.40	0.85	0.1712	0.1949	0.2026	0.2050
20	3	0.00	0.40	0.99	0.1904	0.2164	0.2313	0.2326
21	3	0.00	0.20	0.00	0.1710	0.1730	0.2022	0.2046
22	3	0.00	0.20	0.40	0.1736	0.1973	0.2057	0.2079
23	3	0.00	0.20	0.70	0.1794	0.2163	0.2176	0.2185

24	3	0.00	0.20	0.85	0.1848	0.2247	0.2254	0.2259
25	3	0.00	0.20	0.99	0.1927	0.2293	0.2356	0.2361
26	3	0.25	1.00	0.00	0.0988	0.0865	0.1046	0.0959
27	3	0.25	1.00	0.40	0.1007	0.0956	0.1082	0.1031
28	3	0.25	1.00	0.70	0.1205	0.1164	0.1299	0.1322
29	3	0.25	1.00	0.85	0.1439	0.1399	0.1583	0.1629
30	3	0.25	1.00	0.99	0.1744	0.1761	0.2095	0.2102
31	3	0.25	0.80	0.00	0.1030	0.0897	0.1083	0.1004
32	3	0.25	0.80	0.40	0.1067	0.1006	0.1129	0.1084
33	3	0.25	0.80	0.70	0.1259	0.1231	0.1360	0.1378
34	3	0.25	0.80	0.85	0.1504	0.1468	0.1641	0.1680
35	3	0.25	0.80	0.99	0.1785	0.1838	0.2120	0.2121
36	3	0.25	0.60	0.00	0.1134	0.1019	0.1205	0.1153
37	3	0.25	0.60	0.40	0.1190	0.1145	0.1255	0.1241
38	3	0.25	0.60	0.70	0.1408	0.1395	0.1494	0.1522
39	3	0.25	0.60	0.85	0.1634	0.1648	0.1773	0.1802
40	3	0.25	0.60	0.99	0.1838	0.1987	0.2190	0.2190
41	3	0.25	0.40	0.00	0.1420	0.1272	0.1480	0.1484
42	3	0.25	0.40	0.40	0.1476	0.1469	0.1549	0.1567
43	3	0.25	0.40	0.70	0.1654	0.1732	0.1779	0.1798
44	3	0.25	0.40	0.85	0.1760	0.1931	0.1991	0.1993
45	3	0.25	0.40	0.99	0.1885	0.2080	0.2210	0.2227
46	3	0.25	0.20	0.00	0.1743	0.1768	0.2013	0.2016
47	3	0.25	0.20	0.40	0.1772	0.1984	0.2037	0.2045
48	3	0.25	0.20	0.70	0.1819	0.2165	0.2151	0.2134
49	3	0.25	0.20	0.85	0.1875	0.2271	0.2253	0.2210
50	3	0.25	0.20	0.99	0.1922	0.2232	0.2287	0.2270
51	3	0.50	1.00	0.00	1.0000	0.0884	0.1046	0.0947
52	3	0.50	1.00	0.40	1.0000	0.0961	0.1067	0.0996
53	3	0.50	1.00	0.70	1.0000	0.1104	0.1211	0.1207
54	3	0.50	1.00	0.85	1.0000	0.1261	0.1402	0.1426
55	3	0.50	1.00	0.99	1.0000	0.1529	0.1787	0.1745
56	3	0.50	0.80	0.00	1.0000	0.0946	0.1105	0.1006
57	3	0.50	0.80	0.40	1.0000	0.1030	0.1132	0.1065
58	3	0.50	0.80	0.70	1.0000	0.1200	0.1299	0.1290
59	3	0.50	0.80	0.85	1.0000	0.1370	0.1501	0.1513
60	3	0.50	0.80	0.99	1.0000	0.1656	0.1868	0.1834
61	3	0.50	0.60	0.00	1.0000	0.1075	0.1230	0.1161
62	3	0.50	0.60	0.40	1.0000	0.1192	0.1280	0.1231
63	3	0.50	0.60	0.70	1.0000	0.1398	0.1469	0.1455
64	3	0.50	0.60	0.85	1.0000	0.1576	0.1676	0.1669
65	3	0.50	0.60	0.99	1.0000	0.1843	0.1999	0.1931
66	3	0.50	0.40	0.00	1.0000	0.1372	0.1532	0.1485
67	3	0.50	0.40	0.40	1.0000	0.1543	0.1588	0.1553
68	3	0.50	0.40	0.70	1.0000	0.1756	0.1770	0.1739
69	3	0.50	0.40	0.85	1.0000	0.1910	0.1932	0.1889
70	3	0.50	0.40	0.99	1.0000	0.2029	0.2120	0.2075
71	3	0.50	0.20	0.00	1.0000	0.1865	0.2024	0.1968
72	3	0.50	0.20	0.40	1.0000	0.2094	0.2089	0.2001
73	3	0.50	0.20	0.70	1.0000	0.2189	0.2131	0.2072
74	3	0.50	0.20	0.85	1.0000	0.2270	0.2209	0.2118
75	3	0.50	0.20	0.99	1.0000	0.2338	0.2322	0.2183
76	3	0.75	1.00	0.00	1.0000	0.0901	0.1032	0.0913
77	3	0.75	1.00	0.40	1.0000	0.0939	0.1019	0.0941
78	3	0.75	1.00	0.70	1.0000	0.1021	0.1093	0.1070
79	3	0.75	1.00	0.85	1.0000	0.1103	0.1195	0.1201
80	3	0.75	1.00	0.99	1.0000	0.1659	0.1692	0.1391
81	3	0.75	0.80	0.00	1.0000	0.0982	0.1106	0.0996
82	3	0.75	0.80	0.40	1.0000	0.1045	0.1117	0.1035
83	3	0.75	0.80	0.70	1.0000	0.1151	0.1214	0.1178
84	3	0.75	0.80	0.85	1.0000	0.1243	0.1337	0.1321
85	3	0.75	0.80	0.99	1.0000	0.1428	0.1578	0.1510
86	3	0.75	0.60	0.00	1.0000	0.1156	0.1265	0.1167
87	3	0.75	0.60	0.40	1.0000	0.1276	0.1322	0.1211
88	3	0.75	0.60	0.70	1.0000	0.1391	0.1424	0.1364
89	3	0.75	0.60	0.85	1.0000	0.1515	0.1559	0.1506
90	3	0.75	0.60	0.99	1.0000	0.1636	0.1743	0.1649
91	3	0.75	0.40	0.00	1.0000	0.1471	0.1568	0.1477
92	3	0.75	0.40	0.40	1.0000	0.1613	0.1612	0.1526
93	3	0.75	0.40	0.70	1.0000	0.1752	0.1740	0.1652
94	3	0.75	0.40	0.85	1.0000	0.1839	0.1839	0.1752
95	3	0.75	0.40	0.99	1.0000	0.1942	0.2003	0.1823
96	3	0.75	0.20	0.00	1.0000	0.1970	0.2026	0.1901
97	3	0.75	0.20	0.40	1.0000	0.2150	0.2076	0.1913
98	3	0.75	0.20	0.70	1.0000	0.2224	0.2105	0.1964
99	3	0.75	0.20	0.85	1.0000	0.2254	0.2142	0.2003
100	3	0.75	0.20	0.99	1.0000	0.2205	0.2165	0.2040
101	3	1.00	1.00	0.00	1.0000	0.0861	0.0952	0.0844
102	3	1.00	1.00	0.40	1.0000	0.0891	0.0941	0.0858
103	3	1.00	1.00	0.70	1.0000	0.0926	0.0962	0.0929
104	3	1.00	1.00	0.85	1.0000	0.0955	0.1012	0.0997
105	3	1.00	1.00	0.99	1.0000	0.1051	0.1158	0.1083
106	3	1.00	0.80	0.00	1.0000	0.0983	0.1062	0.0950
107	3	1.00	0.80	0.40	1.0000	0.1023	0.1062	0.0972
108	3	1.00	0.80	0.70	1.0000	0.1083	0.1109	0.1054
109	3	1.00	0.80	0.85	1.0000	0.1152	0.1183	0.1135
110	3	1.00	0.80	0.99	1.0000	0.1233	0.1328	0.1238
111	3	1.00	0.60	0.00	1.0000	0.1203	0.1268	0.1132
112	3	1.00	0.60	0.40	1.0000	0.1248	0.1259	0.1160
113	3	1.00	0.60	0.70	1.0000	0.1342	0.1336	0.1252
114	3	1.00	0.60	0.85	1.0000	0.1402	0.1416	0.1334
115	3	1.00	0.60	0.99	1.0000	0.1466	0.1520	0.1392

116	3	1.00	0.40	0.00	1.0000	0.1506	0.1537	0.1431
117	3	1.00	0.40	0.40	1.0000	0.1633	0.1584	0.1462
118	3	1.00	0.40	0.70	1.0000	0.1715	0.1664	0.1533
119	3	1.00	0.40	0.85	1.0000	0.1790	0.1744	0.1590
120	3	1.00	0.40	0.99	1.0000	0.1904	0.1856	0.1613
121	3	1.00	0.20	0.00	1.0000	0.1963	0.1950	0.1781
122	3	1.00	0.20	0.40	1.0000	0.2149	0.1998	0.1801
123	3	1.00	0.20	0.70	1.0000	0.2169	0.2025	0.1816
124	3	1.00	0.20	0.85	1.0000	0.2195	0.2060	0.1829
125	3	1.00	0.20	0.99	1.0000	0.2167	0.2095	0.1833
126	3	1.50	1.00	0.00	1.0000	0.0736	0.0757	0.0671
127	3	1.50	1.00	0.40	1.0000	0.0746	0.0744	0.0668
128	3	1.50	1.00	0.70	1.0000	0.0745	0.0724	0.0677
129	3	1.50	1.00	0.85	1.0000	0.0733	0.0716	0.0686
130	3	1.50	1.00	0.99	1.0000	0.0745	0.0782	0.0711
131	3	1.50	0.80	0.00	1.0000	0.0885	0.0886	0.0782
132	3	1.50	0.80	0.40	1.0000	0.0902	0.0881	0.0786
133	3	1.50	0.80	0.70	1.0000	0.0909	0.0871	0.0805
134	3	1.50	0.80	0.85	1.0000	0.0909	0.0881	0.0821
135	3	1.50	0.80	0.99	1.0000	0.0910	0.0917	0.0829
136	3	1.50	0.60	0.00	1.0000	0.1095	0.1057	0.0950
137	3	1.50	0.60	0.40	1.0000	0.1135	0.1073	0.0967
138	3	1.50	0.60	0.70	1.0000	0.1136	0.1079	0.0983
139	3	1.50	0.60	0.85	1.0000	0.1163	0.1120	0.1000
140	3	1.50	0.60	0.99	1.0000	0.1181	0.1170	0.1008
141	3	1.50	0.40	0.00	1.0000	0.1403	0.1309	0.1168
142	3	1.50	0.40	0.40	1.0000	0.1498	0.1361	0.1186
143	3	1.50	0.40	0.70	1.0000	0.1470	0.1343	0.1206
144	3	1.50	0.40	0.85	1.0000	0.1475	0.1365	0.1205
145	3	1.50	0.40	0.99	1.0000	0.1452	0.1398	0.1182
146	3	1.50	0.20	0.00	1.0000	0.1775	0.1628	0.1398
147	3	1.50	0.20	0.40	1.0000	0.1896	0.1644	0.1422
148	3	1.50	0.20	0.70	1.0000	0.1952	0.1666	0.1426
149	3	1.50	0.20	0.85	1.0000	0.1801	0.1606	0.1389
150	3	1.50	0.20	0.99	1.0000	0.1715	0.1574	0.1346
151	3	2.00	1.00	0.00	1.0000	0.0602	0.0569	0.0498
152	3	2.00	1.00	0.40	1.0000	0.0617	0.0572	0.0496
153	3	2.00	1.00	0.70	1.0000	0.0599	0.0533	0.0487
154	3	2.00	1.00	0.85	1.0000	0.0561	0.0516	0.0483
155	3	2.00	1.00	0.99	1.0000	0.0541	0.0526	0.0479
156	3	2.00	0.80	0.00	1.0000	0.0739	0.0687	0.0602
157	3	2.00	0.80	0.40	1.0000	0.0745	0.0675	0.0600
158	3	2.00	0.80	0.70	1.0000	0.0727	0.0655	0.0593
159	3	2.00	0.80	0.85	1.0000	0.0707	0.0641	0.0587
160	3	2.00	0.80	0.99	1.0000	0.0684	0.0667	0.0583
161	3	2.00	0.60	0.00	1.0000	0.0914	0.0824	0.0735
162	3	2.00	0.60	0.40	1.0000	0.0938	0.0832	0.0736
163	3	2.00	0.60	0.70	1.0000	0.0937	0.0821	0.0731
164	3	2.00	0.60	0.85	1.0000	0.0943	0.0825	0.0722
165	3	2.00	0.60	0.99	1.0000	0.0859	0.0817	0.0704
166	3	2.00	0.40	0.00	1.0000	0.1205	0.1026	0.0894
167	3	2.00	0.40	0.40	1.0000	0.1191	0.1030	0.0892
168	3	2.00	0.40	0.70	1.0000	0.1202	0.1022	0.0893
169	3	2.00	0.40	0.85	1.0000	0.1223	0.1045	0.0879
170	3	2.00	0.40	0.99	1.0000	0.1093	0.1002	0.0848
171	3	2.00	0.20	0.00	1.0000	0.1536	0.1312	0.1039
172	3	2.00	0.20	0.40	1.0000	0.1472	0.1216	0.1049
173	3	2.00	0.20	0.70	1.0000	0.1466	0.1203	0.1040
174	3	2.00	0.20	0.85	1.0000	0.1385	0.1170	0.1012
175	3	2.00	0.20	0.99	1.0000	0.1459	0.1308	0.1017
176	5	0.00	1.00	0.00	0.0564	0.0463	0.0581	0.0559
177	5	0.00	1.00	0.40	0.0567	0.0481	0.0570	0.0581
178	5	0.00	1.00	0.70	0.0673	0.0558	0.0645	0.0769
179	5	0.00	1.00	0.85	0.0809	0.0678	0.0792	0.0994
180	5	0.00	1.00	0.99	0.1026	0.0957	0.1145	0.1383
181	5	0.00	0.80	0.00	0.0577	0.0468	0.0589	0.0587
182	5	0.00	0.80	0.40	0.0589	0.0496	0.0585	0.0620
183	5	0.00	0.80	0.70	0.0701	0.0591	0.0670	0.0811
184	5	0.00	0.80	0.85	0.0834	0.0721	0.0819	0.1030
185	5	0.00	0.80	0.99	0.1034	0.0998	0.1152	0.1392
186	5	0.00	0.60	0.00	0.0633	0.0495	0.0623	0.0681
187	5	0.00	0.60	0.40	0.0655	0.0552	0.0633	0.0727
188	5	0.00	0.60	0.70	0.0767	0.0677	0.0736	0.0914
189	5	0.00	0.60	0.85	0.0887	0.0817	0.0887	0.1110
190	5	0.00	0.60	0.99	0.1043	0.1046	0.1164	0.1405
191	5	0.00	0.40	0.00	0.0765	0.0584	0.0734	0.0896
192	5	0.00	0.40	0.40	0.0793	0.0689	0.0763	0.0946
193	5	0.00	0.40	0.70	0.0886	0.0840	0.0880	0.1101
194	5	0.00	0.40	0.85	0.0944	0.0955	0.1002	0.1235
195	5	0.00	0.40	0.99	0.1058	0.1113	0.1195	0.1424
196	5	0.00	0.20	0.00	0.0953	0.0807	0.1009	0.1245
197	5	0.00	0.20	0.40	0.0963	0.0950	0.1030	0.1264
198	5	0.00	0.20	0.70	0.0998	0.1069	1092	0.1328
199	5	0.00	0.20	0.85	0.1022	0.1115	0.1137	0.1375
200	5	0.00	0.20	0.99	0.1071	0.1149	0.1195	0.1451
201	5	0.25	1.00	0.00	0.0560	0.0467	0.0582	0.0553
202	5	0.25	1.00	0.40	0.0566	0.0485	0.0574	0.0569
203	5	0.25	1.00	0.70	0.0654	0.0550	0.0632	0.0732
204	5	0.25	1.00	0.85	0.0768	0.0647	0.0753	0.0928
205	5	0.25	1.00	0.99	0.0967	0.0880	0.1052	0.1269
206	5	0.25	0.80	0.00	0.0579	0.0473	0.0590	0.0581
207	5	0.25	0.80	0.40	0.0593	0.0502	0.0588	0.0609

208	5	0.25	0.80	0.70	0.0690	0.0587	0.0661	0.0779
209	5	0.25	0.80	0.85	0.0807	0.0697	0.0789	0.0973
210	5	0.25	0.80	0.99	0.0990	0.0933	0.1075	0.1293
211	5	0.25	0.60	0.00	0.0633	0.0500	0.0624	0.0675
212	5	0.25	0.60	0.40	0.0660	0.0557	0.0635	0.0714
213	5	0.25	0.60	0.70	0.0763	0.0672	0.0728	0.0884
214	5	0.25	0.60	0.85	0.0859	0.0795	0.0862	0.1062
215	5	0.25	0.60	0.99	0.1023	0.0995	0.1105	0.1329
216	5	0.25	0.40	0.00	0.0766	0.0588	0.0732	0.0883
217	5	0.25	0.40	0.40	0.0791	0.0688	0.0760	0.0926
218	5	0.25	0.40	0.70	0.0873	0.0831	0.0868	0.1069
219	5	0.25	0.40	0.85	0.0948	0.0936	0.0980	0.1195
220	5	0.25	0.40	0.99	0.1054	0.1057	0.1134	0.1368
221	5	0.25	0.20	0.00	0.0973	0.0802	0.0997	0.1217
222	5	0.25	0.20	0.40	0.0982	0.0942	0.1021	0.1236
223	5	0.25	0.20	0.70	0.1008	0.1053	0.1076	0.1293
224	5	0.25	0.20	0.85	0.1037	0.1098	0.1119	0.1342
225	5	0.25	0.20	0.99	0.1085	0.1136	0.1178	0.1408
226	5	0.50	1.00	0.00	0.0567	0.0487	0.0592	0.0545
227	5	0.50	1.00	0.40	0.0574	0.0502	0.0583	0.0550
228	5	0.50	1.00	0.70	0.0643	0.0538	0.0612	0.0665
229	5	0.50	1.00	0.85	0.0718	0.0592	0.0683	0.0807
230	5	0.50	1.00	0.99	0.0878	0.0755	0.0896	0.1046
231	5	0.50	0.80	0.00	0.0603	0.0503	0.0610	0.0581
232	5	0.50	0.80	0.40	0.0626	0.0529	0.0609	0.0598
233	5	0.50	0.80	0.70	0.0703	0.0590	0.0657	0.0725
234	5	0.50	0.80	0.85	0.0784	0.0662	0.0742	0.0870
235	5	0.50	0.80	0.99	0.0949	0.0839	0.0959	0.1101
236	5	0.50	0.60	0.00	0.0689	0.0544	0.0656	0.0678
237	5	0.50	0.60	0.40	0.0714	0.0596	0.0668	0.0706
238	5	0.50	0.60	0.70	0.0800	0.0690	0.0741	0.0839
239	5	0.50	0.60	0.85	0.0890	0.0783	0.0842	0.0977
240	5	0.50	0.60	0.99	0.1032	0.0929	0.1025	0.1167
241	5	0.50	0.40	0.00	0.0847	0.0649	0.0779	0.0880
242	5	0.50	0.40	0.40	0.0877	0.0741	0.0807	0.0914
243	5	0.50	0.40	0.70	0.0961	0.0864	0.0898	0.1028
244	5	0.50	0.40	0.85	0.1031	0.0950	0.0989	0.1126
245	5	0.50	0.40	0.99	0.1122	0.1049	0.1115	0.1250
246	5	0.50	0.20	0.00	0.1092	0.0871	0.1043	0.1185
247	5	0.50	0.20	0.40	0.1107	0.1003	0.1073	0.1203
248	5	0.50	0.20	0.70	0.1138	0.1093	0.1118	0.1246
249	5	0.50	0.20	0.85	0.1151	0.1132	0.1148	0.1283
250	5	0.50	0.20	0.99	0.1170	0.1161	0.1192	0.1333
251	5	0.75	1.00	0.00	0.0567	0.0500	0.0589	0.0530
252	5	0.75	1.00	0.40	0.0579	0.0509	0.0580	0.0527
253	5	0.75	1.00	0.70	0.0613	0.0515	0.0577	0.0594
254	5	0.75	1.00	0.85	0.0661	0.0530	0.0602	0.0680
255	5	0.75	1.00	0.99	0.0753	0.0627	0.0738	0.0828
256	5	0.75	0.80	0.00	0.0632	0.0537	0.0628	0.0578
257	5	0.75	0.80	0.40	0.0650	0.0557	0.0627	0.0587
258	5	0.75	0.80	0.70	0.0703	0.0586	0.0643	0.0666
259	5	0.75	0.80	0.85	0.0772	0.0621	0.0687	0.0760
260	5	0.75	0.80	0.99	0.0860	0.0737	0.0832	0.0903
261	5	0.75	0.60	0.00	0.0748	0.0602	0.0696	0.0681
262	5	0.75	0.60	0.40	0.0767	0.0642	0.0705	0.0698
263	5	0.75	0.60	0.70	0.0845	0.0706	0.0751	0.0787
264	5	0.75	0.60	0.85	0.0907	0.0766	0.0816	0.0881
265	5	0.75	0.60	0.99	0.0957	0.0873	0.0950	0.1002
266	5	0.75	0.40	0.00	0.0951	0.0736	0.0843	0.0873
267	5	0.75	0.40	0.40	0.0982	0.0811	0.0867	0.0897
268	5	0.75	0.40	0.70	0.1029	0.0904	0.0933	0.0976
269	5	0.75	0.40	0.85	0.1082	0.0969	0.1002	0.1042
270	5	0.75	0.40	0.99	0.1068	0.1109	0.1161	0.1117
271	5	0.75	0.20	0.00	0.1160	0.0968	0.1106	0.1140
272	5	0.75	0.20	0.40	0.1178	0.1082	0.1138	0.1150
273	5	0.75	0.20	0.70	0.1195	0.1157	0.1169	0.1179
274	5	0.75	0.20	0.85	0.1194	0.1177	0.1186	0.1205
275	5	0.75	0.20	0.99	0.1181	0.1195	0.1212	0.1232
276	5	1.00	1.00	0.00	1.0000	0.0492	0.0563	0.0497
277	5	1.00	1.00	0.40	1.0000	0.0495	0.0552	0.0489
278	5	1.00	1.00	0.70	1.0000	0.0478	0.0526	0.0522
279	5	1.00	1.00	0.85	1.0000	0.0470	0.0525	0.0568
280	5	1.00	1.00	0.99	1.0000	0.0535	0.0617	0.0653
281	5	1.00	0.80	0.00	1.0000	0.0550	0.0621	0.0558
282	5	1.00	0.80	0.40	1.0000	0.0561	0.0618	0.0559
283	5	1.00	0.80	0.70	1.0000	0.0564	0.0610	0.0602
284	5	1.00	0.80	0.85	1.0000	0.0576	0.0627	0.0655
285	5	1.00	0.80	0.99	1.0000	0.0644	0.0718	0.0739
286	5	1.00	0.60	0.00	1.0000	0.0641	0.0713	0.0668
287	5	1.00	0.60	0.40	1.0000	0.0669	0.0719	0.0675
288	5	1.00	0.60	0.70	1.0000	0.0703	0.0739	0.0728
289	5	1.00	0.60	0.85	1.0000	0.0738	0.0777	0.0782
290	5	1.00	0.60	0.99	1.0000	0.0810	0.0870	0.0850
291	5	1.00	0.40	0.00	1.0000	0.0802	0.0880	0.0850
292	5	1.00	0.40	0.40	1.0000	0.0857	0.0899	0.0862
293	5	1.00	0.40	0.70	1.0000	0.0918	0.0939	0.0908
294	5	1.00	0.40	0.85	1.0000	0.0970	0.0994	0.0946
295	5	1.00	0.40	0.99	1.0000	0.1017	0.1054	0.0984
296	5	1.00	0.20	0.00	1.0000	0.1032	0.1130	0.1074
297	5	1.00	0.20	0.40	1.0000	0.1126	0.1162	0.1077
298	5	1.00	0.20	0.70	1.0000	0.1182	0.1184	0.1094
299	5	1.00	0.20	0.85	1.0000	0.1186	0.1184	0.1107

300	5	1.00	0.20	0.99	1.0000	0.1209	0.1214	0.1113
301	5	1.50	1.00	0.00	1.0000	0.0427	0.0461	0.0404
302	5	1.50	1.00	0.40	1.0000	0.0417	0.0446	0.0390
303	5	1.50	1.00	0.70	1.0000	0.0387	0.0410	0.0390
304	5	1.50	1.00	0.85	1.0000	0.0368	0.0395	0.0397
305	5	1.50	1.00	0.99	1.0000	0.0378	0.0426	0.0424
306	5	1.50	0.80	0.00	1.0000	0.0506	0.0537	0.0472
307	5	1.50	0.80	0.40	1.0000	0.0501	0.0528	0.0462
308	5	1.50	0.80	0.70	1.0000	0.0481	0.0503	0.0468
309	5	1.50	0.80	0.85	1.0000	0.0475	0.0499	0.0480
310	5	1.50	0.80	0.99	1.0000	0.0500	0.0542	0.0502
311	5	1.50	0.60	0.00	1.0000	0.0621	0.0647	0.0572
312	5	1.50	0.60	0.40	1.0000	0.0625	0.0645	0.0567
313	5	1.50	0.60	0.70	1.0000	0.0626	0.0639	0.0579
314	5	1.50	0.60	0.85	1.0000	0.0637	0.0652	0.0593
315	5	1.50	0.60	0.99	1.0000	0.0672	0.0702	0.0606
316	5	1.50	0.40	0.00	1.0000	0.0788	0.0809	0.0710
317	5	1.50	0.40	0.40	1.0000	0.0807	0.0814	0.0709
318	5	1.50	0.40	0.70	1.0000	0.0831	0.0829	0.0720
319	5	1.50	0.40	0.85	1.0000	0.0837	0.0837	0.0725
320	5	1.50	0.40	0.99	1.0000	0.0865	0.0873	0.0731
321	5	1.50	0.20	0.00	1.0000	0.0978	0.0996	0.0855
322	5	1.50	0.20	0.40	1.0000	0.1007	0.0999	0.0856
323	5	1.50	0.20	0.70	1.0000	0.1041	0.1017	0.0857
324	5	1.50	0.20	0.85	1.0000	0.1044	0.1019	0.0860
325	5	1.50	0.20	0.99	1.0000	0.1023	0.1006	0.0858
326	5	2.00	1.00	0.00	1.0000	0.0346	0.0352	0.0302
327	5	2.00	1.00	0.40	1.0000	0.0330	0.0337	0.0295
328	5	2.00	1.00	0.70	1.0000	0.0304	0.0309	0.0285
329	5	2.00	1.00	0.85	1.0000	0.0292	0.0299	0.0283
330	5	2.00	1.00	0.99	1.0000	0.0292	0.0317	0.0290
331	5	2.00	0.80	0.00	1.0000	0.0420	0.0420	0.0363
332	5	2.00	0.80	0.40	1.0000	0.0409	0.0411	0.0358
333	5	2.00	0.80	0.70	1.0000	0.0390	0.0391	0.0351
334	5	2.00	0.80	0.85	1.0000	0.0385	0.0388	0.0349
335	5	2.00	0.80	0.99	1.0000	0.0392	0.0412	0.0351
336	5	2.00	0.60	0.00	1.0000	0.0525	0.0515	0.0445
337	5	2.00	0.60	0.40	1.0000	0.0518	0.0512	0.0442
338	5	2.00	0.60	0.70	1.0000	0.0515	0.0507	0.0438
339	5	2.00	0.60	0.85	1.0000	0.0525	0.0519	0.0433
340	5	2.00	0.60	0.90	1.0000	0.0521	0.0531	0.0431
341	5	2.00	0.40	0.00	1.0000	0.0658	0.0636	0.0544
342	5	2.00	0.40	0.40	1.0000	0.0662	0.0640	0.0541
343	5	2.00	0.40	0.70	1.0000	0.0662	0.0639	0.0537
344	5	2.00	0.40	0.85	1.0000	0.0657	0.0638	0.0532
345	5	2.00	0.40	0.99	1.0000	0.0713	0.0699	0.0527
346	5	2.00	0.20	0.00	1.0000	0.0796	0.0758	0.0640
347	5	2.00	0.20	0.40	1.0000	0.0802	0.0761	0.0638
348	5	2.00	0.20	0.70	1.0000	0.0831	0.0786	0.0634
349	5	2.00	0.20	0.85	1.0000	0.0833	0.0791	0.0631
350	5	2.00	0.20	0.99	1.0000	0.0798	0.0765	0.0633
351	7	0.00	1.00	0.00	0.0387	0.0329	0.0394	0.0415
352	7	0.00	1.00	0.40	0.0416	0.0351	0.0406	0.0465
353	7	0.00	1.00	0.70	0.0502	0.0412	0.0468	0.0620
354	7	0.00	1.00	0.85	0.0595	0.0500	0.0568	0.0776
355	7	0.00	1.00	0.99	0.0722	0.0684	0.0790	0.0984
356	7	0.00	0.80	0.00	0.0396	0.0333	0.0399	0.0429
357	7	0.00	0.80	0.40	0.0425	0.0359	0.0412	0.0480
358	7	0.00	0.80	0.70	0.0511	0.0426	0.0475	0.0630
359	7	0.00	0.80	0.85	0.0602	0.0519	0.0578	0.0780
360	7	0.00	0.80	0.99	0.0722	0.0705	0.0792	0.0983
361	7	0.00	0.60	0.00	0.0430	0.0349	0.0419	0.0408
362	7	0.00	0.60	0.40	0.0462	0.0390	0.0436	0.0540
363	7	0.00	0.60	0.70	0.0545	0.0475	0.0510	0.0681
364	7	0.00	0.60	0.85	0.0626	0.0573	0.0614	0.0814
365	7	0.00	0.60	0.99	0.0724	0.0730	0.0797	0.0985
366	7	0.00	0.40	0.00	0.0512	0.0407	0.0487	0.0630
367	7	0.00	0.40	0.40	0.0546	0.0472	0.0514	0.0678
368	7	0.00	0.40	0.70	0.0608	0.0576	0.0599	0.0790
369	7	0.00	0.40	0.85	0.0659	0.0660	0.0686	0.0879
370	7	0.00	0.40	0.99	0.0729	0.0758	0.0804	0.0991
371	7	0.00	0.20	0.00	0.0650	0.0567	0.0676	0.0863
372	7	0.00	0.20	0.40	0.0659	0.0648	0.0695	0.0882
373	7	0.00	0.20	0.70	0.0684	0.0727	0.0741	0.0926
374	7	0.00	0.20	0.85	0.0701	0.0759	0.0771	0.0957
375	7	0.00	0.20	0.99	0.0732	0.0789	0.0813	0.1005
376	7	0.25	1.00	0.00	0.0377	0.0325	0.0387	0.0404
377	7	0.25	1.00	0.40	0.0404	0.0346	0.0399	0.0446
378	7	0.25	1.00	0.70	0.0483	0.0398	0.0449	0.0581
379	7	0.25	1.00	0.85	0.0568	0.0468	0.0531	0.0716
380	7	0.25	1.00	0.99	0.0669	0.0627	0.0724	0.0896
381	7	0.25	0.80	0.00	0.0390	0.0330	0.0393	0.0417
382	7	0.25	0.80	0.40	0.0418	0.0354	0.0405	0.0462
383	7	0.25	0.80	0.70	0.0500	0.0414	0.0461	0.0596
384	7	0.25	0.80	0.85	0.0576	0.0492	0.0548	0.0728
385	7	0.25	0.80	0.99	0.0679	0.0654	0.0735	0.0906
386	7	0.25	0.60	0.00	0.0423	0.0348	0.0414	0.0474
387	7	0.25	0.60	0.40	0.0461	0.0386	0.0431	0.0521
388	7	0.25	0.60	0.70	0.0532	0.0463	0.0497	0.0648
389	7	0.25	0.60	0.85	0.0607	0.0550	0.0590	0.0769
390	7	0.25	0.60	0.99	0.0690	0.0691	0.0754	0.0924
391	7	0.25	0.40	0.00	0.0511	0.0408	0.0483	0.0609

392	7	0.25	0.40	0.40	0.0539	0.0467	0.0508	0.0651
393	7	0.25	0.40	0.70	0.0605	0.0563	0.0586	0.0754
394	7	0.25	0.40	0.85	0.0649	0.0640	0.0666	0.0838
395	7	0.25	0.40	0.99	0.0713	0.0728	0.0771	0.0942
396	7	0.25	0.20	0.00	0.0648	0.0565	0.0667	0.0832
397	7	0.25	0.20	0.40	0.0658	0.0641	0.0685	0.0849
398	7	0.25	0.20	0.70	0.0683	0.0714	0.0728	0.0889
399	7	0.25	0.20	0.85	0.0704	0.0742	0.0753	0.0922
400	7	0.25	0.20	0.99	0.0730	0.0769	0.0791	0.0961
401	7	0.50	1.00	0.00	0.0369	0.0334	0.0388	0.0386
402	7	0.50	1.00	0.40	0.0400	0.0350	0.0398	0.0415
403	7	0.50	1.00	0.70	0.0466	0.0381	0.0427	0.0514
404	7	0.50	1.00	0.85	0.0524	0.0422	0.0476	0.0611
405	7	0.50	1.00	0.99	0.0613	0.0532	0.0612	0.0732
406	7	0.50	0.80	0.00	0.0396	0.0346	0.0401	0.0405
407	7	0.50	0.80	0.40	0.0425	0.0365	0.0412	0.0438
408	7	0.50	0.80	0.70	0.0496	0.0408	0.0451	0.0541
409	7	0.50	0.80	0.85	0.0555	0.0461	0.0510	0.0638
410	7	0.50	0.80	0.99	0.0621	0.0580	0.0660	0.0764
411	7	0.50	0.60	0.00	0.0454	0.0372	0.0430	0.0463
412	7	0.50	0.60	0.40	0.0486	0.0405	0.0447	0.0500
413	7	0.50	0.60	0.70	0.0560	0.0468	0.0501	0.0602
414	7	0.50	0.60	0.85	0.0619	0.0534	0.0571	0.0695
415	7	0.50	0.60	0.99	0.0668	0.0642	0.0697	0.0803
416	7	0.50	0.40	0.00	0.0569	0.0445	0.0510	0.0594
417	7	0.50	0.40	0.40	0.0599	0.0497	0.0535	0.0629
418	7	0.50	0.40	0.70	0.0654	0.0579	0.0602	0.0712
419	7	0.50	0.40	0.85	0.0703	0.0639	0.0665	0.0778
420	7	0.50	0.40	0.99	0.0732	0.0711	0.0750	0.0851
421	7	0.50	0.20	0.00	0.0737	0.0606	0.0692	0.0797
422	7	0.50	0.20	0.40	0.0745	0.0674	0.0713	0.0814
423	7	0.50	0.20	0.70	0.0734	0.0739	0.0752	0.0846
424	7	0.50	0.20	0.85	0.0742	0.0757	0.0768	0.0871
425	7	0.50	0.20	0.99	0.0767	0.0760	0.0779	0.0900
426	7	0.75	1.00	0.00	0.0366	0.0342	0.0388	0.0368
427	7	0.75	1.00	0.40	0.0388	0.0351	0.0393	0.0383
428	7	0.75	1.00	0.70	0.0436	0.0358	0.0398	0.0443
429	7	0.75	1.00	0.85	0.0478	0.0373	0.0416	0.0501
430	7	0.75	1.00	0.99	0.0513	0.0440	0.0502	0.0571
431	7	0.75	0.80	0.00	0.0414	0.0366	0.0412	0.0394
432	7	0.75	0.80	0.40	0.0440	0.0380	0.0421	0.0415
433	7	0.75	0.80	0.70	0.0496	0.0401	0.0439	0.0481
434	7	0.75	0.80	0.85	0.0537	0.0429	0.0471	0.0545
435	7	0.75	0.80	0.98	0.0578	0.0507	0.0564	0.0617
436	7	0.75	0.60	0.00	0.0497	0.0409	0.0456	0.0456
437	7	0.75	0.60	0.40	0.0525	0.0433	0.0471	0.0481
438	7	0.75	0.60	0.70	0.0582	0.0477	0.0508	0.0549
439	7	0.75	0.60	0.85	0.0605	0.0521	0.0556	0.0612
440	7	0.75	0.60	0.99	0.0646	0.0594	0.0641	0.0677
441	7	0.75	0.40	0.00	0.0629	0.0502	0.0554	0.0578
442	7	0.75	0.40	0.40	0.0635	0.0544	0.0577	0.0603
443	7	0.75	0.40	0.70	0.0679	0.0607	0.0629	0.0662
444	7	0.75	0.40	0.85	0.0721	0.0648	0.0673	0.0706
445	7	0.75	0.40	0.99	0.0748	0.0717	0.0750	0.0747
446	7	0.75	0.20	0.00	0.0757	0.0669	0.0736	0.0752
447	7	0.75	0.20	0.40	0.0768	0.0725	0.0756	0.0763
448	7	0.75	0.20	0.70	0.0795	0.0780	0.0791	0.0785
449	7	0.75	0.20	0.85	0.0794	0.0789	0.0798	0.0803
450	7	0.75	0.20	0.99	0.0823	0.0800	0.0813	0.0818
451	7	1.00	1.00	0.00	0.0354	0.0340	0.0376	0.0343
452	7	1.00	1.00	0.40	0.0371	0.0341	0.0376	0.0348
453	7	1.00	1.00	0.70	0.0392	0.0330	0.0361	0.0380
454	7	1.00	1.00	0.85	0.0412	0.0328	0.0362	0.0411
455	7	1.00	1.00	0.99	0.0421	0.0368	0.0417	0.0445
456	7	1.00	0.80	0.00	0.0417	0.0378	0.0414	0.0380
457	7	1.00	0.80	0.40	0.0439	0.0384	0.0419	0.0389
458	7	1.00	0.80	0.70	0.0452	0.0386	0.0418	0.0426
459	7	1.00	0.80	0.85	0.0486	0.0397	0.0432	0.0461
460	7	1.00	0.80	0.99	0.0507	0.0444	0.0491	0.0499
461	7	1.00	0.60	0.00	0.0494	0.0439	0.0476	0.0446
462	7	1.00	0.60	0.40	0.0516	0.0455	0.0486	0.0459
463	7	1.00	0.60	0.70	0.0554	0.0479	0.0506	0.0500
464	7	1.00	0.60	0.85	0.0595	0.0505	0.0535	0.0536
465	7	1.00	0.60	0.99	0.0618	0.0554	0.0594	0.0569
466	7	1.00	0.40	0.00	0.0640	0.0553	0.0592	0.0561
467	7	1.00	0.40	0.40	0.0658	0.0583	0.0610	0.0576
468	7	1.00	0.40	0.70	0.0683	0.0624	0.0644	0.0609
469	7	1.00	0.40	0.85	0.0668	0.0650	0.0672	0.0634
470	7	1.00	0.40	0.99	0.0743	0.0695	0.0723	0.0652
471	7	1.00	0.20	0.00	0.0760	0.0720	0.0766	0.0705
472	7	1.00	0.20	0.40	0.0762	0.0763	0.0785	0.0709
473	7	1.00	0.20	0.70	0.0787	0.0808	0.0815	0.0722
474	7	1.00	0.20	0.85	0.0810	0.0808	0.0814	0.0730
475	7	1.00	0.20	0.99	0.0817	0.0824	0.0833	0.0736
476	7	1.50	1.00	0.00	1.0000	0.0303	0.0321	0.0280
477	7	1.50	1.00	0.40	1.0000	0.0291	0.0311	0.0275
478	7	1.50	1.00	0.70	1.0000	0.0268	0.0286	0.0278
479	7	1.50	1.00	0.85	1.0000	0.0258	0.0277	0.0282
480	7	1.50	1.00	0.99	1.0000	0.0271	0.0301	0.0288
481	7	1.50	0.80	0.00	1.0000	0.0359	0.0376	0.0325
482	7	1.50	0.80	0.40	1.0000	0.0350	0.0370	0.0323
483	7	1.50	0.80	0.70	1.0000	0.0335	0.0353	0.0329

484	7	1.50	0.80	0.85	1.0000	0.0332	0.0353	0.0335
485	7	1.50	0.80	0.99	1.0000	0.0352	0.0384	0.0340
486	7	1.50	0.60	0.00	1.0000	0.0441	0.0456	0.0392
487	7	1.50	0.60	0.40	1.0000	0.0439	0.0456	0.0391
488	7	1.50	0.60	0.70	1.0000	0.0437	0.0453	0.0401
489	7	1.50	0.60	0.85	1.0000	0.0444	0.0463	0.0408
490	7	1.50	0.60	0.99	1.0000	0.0474	0.0501	0.0409
491	7	1.50	0.40	0.00	1.0000	0.0565	0.0575	0.0483
492	7	1.50	0.40	0.40	1.0000	0.0570	0.0580	0.0484
493	7	1.50	0.40	0.70	1.0000	0.0582	0.0591	0.0492
494	7	1.50	0.40	0.85	1.0000	0.0584	0.0596	0.0495
495	7	1.50	0.40	0.99	1.0000	0.0593	0.0608	0.0493
496	7	1.50	0.20	0.00	1.0000	0.0704	0.0711	0.0579
497	7	1.50	0.20	0.40	1.0000	0.0713	0.0714	0.0580
498	7	1.50	0.20	0.70	1.0000	0.0724	0.0719	0.0581
499	7	1.50	0.20	0.85	1.0000	0.0729	0.0724	0.0582
500	7	1.50	0.20	0.99	1.0000	0.0715	0.0715	0.0584
501	7	2.00	1.00	0.00	1.0000	0.0245	0.0249	0.0212
502	7	2.00	1.00	0.40	1.0000	0.0232	0.0239	0.0208
503	7	2.00	1.00	0.70	1.0000	0.0214	0.0220	0.0203
504	7	2.00	1.00	0.85	1.0000	0.0207	0.0214	0.0201
505	7	2.00	1.00	0.99	1.0000	0.0212	0.0230	0.0199
506	7	2.00	0.80	0.00	1.0000	0.0301	0.0302	0.0254
507	7	2.00	0.80	0.40	1.0000	0.0289	0.0295	0.0252
508	7	2.00	0.80	0.70	1.0000	0.0275	0.0281	0.0248
509	7	2.00	0.80	0.85	1.0000	0.0271	0.0280	0.0246
510	7	2.00	0.80	0.99	1.0000	0.0281	0.0302	0.0242
511	7	2.00	0.60	0.00	1.0000	0.0379	0.0374	0.0311
512	7	2.00	0.60	0.40	1.0000	0.0370	0.0371	0.0310
513	7	2.00	0.60	0.70	1.0000	0.0363	0.0367	0.0306
514	7	2.00	0.60	0.85	1.0000	0.0362	0.0369	0.0303
515	7	2.00	0.60	0.99	1.0000	0.0373	0.0389	0.0297
516	7	2.00	0.40	0.00	1.0000	0.0480	0.0467	0.0380
517	7	2.00	0.40	0.40	1.0000	0.0475	0.0469	0.0379
518	7	2.00	0.40	0.70	1.0000	0.0476	0.0473	0.0375
519	7	2.00	0.40	0.85	1.0000	0.0472	0.0472	0.0371
520	7	2.00	0.40	0.99	1.0000	0.0478	0.0484	0.0366
521	7	2.00	0.20	0.00	1.0000	0.0582	0.0559	0.0448
522	7	2.00	0.20	0.40	1.0000	0.0578	0.0560	0.0447
523	7	2.00	0.20	0.70	1.0000	0.0585	0.0568	0.0444
524	7	2.00	0.20	0.85	1.0000	0.0592	0.0578	0.0442
525	7	2.00	0.20	0.99	1.0000	0.0575	0.0567	0.0442
526	10	0.00	1.00	0.00	0.0276	0.0247	0.0285	0.0292
527	10	0.00	1.00	0.40	0.0278	0.0254	0.0282	0.0303
528	10	0.00	1.00	0.70	0.0320	0.0288	0.0312	0.0398
529	10	0.00	1.00	0.85	0.0375	0.0350	0.0380	0.0511
530	10	0.00	1.00	0.99	0.0478	0.0505	0.0557	0.0698
531	10	0.00	0.80	0.00	0.0282	0.0250	0.0289	0.0305
532	10	0.00	0.80	0.40	0.0287	0.0261	0.0289	0.0321
533	10	0.00	0.80	0.70	0.0331	0.0302	0.0323	0.0417
534	10	0.00	0.80	0.85	0.0384	0.0368	0.0392	0.0527
535	10	0.00	0.80	0.99	0.0482	0.0520	0.0561	0.0701
536	10	0.00	0.60	0.00	0.0303	0.0259	0.0302	0.0351
537	10	0.00	0.60	0.40	0.0312	0.0282	0.0307	0.0374
538	10	0.00	0.60	0.70	0.0357	0.0337	0.0351	0.0467
539	10	0.00	0.60	0.85	0.0407	0.0409	0.0424	0.0565
540	10	0.00	0.60	0.99	0.0487	0.0535	0.0566	0.0707
541	10	0.00	0.40	0.00	0.0356	0.0296	0.0347	0.0457
542	10	0.00	0.40	0.40	0.0367	0.0338	0.0361	0.0482
543	10	0.00	0.40	0.70	0.0406	0.0410	0.0418	0.0559
544	10	0.00	0.40	0.85	0.0439	0.0473	0.0482	0.0625
545	10	0.00	0.40	0.99	0.0493	0.0553	0.0573	0.0715
546	10	0.00	0.20	0.00	0.0445	0.0413	0.0482	0.0628
547	10	0.00	0.20	0.40	0.0448	0.0468	0.0493	0.0637
548	10	0.00	0.20	0.70	0.0464	0.0523	0.0527	0.0668
549	10	0.00	0.20	0.85	0.0476	0.0549	0.0552	0.0692
550	10	0.00	0.20	0.99	0.0501	0.0571	0.0580	0.0725
551	10	0.25	1.00	0.00	0.0269	0.0242	0.0279	0.0281
552	10	0.25	1.00	0.40	0.0270	0.0246	0.0274	0.0290
553	10	0.25	1.00	0.70	0.0305	0.0269	0.0293	0.0372
554	10	0.25	1.00	0.85	0.0352	0.0317	0.0344	0.0470
555	10	0.25	1.00	0.99	0.0442	0.0450	0.0496	0.0633
556	10	0.25	0.80	0.00	0.0277	0.0244	0.0281	0.0293
557	10	0.25	0.80	0.40	0.0281	0.0252	0.0279	0.0308
558	10	0.25	0.80	0.70	0.0320	0.0284	0.0304	0.0393
559	10	0.25	0.80	0.85	0.0367	0.0337	0.0359	0.0490
560	10	0.25	0.80	0.99	0.0453	0.0468	0.0505	0.0644
561	10	0.25	0.60	0.00	0.0301	0.0261	0.0292	0.0337
562	10	0.25	0.60	0.40	0.0309	0.0271	0.0295	0.0358
563	10	0.25	0.60	0.70	0.0350	0.0317	0.0331	0.0442
564	10	0.25	0.60	0.85	0.0395	0.0378	0.0393	0.0531
565	10	0.25	0.60	0.99	0.0468	0.0491	0.0518	0.0653
566	10	0.25	0.40	0.00	0.0356	0.0285	0.0333	0.0438
567	10	0.25	0.40	0.40	0.0367	0.0323	0.0345	0.0460
568	10	0.25	0.40	0.70	0.0403	0.0367	0.0395	0.0532
569	10	0.25	0.40	0.85	0.0435	0.0443	0.0451	0.0594
570	10	0.25	0.40	0.99	0.0484	0.0514	0.0532	0.0676
571	10	0.25	0.20	0.00	0.0446	0.0394	0.0459	0.0501
572	10	0.25	0.20	0.40	0.0449	0.0444	0.0469	0.0611
573	10	0.25	0.20	0.70	0.0463	0.0493	0.0498	0.0638
574	10	0.25	0.20	0.85	0.0477	0.0517	0.0521	0.0663
575	10	0.25	0.20	0.99	0.0499	0.0536	0.0544	0.0692

576	10	0.50	1.00	0.00	0.0268	0.0247	0.0279	0.0269
577	10	0.50	1.00	0.40	0.0270	0.0245	0.0271	0.0275
578	10	0.50	1.00	0.70	0.0298	0.0251	0.0273	0.0333
579	10	0.50	1.00	0.85	0.0335	0.0273	0.0297	0.0401
580	10	0.50	1.00	0.99	0.0415	0.0366	0.0403	0.0515
581	10	0.50	0.80	0.00	0.0287	0.0250	0.0283	0.0285
582	10	0.50	0.80	0.40	0.0293	0.0254	0.0279	0.0295
583	10	0.50	0.80	0.70	0.0328	0.0270	0.0290	0.0359
584	10	0.50	0.80	0.85	0.0369	0.0301	0.0322	0.0429
585	10	0.50	0.80	0.99	0.0452	0.0398	0.0429	0.0540
586	10	0.50	0.60	0.00	0.0326	0.0260	0.0296	0.0329
587	10	0.50	0.60	0.40	0.0336	0.0274	0.0297	0.0346
588	10	0.50	0.60	0.70	0.0376	0.0307	0.0322	0.0411
589	10	0.50	0.60	0.85	0.0420	0.0350	0.0365	0.0479
590	10	0.50	0.60	0.99	0.0495	0.0434	0.0460	0.0572
591	10	0.50	0.40	0.00	0.0401	0.0297	0.0339	0.0426
592	10	0.50	0.40	0.40	0.0414	0.0329	0.0349	0.0444
593	10	0.50	0.40	0.70	0.0452	0.0380	0.0390	0.0501
594	10	0.50	0.40	0.85	0.0486	0.0423	0.0433	0.0549
595	10	0.50	0.40	0.99	0.0544	0.0477	0.0495	0.0610
596	10	0.50	0.20	0.00	0.0516	0.0402	0.0458	0.0574
597	10	0.50	0.20	0.40	0.0524	0.0445	0.0469	0.0584
598	10	0.50	0.20	0.70	0.0542	0.0483	0.0490	0.0606
599	10	0.50	0.20	0.85	0.0558	0.0501	0.0507	0.0625
600	10	0.50	0.20	0.99	0.0589	0.0515	0.0524	0.0649
601	10	0.75	1.00	0.00	0.0267	0.0255	0.0282	0.0255
602	10	0.75	1.00	0.40	0.0269	0.0247	0.0270	0.0259
603	10	0.75	1.00	0.70	0.0292	0.0234	0.0255	0.0294
604	10	0.75	1.00	0.85	0.0323	0.0235	0.0257	0.0333
605	10	0.75	1.00	0.99	0.0394	0.0291	0.0321	0.0401
606	10	0.75	0.80	0.00	0.0301	0.0266	0.0293	0.0277
607	10	0.75	0.80	0.40	0.0308	0.0263	0.0285	0.0286
608	10	0.75	0.80	0.70	0.0338	0.0261	0.0280	0.0325
609	10	0.75	0.80	0.85	0.0377	0.0272	0.0293	0.0369
610	10	0.75	0.80	0.99	0.0433	0.0334	0.0362	0.0435
611	10	0.75	0.60	0.00	0.0359	0.0284	0.0313	0.0323
612	10	0.75	0.60	0.40	0.0370	0.0291	0.0312	0.0336
613	10	0.75	0.60	0.70	0.0409	0.0307	0.0323	0.0380
614	10	0.75	0.60	0.85	0.0452	0.0333	0.0350	0.0423
615	10	0.75	0.60	0.99	0.0501	0.0391	0.0415	0.0480
616	10	0.75	0.40	0.00	0.0459	0.0332	0.0367	0.0414
617	10	0.75	0.40	0.40	0.0475	0.0355	0.0374	0.0428
618	10	0.75	0.40	0.70	0.0514	0.0391	0.0403	0.0466
619	10	0.75	0.40	0.85	0.0549	0.0422	0.0434	0.0498
620	10	0.75	0.40	0.99	0.0581	0.0457	0.0475	0.0533
621	10	0.75	0.20	0.00	0.0602	0.0437	0.0484	0.0541
622	10	0.75	0.20	0.40	0.0614	0.0469	0.0491	0.0547
623	10	0.75	0.20	0.70	0.0611	0.0490	0.0506	0.0561
624	10	0.75	0.20	0.85	0.0622	0.0510	0.0518	0.0574
625	10	0.75	0.20	0.99	0.0628	0.0520	0.0531	0.0587
626	10	1.00	1.00	0.00	0.0259	0.0256	0.0277	0.0238
627	10	1.00	1.00	0.40	0.0261	0.0244	0.0263	0.0240
628	10	1.00	1.00	0.70	0.0279	0.0218	0.0236	0.0258
629	10	1.00	1.00	0.85	0.0305	0.0206	0.0226	0.0277
630	10	1.00	1.00	0.99	0.0330	0.0238	0.0263	0.0312
631	10	1.00	0.80	0.00	0.0305	0.0278	0.0299	0.0264
632	10	1.00	0.80	0.40	0.0311	0.0269	0.0289	0.0270
633	10	1.00	0.80	0.70	0.0336	0.0253	0.0272	0.0293
634	10	1.00	0.80	0.85	0.0370	0.0252	0.0271	0.0316
635	10	1.00	0.80	0.99	0.0383	0.0291	0.0315	0.0351
636	10	1.00	0.60	0.00	0.0378	0.0311	0.0333	0.0313
637	10	1.00	0.60	0.40	0.0386	0.0310	0.0329	0.0322
638	10	1.00	0.60	0.70	0.0423	0.0312	0.0329	0.0348
639	10	1.00	0.60	0.85	0.0444	0.0325	0.0342	0.0373
640	10	1.00	0.60	0.99	0.0468	0.0362	0.0385	0.0402
641	10	1.00	0.40	0.00	0.0489	0.0374	0.0400	0.0397
642	10	1.00	0.40	0.40	0.0508	0.0387	0.0405	0.0407
643	10	1.00	0.40	0.70	0.0523	0.0408	0.0422	0.0429
644	10	1.00	0.40	0.85	0.0535	0.0427	0.0443	0.0447
645	10	1.00	0.40	0.99	0.0536	0.0446	0.0466	0.0463
646	10	1.00	0.20	0.00	0.0600	0.0479	0.0514	0.0501
647	10	1.00	0.20	0.40	0.0607	0.0499	0.0518	0.0506
648	10	1.00	0.20	0.70	0.0623	0.0517	0.0529	0.0513
649	10	1.00	0.20	0.85	0.0599	0.0526	0.0536	0.0519
650	10	1.00	0.20	0.99	0.0591	0.0530	0.0543	0.0523
651	10	1.50	1.00	0.00	1.0000	0.0229	0.0239	0.0197
652	10	1.50	1.00	0.40	1.0000	0.0214	0.0226	0.0194
653	10	1.50	1.00	0.70	1.0000	0.0182	0.0195	0.0193
654	10	1.50	1.00	0.85	1.0000	0.0166	0.0181	0.0193
655	10	1.50	1.00	0.99	1.0000	0.0176	0.0196	0.0200
656	10	1.50	0.80	0.00	1.0000	0.0268	0.0276	0.0228
657	10	1.50	0.80	0.40	1.0000	0.0254	0.0267	0.0227
658	10	1.50	0.80	0.70	1.0000	0.0229	0.0243	0.0230
659	10	1.50	0.80	0.85	1.0000	0.0219	0.0236	0.0232
660	10	1.50	0.80	0.99	1.0000	0.0234	0.0255	0.0237
661	10	1.50	0.60	0.00	1.0000	0.0321	0.0329	0.0273
662	10	1.50	0.60	0.40	1.0000	0.0312	0.0325	0.0275
663	10	1.50	0.60	0.70	1.0000	0.0300	0.0315	0.0281
664	10	1.50	0.60	0.85	1.0000	0.0302	0.0318	0.0285
665	10	1.50	0.60	0.99	1.0000	0.0313	0.0334	0.0286
666	10	1.50	0.40	0.00	1.0000	0.0399	0.0408	0.0337
667	10	1.50	0.40	0.40	1.0000	0.0399	0.0410	0.0339

668	10	1.50	0.40	0.70	1.0000	0.0400	0.0414	0.0345
669	10	1.50	0.40	0.85	1.0000	0.0398	0.0413	0.0346
670	10	1.50	0.40	0.99	1.0000	0.0409	0.0429	0.0345
671	10	1.50	0.20	0.00	1.0000	0.0487	0.0499	0.0404
672	10	1.50	0.20	0.40	1.0000	0.0492	0.0504	0.0406
673	10	1.50	0.20	0.70	1.0000	0.0498	0.0509	0.0407
674	10	1.50	0.20	0.85	1.0000	0.0502	0.0514	0.0407
675	10	1.50	0.20	0.99	1.0000	0.0488	0.0502	0.0408
676	10	2.00	1.00	0.00	1.0000	0.0183	0.0183	0.0149
677	10	2.00	1.00	0.40	1.0000	0.0171	0.0176	0.0148
678	10	2.00	1.00	0.70	1.0000	0.0148	0.0156	0.0142
679	10	2.00	1.00	0.85	1.0000	0.0137	0.0148	0.0139
680	10	2.00	1.00	0.99	1.0000	0.0140	0.0156	0.0138
681	10	2.00	0.80	0.00	1.0000	0.0223	0.0221	0.0179
682	10	2.00	0.80	0.40	1.0000	0.0211	0.0216	0.0179
683	10	2.00	0.80	0.70	1.0000	0.0192	0.0201	0.0174
684	10	2.00	0.80	0.85	1.0000	0.0185	0.0198	0.0171
685	10	2.00	0.80	0.99	1.0000	0.0190	0.0208	0.0168
686	10	2.00	0.60	0.00	1.0000	0.0276	0.0272	0.0218
687	10	2.00	0.60	0.40	1.0000	0.0267	0.0271	0.0219
688	10	2.00	0.60	0.70	1.0000	0.0255	0.0264	0.0215
689	10	2.00	0.60	0.85	1.0000	0.0251	0.0264	0.0212
690	10	2.00	0.60	0.99	1.0000	0.0255	0.0274	0.0207
691	10	2.00	0.40	0.00	1.0000	0.0343	0.0337	0.0266
692	10	2.00	0.40	0.40	1.0000	0.0337	0.0340	0.0266
693	10	2.00	0.40	0.70	1.0000	0.0332	0.0341	0.0263
694	10	2.00	0.40	0.85	1.0000	0.0327	0.0339	0.0260
695	10	2.00	0.40	0.99	1.0000	0.0326	0.0343	0.0255
696	10	2.00	0.20	0.00	1.0000	0.0407	0.0400	0.0313
697	10	2.00	0.20	0.40	1.0000	0.0405	0.0406	0.0312
698	10	2.00	0.20	0.70	1.0000	0.0407	0.0413	0.0310
699	10	2.00	0.20	0.85	1.0000	0.0409	0.0419	0.0308
700	10	2.00	0.20	0.99	1.0000	0.0418	0.0431	0.0307
701	15	0.00	1.00	0.00	0.0169	0.0161	0.0170	0.0192
702	15	0.00	1.00	0.40	0.0175	0.0165	0.0170	0.0198
703	15	0.00	1.00	0.70	0.0206	0.0190	0.0192	0.0271
704	15	0.00	1.00	0.85	0.0243	0.0236	0.0239	0.0358
705	15	0.00	1.00	0.99	0.0307	0.0351	0.0356	0.0502
706	15	0.00	0.80	0.00	0.0176	0.0164	0.0173	0.0204
707	15	0.00	0.80	0.40	0.0183	0.0170	0.0175	0.0216
708	15	0.00	0.80	0.70	0.0214	0.0198	0.0200	0.0288
709	15	0.00	0.80	0.85	0.0250	0.0247	0.0247	0.0371
710	15	0.00	0.80	0.99	0.0309	0.0355	0.0358	0.0505
711	15	0.00	0.60	0.00	0.0192	0.0173	0.0183	0.0240
712	15	0.00	0.60	0.40	0.0200	0.0184	0.0188	0.0257
713	15	0.00	0.60	0.70	0.0232	0.0220	0.0220	0.0327
714	15	0.00	0.60	0.85	0.0263	0.0270	0.0269	0.0401
715	15	0.00	0.60	0.99	0.0310	0.0361	0.0362	0.0509
716	15	0.00	0.40	0.00	0.0228	0.0203	0.0216	0.0319
717	15	0.00	0.40	0.40	0.0237	0.0222	0.0226	0.0338
718	15	0.00	0.40	0.70	0.0262	0.0267	0.0265	0.0396
719	15	0.00	0.40	0.85	0.0284	0.0311	0.0309	0.0446
720	15	0.00	0.40	0.99	0.0314	0.0368	0.0367	0.0516
721	15	0.00	0.20	0.00	0.0285	0.0291	0.0309	0.0447
722	15	0.00	0.20	0.40	0.0287	0.0313	0.0317	0.0455
723	15	0.00	0.20	0.70	0.0297	0.0342	0.0339	0.0479
724	15	0.00	0.20	0.85	0.0304	0.0359	0.0354	0.0497
725	15	0.00	0.20	0.99	0.0318	0.0375	0.0371	0.0524
726	15	0.25	1.00	0.00	0.0173	0.0169	0.0178	0.0192
727	15	0.25	1.00	0.40	0.0178	0.0169	0.0174	0.0195
728	15	0.25	1.00	0.70	0.0204	0.0184	0.0188	0.0259
729	15	0.25	1.00	0.85	0.0237	0.0219	0.0222	0.0338
730	15	0.25	1.00	0.99	0.0297	0.0319	0.0324	0.0472
731	15	0.25	0.80	0.00	0.0182	0.0171	0.0180	0.0204
732	15	0.25	0.80	0.40	0.0189	0.0173	0.0178	0.0214
733	15	0.25	0.80	0.70	0.0217	0.0193	0.0196	0.0280
734	15	0.25	0.80	0.85	0.0249	0.0232	0.0233	0.0357
735	15	0.25	0.80	0.99	0.0306	0.0327	0.0331	0.0482
736	15	0.25	0.60	0.00	0.0201	0.0178	0.0188	0.0242
737	15	0.25	0.60	0.40	0.0209	0.0185	0.0190	0.0257
738	15	0.25	0.60	0.70	0.0239	0.0214	0.0215	0.0322
739	15	0.25	0.60	0.85	0.0270	0.0257	0.0257	0.0391
740	15	0.25	0.60	0.99	0.0317	0.0339	0.0340	0.0497
741	15	0.25	0.40	0.00	0.0241	0.0205	0.0216	0.0321
742	15	0.25	0.40	0.40	0.0250	0.0220	0.0224	0.0339
743	15	0.25	0.40	0.70	0.0275	0.0260	0.0259	0.0394
744	15	0.25	0.40	0.85	0.0297	0.0300	0.0298	0.0443
745	15	0.25	0.40	0.99	0.0330	0.0350	0.0350	0.0511
746	15	0.25	0.20	0.00	0.0304	0.0286	0.0303	0.0451
747	15	0.25	0.20	0.40	0.0307	0.0306	0.0311	0.0459
748	15	0.25	0.20	0.70	0.0317	0.0331	0.0329	0.0481
749	15	0.25	0.20	0.85	0.0326	0.0347	0.0344	0.0500
750	15	0.25	0.20	0.99	0.0341	0.0361	0.0359	0.0525
751	15	0.50	1.00	0.00	0.0184	0.0186	0.0193	0.0189
752	15	0.50	1.00	0.40	0.0189	0.0180	0.0185	0.0190
753	15	0.50	1.00	0.70	0.0211	0.0180	0.0184	0.0236
754	15	0.50	1.00	0.85	0.0240	0.0194	0.0199	0.0296
755	15	0.50	1.00	0.99	0.0299	0.0266	0.0271	0.0393
756	15	0.50	0.80	0.00	0.0202	0.0189	0.0196	0.0205
757	15	0.50	0.80	0.40	0.0209	0.0186	0.0191	0.0211
758	15	0.50	0.80	0.70	0.0235	0.0192	0.0196	0.0262
759	15	0.50	0.80	0.85	0.0267	0.0213	0.0217	0.0321

760	15	0.50	0.80	0.99	0.0329	0.0285	0.0290	0.0415
761	15	0.50	0.60	0.00	0.0233	0.0197	0.0205	0.0243
762	15	0.50	0.60	0.40	0.0243	0.0199	0.0204	0.0255
763	15	0.50	0.60	0.70	0.0274	0.0216	0.0219	0.0308
764	15	0.50	0.60	0.85	0.0307	0.0245	0.0248	0.0364
765	15	0.50	0.60	0.99	0.0364	0.0309	0.0313	0.0442
766	15	0.50	0.40	0.00	0.0293	0.0225	0.0234	0.0323
767	15	0.50	0.40	0.40	0.0304	0.0235	0.0240	0.0337
768	15	0.50	0.40	0.70	0.0333	0.0265	0.0267	0.0383
769	15	0.50	0.40	0.85	0.0360	0.0295	0.0297	0.0423
770	15	0.50	0.40	0.99	0.0404	0.0335	0.0339	0.0473
771	15	0.50	0.20	0.00	0.0383	0.0304	0.0318	0.0444
772	15	0.50	0.20	0.40	0.0389	0.0319	0.0325	0.0452
773	15	0.50	0.20	0.70	0.0403	0.0338	0.0339	0.0470
774	15	0.50	0.20	0.85	0.0416	0.0349	0.0350	0.0485
775	15	0.50	0.20	0.99	0.0440	0.0360	0.0362	0.0505
776	15	0.75	1.00	0.00	0.0193	0.0202	0.0207	0.0185
777	15	0.75	1.00	0.40	0.0198	0.0190	0.0196	0.0184
778	15	0.75	1.00	0.70	0.0217	0.0174	0.0180	0.0212
779	15	0.75	1.00	0.85	0.0242	0.0171	0.0177	0.0248
780	15	0.75	1.00	0.99	0.0300	0.0215	0.0222	0.0310
781	15	0.75	0.80	0.00	0.0223	0.0211	0.0217	0.0205
782	15	0.75	0.80	0.40	0.0231	0.0202	0.0208	0.0208
783	15	0.75	0.80	0.70	0.0255	0.0194	0.0199	0.0240
784	15	0.75	0.80	0.85	0.0285	0.0198	0.0204	0.0280
785	15	0.75	0.80	0.99	0.0350	0.0246	0.0253	0.0339
786	15	0.75	0.60	0.00	0.0270	0.0225	0.0231	0.0244
787	15	0.75	0.60	0.40	0.0281	0.0221	0.0227	0.0252
788	15	0.75	0.60	0.70	0.0312	0.0225	0.0231	0.0288
789	15	0.75	0.60	0.85	0.0346	0.0240	0.0246	0.0326
790	15	0.75	0.60	0.99	0.0414	0.0286	0.0294	0.0377
791	15	0.75	0.40	0.00	0.0352	0.0262	0.0269	0.0319
792	15	0.75	0.40	0.40	0.0365	0.0266	0.0272	0.0329
793	15	0.75	0.40	0.70	0.0396	0.0284	0.0290	0.0361
794	15	0.75	0.40	0.85	0.0425	0.0304	0.0311	0.0388
795	15	0.75	0.40	0.99	0.0475	0.0333	0.0342	0.0419
796	15	0.75	0.20	0.00	0.0468	0.0343	0.0354	0.0423
797	15	0.75	0.20	0.40	0.0476	0.0351	0.0358	0.0428
798	15	0.75	0.20	0.70	0.0495	0.0362	0.0368	0.0440
799	15	0.75	0.20	0.85	0.0512	0.0369	0.0376	0.0451
800	15	0.75	0.20	0.99	0.0537	0.0376	0.0385	0.0462
801	15	1.00	1.00	0.00	0.0195	0.0208	0.0212	0.0175
802	15	1.00	1.00	0.40	0.0199	0.0193	0.0199	0.0172
803	15	1.00	1.00	0.70	0.0214	0.0165	0.0172	0.0187
804	15	1.00	1.00	0.85	0.0237	0.0152	0.0159	0.0206
805	15	1.00	1.00	0.99	0.0284	0.0178	0.0186	0.0243
806	15	1.00	0.80	0.00	0.0234	0.0226	0.0230	0.0198
807	15	1.00	0.80	0.40	0.0241	0.0213	0.0219	0.0199
808	15	1.00	0.80	0.70	0.0262	0.0192	0.0200	0.0217
809	15	1.00	0.80	0.85	0.0290	0.0186	0.0194	0.0238
810	15	1.00	0.80	0.99	0.0344	0.0217	0.0227	0.0274
811	15	1.00	0.60	0.00	0.0293	0.0252	0.0256	0.0239
812	15	1.00	0.60	0.40	0.0303	0.0243	0.0250	0.0243
813	15	1.00	0.60	0.70	0.0331	0.0235	0.0243	0.0264
814	15	1.00	0.60	0.85	0.0364	0.0239	0.0249	0.0286
815	15	1.00	0.60	0.99	0.0417	0.0271	0.0283	0.0315
816	15	1.00	0.40	0.00	0.0389	0.0301	0.0306	0.0307
817	15	1.00	0.40	0.40	0.0400	0.0300	0.0308	0.0314
818	15	1.00	0.40	0.70	0.0431	0.0306	0.0316	0.0332
819	15	1.00	0.40	0.85	0.0454	0.0317	0.0329	0.0347
820	15	1.00	0.40	0.99	0.0476	0.0334	0.0348	0.0363
821	15	1.00	0.20	0.00	0.0510	0.0384	0.0391	0.0392
822	15	1.00	0.20	0.40	0.0516	0.0385	0.0393	0.0394
823	15	1.00	0.20	0.70	0.0530	0.0388	0.0399	0.0401
824	15	1.00	0.20	0.85	0.0548	0.0391	0.0403	0.0406
825	15	1.00	0.20	0.99	0.0546	0.0391	0.0406	0.0411
826	15	1.50	1.00	0.00	0.0171	0.0188	0.0189	0.0147
827	15	1.50	1.00	0.40	0.0175	0.0170	0.0175	0.0142
828	15	1.50	1.00	0.70	0.0183	0.0140	0.0148	0.0141
829	15	1.50	1.00	0.85	0.0190	0.0125	0.0134	0.0144
830	15	1.50	1.00	0.99	0.0181	0.0135	0.0145	0.0155
831	15	1.50	0.80	0.00	0.0214	0.0219	0.0219	0.0171
832	15	1.50	0.80	0.40	0.0219	0.0203	0.0209	0.0167
833	15	1.50	0.80	0.70	0.0230	0.0176	0.0185	0.0170
834	15	1.50	0.80	0.85	0.0241	0.0166	0.0177	0.0174
835	15	1.50	0.80	0.99	0.0209	0.0179	0.0193	0.0183
836	15	1.50	0.60	0.00	0.0270	0.0262	0.0261	0.0206
837	15	1.50	0.60	0.40	0.0280	0.0249	0.0255	0.0205
838	15	1.50	0.60	0.70	0.0290	0.0231	0.0243	0.0210
839	15	1.50	0.60	0.85	0.0287	0.0229	0.0243	0.0215
840	15	1.50	0.60	0.99	0.0251	0.0239	0.0256	0.0220
841	15	1.50	0.40	0.00	0.0355	0.0324	0.0323	0.0254
842	15	1.50	0.40	0.40	0.0355	0.0316	0.0323	0.0254
843	15	1.50	0.40	0.70	0.0338	0.0309	0.0322	0.0260
844	15	1.50	0.40	0.85	0.0340	0.0307	0.0325	0.0261
845	15	1.50	0.40	0.99	0.0306	0.0310	0.0331	0.0264
846	15	1.50	0.20	0.00	0.0384	0.0391	0.0391	0.0304
847	15	1.50	0.20	0.40	0.0387	0.0384	0.0392	0.0305
848	15	1.50	0.20	0.70	0.0382	0.0378	0.0393	0.0306
849	15	1.50	0.20	0.85	0.0349	0.0377	0.0397	0.0307
850	15	1.50	0.20	0.99	0.0354	0.0374	0.0398	0.0309
851	15	2.00	1.00	0.00	1.0000	0.0149	0.0147	0.0114

852	15	2.00	1.00	0.40	1.0000	0.0134	0.0137	0.0111
853	15	2.00	1.00	0.70	1.0000	0.0112	0.0119	0.0105
854	15	2.00	1.00	0.85	1.0000	0.0103	0.0112	0.0104
855	15	2.00	1.00	0.99	1.0000	0.0103	0.0119	0.0106
856	15	2.00	0.80	0.00	1.0000	0.0180	0.0177	0.0136
857	15	2.00	0.80	0.40	1.0000	0.0165	0.0169	C.0134
858	15	2.00	0.80	0.70	1.0000	0.0146	0.0155	0.0129
859	15	2.00	0.80	0.85	1.0000	0.0140	0.0152	0.0128
860	15	2.00	0.80	0.99	1.0000	0.0145	0.0160	0.0129
861	15	2.00	0.60	0.00	1.0000	0.0221	0.0217	0.0165
862	15	2.00	0.60	0.40	1.0000	0.0208	0.0213	0.0164
863	15	2.00	0.60	0.70	1.0000	0.0194	0.0206	0.0160
864	15	2.00	0.60	0.85	1.0000	0.0191	0.0206	0.0158
865	15	2.00	0.60	0.99	1.0000	0.0192	0.0212	0.0157
866	15	2.00	0.40	0.00	1.0000	0.0271	0.0266	0.0199
867	15	2.00	0.40	0.40	1.0000	0.0261	0.0266	0.0198
868	15	2.00	0.40	0.70	1.0000	0.0251	0.0265	0.0195
869	15	2.00	0.40	0.85	1.0000	0.0247	0.0266	0.0194
870	15	2.00	0.40	0.99	1.0000	0.0244	0.0267	0.0191
871	15	2.00	0.20	0.00	1.0000	0.0318	0.0312	0.0232
872	15	2.00	0.20	0.40	1.0000	0.0307	0.0313	0.0231
873	15	2.00	0.20	0.70	1.0000	0.0300	0.0315	0.0229
874	15	2.00	0.20	0.85	1.0000	0.0299	0.0319	0.0228
875	15	2.00	0.20	0.99	1.0000	0.0308	0.0336	0.0229

Appendix S. Rank of Variance of Relative Error Data for MCBN Analysis

<u>Index</u>

Design Point - DP

<u>Parameters</u>

Sample Size - SS

Bias - BIAS

Ratio of Standard Deviations - STDR

Correlation - CORR

<u>Estimation Methods</u>

RAND-234 - R234

Modified CBN - MCBN

CBN - CBN

Rayleigh method - RAYL

TP	SS	BIAS	STDR	CORR	R234	MCBN	CBN	RAYL
1	3	0.00	1.00	0.00	3.0000	1.0000	4.0000	2.0000
2	3	0.00	1.00	0.40	2.0000	1.0000	4.0000	3.0000
3	3	0.00	1.00	0.70	2.0000	1.0000	3.0000	4.0000
4	3	0.00	1.00	0.85	2.0000	1.0000	3.0000	4.0000
5	3	0.00	1.00	0.99	1.0000	2.0000	3.0000	3.0000
6	3	0.00	0.80	0.00	3.0000	1.0000	4.0000	2.0000
7	3	0.00	0.80	0.40	2.0000	1.0000	4.0000	3.0000
8	3	0.00	0.80	0.70	2.0000	1.0000	3.0000	4.0000
9	3	0.00	0.80	0.85	2.0000	1.0000	3.0000	4.0000
10	3	0.00	0.80	0.99	1.0000	2.0000	3.0000	4.0000
11	3	0.00	0.60	0.00	2.0000	1.0000	4.0000	3.0000
12	3	0.00	0.60	0.40	2.0000	1.0000	3.0000	3.0000
13	3	0.00	0.60	0.70	2.0000	1.0000	3.0000	4.0000
14	3	0.00	0.60	0.85	1.0000	2.0000	3.0000	4.0000
15	3	0.00	0.60	0.99	1.0000	2.0000	3.0000	3.0000
16	3	0.00	0.40	0.00	2.0000	1.0000	3.0000	4.0000
17	3	0.00	0.40	0.40	1.0000	2.0000	3.0000	4.0000
18	3	0.00	0.40	0.70	1.0000	2.0000	3.0000	4.0000
19	3	0.00	0.40	0.85	1.0000	2.0000	3.0000	4.0000
20	3	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
21	3	0.00	0.20	0.00	1.0000	2.0000	3.0000	4.0000
22	3	0.00	0.20	0.40	1.0000	2.0000	3.0000	4.0000
23	3	0.00	0.20	0.70	1.0000	2.0000	3.0000	3.0000
24	3	0.00	0.20	0.85	1.0000	2.0000	2.0000	2.0000
25	3	0.00	0.20	0.99	1.0000	2.0000	3.0000	3.0000
26	3	0.25	1.00	0.00	3.0000	1.0000	4.0000	2.0000
27	3	0.25	1.00	0.40	2.0000	1.0000	4.0000	3.0000
28	3	0.25	1.00	0.70	2.0000	1.0000	3.0000	4.0000
29	3	0.25	1.00	0.85	2.0000	1.0000	3.0000	4.0000
30	3	0.25	1.00	0.99	1.0000	2.0000	3.0000	3.0000
31	3	0.25	0.80	0.00	3.0000	1.0000	4.0000	2.0000
32	3	0.25	0.80	0.40	2.0000	1.0000	4.0000	3.0000
33	3	0.25	0.80	0.70	2.0000	1.0000	3.0000	4.0000
34	3	0.25	0.80	0.85	2.0000	1.0000	3.0000	4.0000
35	3	0.25	0.80	0.99	1.0000	2.0000	3.0000	3.0000
36	3	0.25	0.60	0.00	2.0000	1.0000	4.0000	3.0000
37	3	0.25	0.60	0.40	2.0000	1.0000	4.0000	3.0000
38	3	0.25	0.60	0.70	2.0000	1.0000	3.0000	4.0000

39	3	0.25	0.60	0.85	1.0000	2.0000	3.0000	4.0000
40	3	0.25	0.60	0.99	1.0000	2.0000	3.0000	3.0000
41	3	0.25	0.40	0.00	2.0000	1.0000	3.0000	3.0000
42	3	0.25	0.40	0.40	1.0000	1.0000	3.0000	4.0000
43	3	0.25	0.40	0.70	1.0000	2.0000	3.0000	4.0000
44	3	0.25	0.40	0.85	1.0000	2.0000	3.0000	3.0000
45	3	0.25	0.40	0.99	1.0000	2.0000	3.0000	4.0000
46	3	0.25	0.20	0.00	1.0000	2.0000	3.0000	3.0000
47	3	0.25	0.20	0.40	1.0000	2.0000	3.0000	3.0000
48	3	0.25	0.20	0.70	1.0000	4.0000	3.0000	2.0000
49	3	0.25	0.20	0.85	1.0000	4.0000	3.0000	2.0000
50	3	0.25	0.20	0.99	1.0000	2.0000	4.0000	3.0000
51	3	0.50	1.00	0.00	4.0000	1.0000	3.0000	2.0000
52	3	0.50	1.00	0.40	4.0000	1.0000	3.0000	2.0000
53	3	0.50	1.00	0.70	4.0000	1.0000	2.0000	2.0000
54	3	0.50	1.00	0.85	4.0000	1.0000	2.0000	3.0000
55	3	0.50	1.00	0.99	4.0000	1.0000	3.0000	2.0000
56	3	0.50	0.80	0.00	4.0000	1.0000	3.0000	2.0000
57	3	0.50	0.80	0.40	4.0000	1.0000	3.0000	2.0000
58	3	0.50	0.80	0.70	4.0000	1.0000	2.0000	2.0000
59	3	0.50	0.80	0.85	4.0000	1.0000	2.0000	3.0000
60	3	0.50	0.80	0.99	4.0000	1.0000	3.0000	2.0000
61	3	0.50	0.60	0.00	4.0000	1.0000	3.0000	2.0000
62	3	0.50	0.60	0.40	4.0000	1.0000	3.0000	2.0000
63	3	0.50	0.60	0.70	4.0000	1.0000	3.0000	2.0000
64	3	0.50	0.60	0.85	4.0000	1.0000	2.0000	2.0000
65	3	0.50	0.60	0.99	4.0000	1.0000	3.0000	2.0000
66	3	0.50	0.40	0.00	4.0000	1.0000	3.0000	2.0000
67	3	0.50	0.40	0.40	4.0000	1.0000	3.0000	2.0000
68	3	0.50	0.40	0.70	4.0000	2.0000	3.0000	1.0000
69	3	0.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000
70	3	0.50	0.40	0.99	4.0000	1.0000	3.0000	2.0000
71	3	0.50	0.20	0.00	4.0000	1.0000	3.0000	2.0000
72	3	0.50	0.20	0.40	4.0000	2.0000	2.0000	1.0000
73	3	0.50	0.20	0.70	4.0000	3.0000	2.0000	1.0000
74	3	0.50	0.20	0.85	4.0000	3.0000	2.0000	1.0000
75	3	0.50	0.20	0.99	4.0000	3.0000	2.0000	1.0000
76	3	0.75	1.00	0.00	4.0000	1.0000	3.0000	2.0000
77	3	0.75	1.00	0.40	4.0000	1.0000	3.0000	1.0000
78	3	0.75	1.00	0.70	4.0000	1.0000	3.0000	2.0000
79	3	0.75	1.00	0.85	4.0000	1.0000	2.0000	2.0000
80	3	0.75	1.00	0.99	4.0000	2.0000	3.0000	1.0000
81	3	0.75	0.80	0.00	4.0000	1.0000	3.0000	2.0000
82	3	0.75	0.80	0.40	4.0000	2.0000	3.0000	1.0000
83	3	0.75	0.80	0.70	4.0000	1.0000	3.0000	2.0000
84	3	0.75	0.80	0.85	4.0000	1.0000	3.0000	2.0000
85	3	0.75	0.80	0.99	4.0000	1.0000	3.0000	2.0000
86	3	0.75	0.60	0.00	4.0000	1.0000	3.0000	2.0000
87	3	0.75	0.60	0.40	4.0000	2.0000	3.0000	1.0000
88	3	0.75	0.60	0.70	4.0000	2.0000	3.0000	1.0000
89	3	0.75	0.60	0.85	4.0000	1.0000	3.0000	1.0000
90	3	0.75	0.60	0.99	4.0000	1.0000	3.0000	2.0000
91	3	0.75	0.40	0.00	4.0000	1.0000	3.0000	1.0000
92	3	0.75	0.40	0.40	4.0000	2.0000	2.0000	1.0000
93	3	0.75	0.40	0.70	4.0000	3.0000	2.0000	1.0000
94	3	0.75	0.40	0.85	4.0000	2.0000	2.0000	1.0000
95	3	0.75	0.40	0.99	4.0000	2.0000	3.0000	1.0000
96	3	0.75	0.20	0.00	4.0000	2.0000	3.0000	1.0000
97	3	0.75	0.20	0.40	4.0000	3.0000	2.0000	1.0000
98	3	0.75	0.20	0.70	4.0000	3.0000	2.0000	1.0000
99	3	0.75	0.20	0.85	4.0000	3.0000	2.0000	1.0000
100	3	0.75	0.20	0.99	4.0000	3.0000	2.0000	1.0000
101	3	1.00	1.00	0.00	4.0000	2.0000	3.0000	1.0000
102	3	1.00	1.00	0.40	4.0000	2.0000	3.0000	1.0000
103	3	1.00	1.00	0.70	4.0000	1.0000	3.0000	1.0000
104	3	1.00	1.00	0.85	4.0000	1.0000	3.0000	2.0000
105	3	1.00	1.00	0.99	4.0000	1.0000	3.0000	2.0000
106	3	1.00	0.80	0.00	4.0000	2.0000	3.0000	1.0000
107	3	1.00	0.80	0.40	4.0000	2.0000	3.0000	1.0000
108	3	1.00	0.80	0.70	4.0000	2.0000	3.0000	1.0000
109	3	1.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
110	3	1.00	0.80	0.99	4.0000	1.0000	3.0000	1.0000
111	3	1.00	0.60	0.00	4.0000	2.0000	3.0000	1.0000
112	3	1.00	0.60	0.40	4.0000	2.0000	3.0000	1.0000
113	3	1.00	0.60	0.70	4.0000	2.0000	2.0000	1.0000
114	3	1.00	0.60	0.85	4.0000	2.0000	3.0000	1.0000
115	3	1.00	0.60	0.99	4.0000	2.0000	3.0000	1.0000
116	3	1.00	0.40	0.00	4.0000	2.0000	3.0000	1.0000
117	3	1.00	0.40	0.40	4.0000	3.0000	2.0000	1.0000
118	3	1.00	0.40	0.70	4.0000	3.0000	2.0000	1.0000
119	3	1.00	0.40	0.35	4.0000	3.0000	2.0000	1.0000
120	3	1.00	0.40	0.99	4.0000	3.0000	2.0000	1.0000
121	3	1.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
122	3	1.00	0.20	0.40	4.0000	3.0000	2.0000	1.0000
123	3	1.00	0.20	0.70	4.0000	3.0000	2.0000	1.0000
124	3	1.00	0.20	0.85	4.0000	3.0000	2.0000	1.0000
125	3	1.00	0.20	0.99	4.0000	3.0000	2.0000	1.0000
126	3	1.50	1.00	0.00	4.0000	2.0000	3.0000	1.0000
127	3	1.50	1.00	0.40	4.0000	2.0000	2.0000	1.0000
128	3	1.50	1.00	0.70	4.0000	3.0000	2.0000	1.0000
129	3	1.50	1.00	0.85	4.0000	3.0000	2.0000	1.0000
130	3	1.50	1.00	0.99	4.0000	2.0000	3.0000	1.0000

131	3	1.50	0.80	0.00	4.0000	2.0000	2.0000	1.0000
132	3	1.50	0.80	0.40	4.0000	3.0000	2.0000	1.0000
133	3	1.50	0.80	0.70	4.0000	3.0000	2.0000	1.0000
134	3	1.50	0.80	0.85	4.0000	3.0000	2.0000	1.0000
135	3	1.50	0.80	0.99	4.0000	2.0000	2.0000	1.0000
136	3	1.50	0.60	0.00	4.0000	3.0000	2.0000	1.0000
137	3	1.50	0.60	0.40	4.0000	3.0000	2.0000	1.0000
138	3	1.50	0.60	0.70	4.0000	3.0000	2.0000	1.0000
139	3	1.50	0.60	0.85	4.0000	3.0000	2.0000	1.0000
140	3	1.50	0.60	0.99	4.0000	3.0000	2.0000	1.0000
141	3	1.50	0.40	0.00	4.0000	3.0000	2.0000	1.0000
142	3	1.50	0.40	0.40	4.0000	3.0000	2.0000	1.0000
143	3	1.50	0.40	0.70	4.0000	3.0000	2.0000	1.0000
144	3	1.50	0.40	0.85	4.0000	3.0000	2.0000	1.0000
145	3	1.50	0.40	0.99	4.0000	3.0000	2.0000	1.0000
146	3	1.50	0.20	0.00	4.0000	3.0000	2.0000	1.0000
147	3	1.50	0.20	0.40	4.0000	3.0000	2.0000	1.0000
148	3	1.50	0.20	0.70	4.0000	3.0000	2.0000	1.0000
149	3	1.50	0.20	0.85	4.0000	3.0000	2.0000	1.0000
150	3	1.50	0.20	0.99	4.0000	3.0000	2.0000	1.0000
151	3	2.00	1.00	0.00	4.0000	3.0000	2.0000	1.0000
152	3	2.00	1.00	0.40	4.0000	3.0000	2.0000	1.0000
153	3	2.00	1.00	0.70	4.0000	3.0000	2.0000	1.0000
154	3	2.00	1.00	0.85	4.0000	3.0000	2.0000	1.0000
155	3	2.00	1.00	0.99	4.0000	3.0000	2.0000	1.0000
156	3	2.00	0.80	0.00	4.0000	3.0000	2.0000	1.0000
157	3	2.00	0.80	0.40	4.0000	3.0000	2.0000	1.0000
158	3	2.00	0.80	0.70	4.0000	3.0000	2.0000	1.0000
159	3	2.00	0.80	0.85	4.0000	3.0000	2.0000	1.0000
160	3	2.00	0.80	0.99	4.0000	3.0000	2.0000	1.0000
161	3	2.00	0.60	0.00	4.0000	3.0000	2.0000	1.0000
162	3	2.00	0.60	0.40	4.0000	3.0000	2.0000	1.0000
163	3	2.00	0.60	0.70	4.0000	3.0000	2.0000	1.0000
164	3	2.00	0.60	0.85	4.0000	3.0000	2.0000	1.0000
165	3	2.00	0.60	0.99	4.0000	3.0000	2.0000	1.0000
166	3	2.00	0.40	0.00	4.0000	3.0000	2.0000	1.0000
167	3	2.00	0.40	0.40	4.0000	3.0000	2.0000	1.0000
168	3	2.00	0.40	0.70	4.0000	3.0000	2.0000	1.0000
169	3	2.00	0.40	0.85	4.0000	3.0000	2.0000	1.0000
170	3	2.00	0.40	0.99	4.0000	3.0000	2.0000	1.0000
171	3	2.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
172	3	2.00	0.20	0.40	4.0000	3.0000	2.0000	1.0000
173	3	2.00	0.20	0.70	4.0000	3.0000	2.0000	1.0000
174	3	2.00	0.20	0.85	4.0000	3.0000	2.0000	1.0000
175	3	2.00	0.20	0.99	4.0000	3.0000	2.0000	1.0000
176	5	0.00	1.00	0.00	2.0000	1.0000	4.0000	2.0000
177	5	0.00	1.00	0.40	2.0000	1.0000	2.0000	4.0000
178	5	0.00	1.00	0.70	3.0000	1.0000	2.0000	4.0000
179	5	0.00	1.00	0.85	3.0000	1.0000	2.0000	4.0000
180	5	0.00	1.00	0.99	2.0000	1.0000	3.0000	4.0000
181	5	0.00	0.80	0.00	2.0000	1.0000	2.0000	2.0000
182	5	0.00	0.80	0.40	2.0000	1.0000	2.0000	4.0000
183	5	0.00	0.80	0.70	3.0000	1.0000	2.0000	4.0000
184	5	0.00	0.80	0.85	3.0000	1.0000	2.0000	4.0000
185	5	0.00	0.80	0.99	2.0000	1.0000	3.0000	4.0000
186	5	0.00	0.60	0.00	2.0000	1.0000	2.0000	4.0000
187	5	0.00	0.60	0.40	3.0000	1.0000	2.0000	4.0000
188	5	0.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
189	5	0.00	0.60	0.85	2.0000	1.0000	2.0000	4.0000
190	5	0.00	0.60	0.99	1.0000	1.0000	3.0000	4.0000
191	5	0.00	0.40	0.00	3.0000	1.0000	2.0000	4.0000
192	5	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
193	5	0.00	0.40	0.70	2.0000	1.0000	2.0000	4.0000
194	5	0.00	0.40	0.85	1.0000	2.0000	3.0000	4.0000
195	5	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
196	5	0.00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
197	5	0.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
198	5	0.00	0.20	0.70	1.0000	2.0000	3.0000	4.0000
199	5	0.00	0.20	0.85	1.0000	2.0000	3.0000	4.0000
200	5	0.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
201	5	0.25	1.00	0.00	2.0000	1.0000	4.0000	2.0000
202	5	0.25	1.00	0.40	2.0000	1.0000	2.0000	2.0000
203	5	0.25	1.00	0.70	3.0000	1.0000	2.0000	4.0000
204	5	0.25	1.00	0.85	3.0000	1.0000	2.0000	4.0000
205	5	0.25	1.00	0.99	2.0000	1.0000	3.0000	4.0000
206	5	0.25	0.80	0.00	2.0000	1.0000	2.0000	2.0000
207	5	0.25	0.80	0.40	2.0000	1.0000	2.0000	4.0000
208	5	0.25	0.80	0.70	3.0000	1.0000	2.0000	4.0000
209	5	0.25	0.80	0.85	3.0000	1.0000	2.0000	4.0000
210	5	0.25	0.80	0.99	2.0000	1.0000	3.0000	4.0000
211	5	0.25	0.60	0.00	2.0000	1.0000	2.0000	4.0000
212	5	0.25	0.60	0.40	3.0000	1.0000	2.0000	4.0000
213	5	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
214	5	0.25	0.60	0.85	2.0000	1.0000	2.0000	4.0000
215	5	0.25	0.60	0.99	2.0000	1.0000	3.0000	4.0000
216	5	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
217	5	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
218	5	0.25	0.40	0.70	2.0000	1.0000	2.0000	4.0000
219	5	0.25	0.40	0.85	2.0000	1.0000	3.0000	4.0000
220	5	0.25	0.40	0.99	1.0000	1.0000	3.0000	4.0000
221	5	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
222	5	0.25	0.20	0.40	2.0000	1.0000	3.0000	4.0000

223	5	0.25	0.20	0.70	1.0000	2.0000	3.0000	4.0000
224	5	0.25	0.20	0.85	1.0000	2.0000	3.0000	4.0000
225	5	0.25	0.20	0.99	1.0000	2.0000	3.0000	4.0000
226	5	0.50	1.00	0.00	3.0000	1.0000	4.0000	2.0000
227	5	0.50	1.00	0.40	3.0000	1.0000	3.0000	2.0000
228	5	0.50	1.00	0.70	3.0000	1.0000	2.0000	4.0000
229	5	0.50	1.00	0.85	3.0000	1.0000	2.0000	4.0000
230	5	0.50	1.00	0.99	2.0000	1.0000	3.0000	4.0000
231	5	0.50	0.80	0.00	3.0000	1.0000	3.0000	2.0000
232	5	0.50	0.80	0.40	4.0000	1.0000	3.0000	2.0000
233	5	0.50	0.80	0.70	3.0000	1.0000	2.0000	4.0000
234	5	0.50	0.80	0.85	3.0000	1.0000	2.0000	4.0000
235	5	0.50	0.80	0.99	2.0000	1.0000	3.0000	4.0000
236	5	0.50	0.60	0.00	4.0000	1.0000	2.0000	3.0000
237	5	0.50	0.60	0.40	3.0000	1.0000	2.0000	3.0000
238	5	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
239	5	0.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
240	5	0.50	0.60	0.99	2.0000	1.0000	2.0000	4.0000
241	5	0.50	0.40	0.00	3.0000	1.0000	2.0000	4.0000
242	5	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
243	5	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
244	5	0.50	0.40	0.85	3.0000	1.0000	2.0000	4.0000
245	5	0.50	0.40	0.99	2.0000	1.0000	2.0000	4.0000
246	5	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
247	5	0.50	0.20	0.40	3.0000	1.0000	2.0000	4.0000
248	5	0.50	0.20	0.70	3.0000	1.0000	2.0000	4.0000
249	5	0.50	0.20	0.85	2.0000	1.0000	2.0000	4.0000
250	5	0.50	0.20	0.99	1.0000	1.0000	3.0000	4.0000
251	5	0.75	1.00	0.00	3.0000	1.0000	4.0000	2.0000
252	5	0.75	1.00	0.40	3.0000	1.0000	3.0000	2.0000
253	5	0.75	1.00	0.70	4.0000	1.0000	2.0000	3.0000
254	5	0.75	1.00	0.85	3.0000	1.0000	2.0000	4.0000
255	5	0.75	1.00	0.99	3.0000	1.0000	2.0000	4.0000
256	5	0.75	0.80	0.00	3.0000	1.0000	3.0000	2.0000
257	5	0.75	0.80	0.40	4.0000	1.0000	3.0000	2.0000
258	5	0.75	0.80	0.70	4.0000	1.0000	2.0000	3.0000
259	5	0.75	0.80	0.85	4.0000	1.0000	2.0000	3.0000
260	5	0.75	0.80	0.99	3.0000	1.0000	2.0000	4.0000
261	5	0.75	0.60	0.00	4.0000	1.0000	3.0000	2.0000
262	5	0.75	0.60	0.40	4.0000	1.0000	2.0000	2.0000
263	5	0.75	0.60	0.70	4.0000	1.0000	2.0000	3.0000
264	5	0.75	0.60	0.85	4.0000	1.0000	2.0000	3.0000
265	5	0.75	0.60	0.99	2.0000	1.0000	2.0000	4.0000
266	5	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
267	5	0.75	0.40	0.40	4.0000	1.0000	2.0000	3.0000
268	5	0.75	0.40	0.70	4.0000	1.0000	2.0000	3.0000
269	5	0.75	0.40	0.85	4.0000	1.0000	2.0000	3.0000
270	5	0.75	0.40	0.99	1.0000	2.0000	4.0000	2.0000
271	5	0.75	0.20	0.00	4.0000	1.0000	2.0000	3.0000
272	5	0.75	0.20	0.40	4.0000	1.0000	2.0000	3.0000
273	5	0.75	0.20	0.70	4.0000	1.0000	2.0000	3.0000
274	5	0.75	0.20	0.85	1.0000	1.0000	1.0000	4.0000
275	5	0.75	0.20	0.99	1.0000	2.0000	3.0000	4.0000
276	5	1.00	1.00	0.00	4.0000	1.0000	3.0000	1.0000
277	5	1.00	1.00	0.40	4.0000	1.0000	3.0000	1.0000
278	5	1.00	1.00	0.70	4.0000	1.0000	2.0000	2.0000
279	5	1.00	1.00	0.85	4.0000	1.0000	2.0000	3.0000
280	5	1.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
281	5	1.00	0.80	0.00	4.0000	1.0000	3.0000	1.0000
282	5	1.00	0.80	0.40	4.0000	1.0000	3.0000	1.0000
283	5	1.00	0.80	0.70	4.0000	1.0000	2.0000	2.0000
284	5	1.00	0.80	0.85	4.0000	1.0000	2.0000	3.0000
285	5	1.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
286	5	1.00	0.60	0.00	4.0000	1.0000	3.0000	2.0000
287	5	1.00	0.60	0.40	4.0000	1.0000	3.0000	1.0000
288	5	1.00	0.60	0.70	4.0000	1.0000	3.0000	2.0000
289	5	1.00	0.60	0.85	4.0000	1.0000	2.0000	2.0000
290	5	1.00	0.60	0.99	4.0000	1.0000	3.0000	2.0000
291	5	1.00	0.40	0.00	4.0000	1.0000	3.0000	2.0000
292	5	1.00	0.40	0.40	4.0000	1.0000	3.0000	1.0000
293	5	1.00	0.40	0.70	4.0000	1.0000	3.0000	1.0000
294	5	1.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
295	5	1.00	0.40	0.99	4.0000	2.0000	3.0000	1.0000
296	5	1.00	0.20	0.00	4.0000	1.0000	3.0000	2.0000
297	5	1.00	0.20	0.40	4.0000	2.0000	3.0000	1.0000
298	5	1.00	0.20	0.70	4.0000	2.0000	2.0000	1.0000
299	5	1.00	0.20	0.85	4.0000	2.0000	2.0000	1.0000
300	5	1.00	0.20	0.99	4.0000	2.0000	2.0000	1.0000
301	5	1.50	1.00	0.00	4.0000	2.0000	3.0000	1.0000
302	5	1.50	1.00	0.40	4.0000	2.0000	3.0000	1.0000
303	5	1.50	1.00	0.70	4.0000	1.0000	3.0000	1.0000
304	5	1.50	1.00	0.85	4.0000	1.0000	2.0000	2.0000
305	5	1.50	1.00	0.99	4.0000	1.0000	2.0000	2.0000
306	5	1.50	0.80	0.00	4.0000	2.0000	3.0000	1.0000
307	5	1.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000
308	5	1.50	0.80	0.70	4.0000	2.0000	3.0000	1.0000
309	5	1.50	0.80	0.85	4.0000	1.0000	3.0000	1.0000
310	5	1.50	0.80	0.99	4.0000	1.0000	3.0000	1.0000
311	5	1.50	0.60	0.00	4.0000	2.0000	3.0000	1.0000
312	5	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
313	5	1.50	0.60	0.70	4.0000	2.0000	3.0000	1.0000
314	5	1.50	0.60	0.85	4.0000	2.0000	3.0000	1.0000

315	5	1.50	0.60	0.99	4.0000	2.0000	3.0000	1.0000
316	5	1.50	0.40	0.00	4.0000	2.0000	3.0000	1.0000
317	5	1.50	0.40	0.40	4.0000	2.0000	2.0000	1.0000
318	5	1.50	0.40	0.70	4.0000	2.0000	2.0000	1.0000
319	5	1.50	0.40	0.85	4.0000	2.0000	2.0000	1.0000
320	5	1.50	0.40	0.99	4.0000	2.0000	2.0000	1.0000
321	5	1.50	0.20	0.00	4.0000	2.0000	3.0000	1.0000
322	5	1.50	0.20	0.40	4.0000	2.0000	2.0000	1.0000
323	5	1.50	0.20	0.70	4.0000	3.0000	2.0000	1.0000
324	5	1.50	0.20	0.85	4.0000	3.0000	2.0000	1.0000
325	5	1.50	0.20	0.99	4.0000	3.0000	2.0000	1.0000
326	5	2.00	1.00	0.00	4.0000	2.0000	2.0000	1.0000
327	5	2.00	1.00	0.40	4.0000	2.0000	2.0000	1.0000
328	5	2.00	1.00	0.70	4.0000	2.0000	2.0000	1.0000
329	5	2.00	1.00	0.85	4.0000	1.0000	1.0000	1.0000
330	5	2.00	1.00	0.99	4.0000	1.0000	3.0000	1.0000
331	5	2.00	0.80	0.00	4.0000	2.0000	2.0000	1.0000
332	5	2.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000
333	5	2.00	0.80	0.70	4.0000	2.0000	2.0000	1.0000
334	5	2.00	0.80	0.85	4.0000	2.0000	2.0000	1.0000
335	5	2.00	0.80	0.99	4.0000	2.0000	3.0000	1.0000
336	5	2.00	0.60	0.00	4.0000	2.0000	2.0000	1.0000
337	5	2.00	0.60	0.40	4.0000	2.0000	2.0000	1.0000
338	5	2.00	0.60	0.70	4.0000	2.0000	2.0000	1.0000
339	5	2.00	0.60	0.85	4.0000	2.0000	2.0000	1.0000
340	5	2.00	0.60	0.99	4.0000	2.0000	3.0000	1.0000
341	5	2.00	0.40	0.00	4.0000	3.0000	2.0000	1.0000
342	5	2.00	0.40	0.40	4.0000	3.0000	2.0000	1.0000
343	5	2.00	0.40	0.70	4.0000	3.0000	2.0000	1.0000
344	5	2.00	0.40	0.85	4.0000	3.0000	2.0000	1.0000
345	5	2.00	0.40	0.99	4.0000	3.0000	2.0000	1.0000
346	5	2.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
347	5	2.00	0.20	0.40	4.0000	3.0000	2.0000	1.0000
348	5	2.00	0.20	0.70	4.0000	3.0000	2.0000	1.0000
349	5	2.00	0.20	0.85	4.0000	3.0000	2.0000	1.0000
350	5	2.00	0.20	0.99	4.0000	3.0000	2.0000	1.0000
351	7	0.00	1.00	0.00	2.0000	1.0000	2.0000	4.0000
352	7	0.00	1.00	0.40	2.0000	1.0000	2.0000	4.0000
353	7	0.00	1.00	0.70	3.0000	1.0000	2.0000	4.0000
354	7	0.00	1.00	0.85	3.0000	1.0000	2.0000	4.0000
355	7	0.00	1.00	0.99	2.0000	1.0000	3.0000	4.0000
356	7	0.00	0.80	0.00	2.0000	1.0000	2.0000	4.0000
357	7	0.00	0.80	0.40	3.0000	1.0000	2.0000	4.0000
358	7	0.00	0.80	0.70	3.0000	1.0000	2.0000	4.0000
359	7	0.00	0.80	0.85	3.0000	1.0000	2.0000	4.0000
360	7	0.00	0.80	0.99	2.0000	1.0000	3.0000	4.0000
361	7	0.00	0.60	0.00	3.0000	1.0000	2.0000	4.0000
362	7	0.00	0.60	0.40	3.0000	1.0000	2.0000	4.0000
363	7	0.00	0.60	0.70	3.0000	1.0000	2.0000	4.0000
364	7	0.00	0.60	0.85	3.0000	1.0000	2.0000	4.0000
365	7	0.00	0.60	0.99	1.0000	1.0000	3.0000	4.0000
366	7	0.00	0.40	0.00	3.0000	1.0000	2.0000	4.0000
367	7	0.00	0.40	0.40	3.0000	1.0000	2.0000	4.0000
368	7	0.00	0.40	0.70	2.0000	1.0000	2.0000	4.0000
369	7	0.00	0.40	0.85	1.0000	1.0000	3.0000	4.0000
370	7	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
371	7	0 00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
372	7	0.00	0.20	0.40	2.0000	1.0000	3.0000	4.0000
373	7	0.00	0.20	0.70	1.0000	2.0000	3.0000	4.0000
374	7	0.00	0.20	0.85	1.0000	2.0000	3.0000	4.0000
375	7	0.00	0.20	0.99	1.0000	2.0000	3.0000	4.0000
376	7	0.25	1.00	0.00	2.0000	1.0000	2.0000	4.0000
377	7	0.25	1.00	0.40	2.0000	1.0000	2.0000	4.0000
378	7	0.25	1.00	0.70	3.0000	1.0000	2.0000	4.0000
379	7	0.25	1.00	0.85	3.0000	1.0000	2.0000	4.0000
380	7	0.25	1.00	0.99	2.0000	1.0000	3.0000	4.0000
381	7	0.25	0.80	0.00	2.0000	1.0000	2.0000	4.0000
382	7	0.25	0.80	0.40	3.0000	1.0000	2.0000	4.0000
383	7	0.35	0.80	0.70	3.0000	1.0000	2.0000	4.0000
384	7	0.25	0.80	0.85	3.0000	1.0000	2.0000	4.0000
385	7	0.25	0.80	0.99	2.0000	1.0000	3.0000	4.0000
386	7	0.25	0.60	0.00	2.0000	1.0000	2.0000	4.0000
387	7	0.25	0.60	0.40	3.0000	1.0000	2.0000	4.0000
388	7	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
389	7	0.25	0.60	0.85	3.0000	1.0000	2.0000	4.0000
390	7	0.25	0.60	0.99	1.0000	1.0000	3.0000	4.0000
391	7	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
392	7	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
393	7	0.25	0.40	0.70	3.0000	1.0000	2.0000	4.0000
394	7	0.25	0.40	0.85	1.0000	1.0000	3.0000	4.0000
395	7	0.25	0.40	0.99	1.0000	2.0000	3.0000	4.0000
396	7	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
397	7	0.25	0.20	0.40	2.0000	1.0000	3.0000	4.0000
398	7	0.25	0.20	0.70	1.0000	2.0000	3.0000	4.0000
399	7	0.25	0.20	0.85	1.0000	2.0000	3.0000	4.0000
400	7	0.25	0.20	0.99	1.0000	2.0000	3.0000	4.0000
401	7	0.50	1.00	0.00	2.0000	1.0000	3.0000	3.0000
402	7	0.50	1.00	0.40	2.0000	1.0000	2.0000	4.0000
403	7	0.50	1.00	0.70	3.0000	1.0000	2.0000	4.0000
404	7	0.50	1.00	0.85	3.0000	1.0000	2.0000	4.0000
405	7	0.50	1.00	0.99	2.0000	1.0000	2.0000	4.0000
406	7	0.50	0.80	0.00	2.0000	1.0000	2.0000	2.0000

407	7	0.50	0.80	0.40	3.0000	1.0000	2.0000	4.0000
408	7	0.50	0.80	0.70	3.0000	1.0000	2.0000	4.0000
409	7	0.50	0.80	0.85	3.0000	1.0000	2.0000	4.0000
410	7	0.50	0.80	0.99	2.0000	1.0000	3.0000	4.0000
411	7	0.50	0.60	0.00	3.0000	1.0000	2.0000	3.0000
412	7	0.50	0.60	0.40	3.0000	1.0000	2.0000	4.0000
413	7	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
414	7	0.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
415	7	0.50	0.60	0.99	2.0000	1.0000	3.0000	4.0000
416	7	0.50	0.40	0.00	3.0000	1.0000	2.0000	4.0000
417	7	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
418	7	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
419	7	0.50	0.40	0.85	3.0000	1.0000	2.0000	4.0000
420	7	0.50	0.40	0.99	2.0000	1.0000	3.0000	4.0000
421	7	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
422	7	0.50	0.20	0.40	3.0000	1.0000	2.0000	4.0000
423	7	0.50	0.20	0.70	1.0000	1.0000	3.0000	4.0000
424	7	0.50	0.20	0.85	1.0000	2.0000	3.0000	4.0000
425	7	0.50	0.20	0.99	1.0000	1.0000	3.0000	4.0000
426	7	0.75	1.00	0.00	2.0000	1.0000	4.0000	2.0000
427	7	0.75	1.00	0.40	2.0000	1.0000	2.0000	2.0000
428	7	0.75	1.00	0.70	3.0000	1.0000	2.0000	3.0000
429	7	0.75	1.00	0.85	3.0000	1.0000	2.0000	4.0000
430	7	0.75	1.00	0.99	3.0000	1.0000	2.0000	4.0000
431	7	0.75	0.80	0.00	3.0000	1.0000	3.0000	2.0000
432	7	0.75	0.80	0.40	4.0000	1.0000	2.0000	2.0000
433	7	0.75	0.80	0.70	4.0000	1.0000	2.0000	3.0000
434	7	0.75	0.80	0.85	3.0000	1.0000	2.0000	3.0000
435	7	0.75	0.80	0.99	3.0000	1.0000	2.0000	4.0000
436	7	0.75	0.60	0.00	4.0000	1.0000	2.0000	2.0000
437	7	0.75	0.60	0.40	4.0000	1.0000	2.0000	2.0000
438	7	0.75	0.60	0.70	4.0000	1.0000	2.0000	3.0000
439	7	0.75	0.60	0.85	3.0000	1.0000	2.0000	3.0000
440	7	0.75	0.60	0.99	2.0000	1.0000	2.0000	4.0000
441	7	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
442	7	0.75	0.40	0.40	4.0000	1.0000	2.0000	3.0000
443	7	0.75	0.40	0.70	4.0000	1.0000	2.0000	3.0000
444	7	0.75	0.40	0.85	4.0000	1.0000	2.0000	3.0000
445	7	0.75	0.40	0.99	2.0000	1.0000	2.0000	2.0000
446	7	0.75	0.20	0.00	3.0000	1.0000	2.0000	3.0000
447	7	0.75	0.20	0.40	2.0000	1.0000	2.0000	2.0000
448	7	0.75	0.20	0.70	1.0000	1.0000	1.0000	1.0000
449	7	0.75	0.20	0.85	1.0000	1.0000	1.0000	1.0000
450	7	0.75	0.20	0.99	2.0000	1.0000	2.0000	2.0000
451	7	1.00	1.00	0.00	3.0000	1.0000	4.0000	1.0000
452	7	1.00	1.00	0.40	3.0000	1.0000	3.0000	1.0000
453	7	1.00	1.00	0.70	4.0000	1.0000	2.0000	3.0000
454	7	1.00	1.00	0.85	3.0000	1.0000	2.0000	3.0000
455	7	1.00	1.00	0.99	2.0000	1.0000	2.0000	4.0000
456	7	1.00	0.80	0.00	3.0000	1.0000	3.0000	1.0000
457	7	1.00	0.80	0.40	4.0000	1.0000	3.0000	1.0000
458	7	1.00	0.80	0.70	4.0000	1.0000	2.0000	2.0000
459	7	1.00	0.80	0.85	4.0000	1.0000	2.0000	3.0000
460	7	1.00	0.80	0.99	2.0000	1.0000	2.0000	2.0000
461	7	1.00	0.60	0.00	4.0000	1.0000	3.0000	1.0000
462	7	1.00	0.60	0.40	4.0000	1.0000	3.0000	1.0000
463	7	1.00	0.60	0.70	4.0000	1.0000	2.0000	2.0000
464	7	1.00	0.60	0.85	4.0000	1.0000	2.0000	2.0000
465	7	1.00	0.60	0.99	4.0000	1.0000	3.0000	2.0000
466	7	1.00	0.40	0.00	4.0000	1.0000	3.0000	1.0000
467	7	1.00	0.40	0.40	4.0000	1.0000	3.0000	1.0000
468	7	1.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
469	7	1.00	0.40	0.85	3.0000	2.0000	3.0000	1.0000
470	7	1.00	0.40	0.99	4.0000	2.0000	3.0000	1.0000
471	7	1.00	0.20	0.00	3.0000	2.0000	3.0000	1.0000
472	7	1.00	0.20	0.40	2.0000	2.0000	4.0000	1.0000
473	7	1.00	0.20	0.70	2.0000	3.0000	3.0000	1.0000
474	7	1.00	0.20	0.85	2.0000	2.0000	2.0000	1.0000
475	7	1.00	0.20	0.99	2.0000	2.0000	2.0000	1.0000
476	7	1.50	1.00	0.00	4.0000	2.0000	3.0000	1.0000
477	7	1.50	1.00	0.40	4.0000	2.0000	3.0000	1.0000
478	7	1.50	1.00	0.70	4.0000	1.0000	2.0000	2.0000
479	7	1.50	1.00	0.85	4.0000	1.0000	2.0000	2.0000
480	7	1.50	1.00	0.99	4.0000	1.0000	3.0000	2.0000
481	7	1.50	0.80	0.00	4.0000	2.0000	3.0000	1.0000
482	7	1.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000
483	7	1.50	0.80	0.70	4.0000	1.0000	3.0000	1.0000
484	7	1.50	0.80	0.85	4.0000	1.0000	3.0000	1.0000
485	7	1.50	0.80	0.99	4.0000	2.0000	3.0000	1.0000
486	7	1.50	0.60	0.00	4.0000	2.0000	3.0000	1.0000
487	7	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
488	7	1.50	0.60	0.70	4.0000	2.0000	3.0000	1.0000
489	7	1.50	0.60	0.85	4.0000	2.0000	3.0000	1.0000
490	7	1.50	0.60	0.99	4.0000	2.0000	3.0000	1.0000
491	7	1.50	0.40	0.00	4.0000	2.0000	3.0000	1.0000
492	7	1.50	0.40	0.40	4.0000	2.0000	2.0000	1.0000
493	7	1.50	0.40	0.70	4.0000	2.0000	2.0000	1.0000
494	7	1.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000
495	7	1.50	0.40	0.99	4.0000	2.0000	3.0000	1.0000
496	7	1.50	0.20	0.00	4.0000	2.0000	2.0000	1.0000
497	7	1.50	0.20	0.40	4.0000	2.0000	2.0000	1.0000
498	7	1.50	0.20	0.70	4.0000	2.0000	2.0000	1.0000

499	7	1.50	0.20	0.85	4.0000	2.0000	2.0000	1.0000
500	7	1.50	0.20	0.99	4.0000	2.0000	2.0000	1.0000
501	7	2.00	1.00	0.00	4.0000	2.0000	2.0000	1.0000
502	7	2.00	1.00	0.40	4.0000	2.0000	2.0000	1.0000
503	7	2.00	1.00	0.70	4.0000	2.0000	2.0000	1.0000
504	7	2.00	1.00	0.85	4.0000	1.0000	1.0000	1.0000
505	7	2.00	1.00	0.99	4.0000	2.0000	3.0000	1.0000
506	7	2.00	0.80	0.00	4.0000	2.0000	2.0000	1.0000
507	7	2.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000
508	7	2.00	0.80	0.70	4.0000	2.0000	2.0000	1.0000
509	7	2.00	0.80	0.85	4.0000	2.0000	2.0000	1.0000
510	7	2.00	0.80	0.99	4.0000	2.0000	3.0000	1.0000
511	7	2.00	0.60	0.00	4.0000	2.0000	2.0000	1.0000
512	7	2.00	0.60	0.40	4.0000	2.0000	2.0000	1.0000
513	7	2.00	0.60	0.70	4.0000	2.0000	2.0000	1.0000
514	7	2.00	0.60	0.85	4.0000	2.0000	2.0000	1.0000
515	7	2.00	0.60	0.99	4.0000	2.0000	3.0000	1.0000
516	7	2.00	0.40	0.00	4.0000	3.0000	2.0000	1.0000
517	7	2.00	0.40	0.40	4.0000	2.0000	2.0000	1.0000
518	7	2.00	0.40	0.70	4.0000	2.0000	2.0000	1.0000
519	7	2.00	0.40	0.85	4.0000	2.0000	2.0000	1.0000
520	7	2.00	0.40	0.99	4.0000	2.0000	2.0000	1.0000
521	7	2.00	0.20	0.00	4.0000	3.0000	2.0000	1.0000
522	7	2.00	0.20	0.40	4.0000	3.0000	2.0000	1.0000
523	7	2.00	0.20	0.70	4.0000	3.0000	2.0000	1.0000
524	7	2.00	0.20	0.85	4.0000	3.0000	2.0000	1.0000
525	7	2.00	0.20	0.99	4.0000	2.0000	2.0000	1.0000
526	10	0.00	1.00	0.00	2.0000	1.0000	2.0000	2.0000
527	10	0.00	1.00	0.40	2.0000	1.0000	2.0000	4.0000
528	10	0.00	1.00	0.70	2.0000	1.0000	2.0000	4.0000
529	10	0.00	1.00	0.85	2.0000	1.0000	2.0000	4.0000
530	10	0.00	1.00	0.99	1.0000	2.0000	3.0000	4.0000
531	10	0.00	0.80	0.00	2.0000	1.0000	2.0000	4.0000
532	10	0.00	0.80	0.40	2.0000	1.0000	2.0000	4.0000
533	10	0.00	0.80	0.70	2.0000	1.0000	2.0000	4.0000
534	10	0.00	0.80	0.85	2.0000	1.0000	2.0000	4.0000
535	10	0.00	0.80	0.99	1.0000	2.0000	3.0000	4.0000
536	10	0.00	0.60	0.00	2.0000	1.0000	2.0000	4.0000
537	10	0.00	0.60	0.40	2.0000	1.0000	2.0000	4.0000
538	10	0.00	0.60	0.70	2.0000	1.0000	2.0000	4.0000
539	10	0.00	0.60	0.85	1.0000	1.0000	3.0000	4.0000
540	10	0.00	0.60	0.99	1.0000	2.0000	3.0000	4.0000
541	10	0.00	0.40	0.00	2.0000	1.0000	2.0000	4.0000
542	10	0.00	0.40	0.40	2.0000	1.0000	2.0000	4.0000
543	10	0.00	0.40	0.70	1.0000	1.0000	1.0000	4.0000
544	10	0.00	0.40	0.85	1.0000	2.0000	2.0000	4.0000
545	10	0.00	0.40	0.99	1.0000	2.0000	3.0000	4.0000
546	10	0.00	0.20	0.00	2.0000	1.0000	3.0000	4.0000
547	10	0.00	0.20	0.40	1.0000	2.0000	3.0000	4.0000
548	10	0.00	0.20	0.70	1.0000	2.0000	2.0000	4.0000
549	10	0.00	0.20	0.85	1.0000	2.0000	2.0000	4.0000
550	10	0.00	0.20	0.99	1.0000	2.0000	2.0000	4.0000
551	10	0.25	1.00	0.00	2.0000	1.0000	2.0000	2.0000
552	10	0.25	1.00	0.40	2.0000	1.0000	2.0000	4.0000
553	10	0.25	1.00	0.70	3.0000	1.0000	2.0000	4.0000
554	10	0.25	1.00	0.85	2.0000	1.0000	2.0000	4.0000
555	10	0.25	1.00	0.99	1.0000	1.0000	3.0000	4.0000
556	10	0.25	0.80	0.00	2.0000	1.0000	2.0000	4.0000
557	10	0.25	0.80	0.40	2.0000	1.0000	2.0000	4.0000
558	10	0.25	0.80	0.70	3.0000	1.0000	2.0000	4.0000
559	10	0.25	0.80	0.85	2.0000	1.0000	2.0000	4.0000
560	10	0.25	0.80	0.99	1.0000	2.0000	3.0000	4.0000
561	10	0.25	0.60	0.00	2.0000	1.0000	2.0000	4.0000
562	10	0.25	0.60	0.40	3.0000	1.0000	2.0000	4.0000
563	10	0.25	0.60	0.70	3.0000	1.0000	2.0000	4.0000
564	10	0.25	0.60	0.85	2.0000	1.0000	2.0000	4.0000
565	10	0.25	0.60	0.99	1.0000	2.0000	3.0000	4.0000
566	10	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
567	10	0.25	0.40	0.40	3.0000	1.0000	2.0000	4.0000
568	10	0.25	0.40	0.70	1.0000	1.0000	1.0000	4.0000
569	10	0.25	0.40	0.85	1.0000	1.0000	1.0000	4.0000
570	10	0.25	0.40	0.99	1.0000	2.0000	3.0000	4.0000
571	10	0.25	0.20	0.00	2.0000	1.0000	3.0000	4.0000
572	10	0.25	0.20	0.40	1.0000	1.0000	3.0000	4.0000
573	10	0.25	0.20	0.70	1.0000	2.0000	2.0000	4.0000
574	10	0.25	0.20	0.85	1.0000	2.0000	2.0000	4.0000
575	10	0.25	0.20	0.99	1.0000	2.0000	2.0000	4.0000
576	10	0.50	1.00	0.00	2.0000	1.0000	2.0000	2.0000
577	10	0.50	1.00	0.40	2.0000	1.0000	2.0000	2.0000
578	10	0.50	1.00	0.70	3.0000	1.0000	2.0000	4.0000
579	10	0.50	1.00	0.85	3.0000	1.0000	2.0000	4.0000
580	10	0.50	1.00	0.99	3.0000	1.0000	2.0000	4.0000
581	10	0.50	0.80	0.00	2.0000	1.0000	2.0000	2.0000
582	10	0.50	0.80	0.40	3.0000	1.0000	2.0000	3.0000
583	10	0.50	0.80	0.70	3.0000	1.0000	2.0000	4.0000
584	10	0.50	0.80	0.85	3.0000	1.0000	2.0000	4.0000
585	10	0.50	0.80	0.99	3.0000	1.0000	2.0000	4.0000
586	10	0.50	0.60	0.00	3.0000	1.0000	2.0000	3.0000
587	10	0.50	0.60	0.40	3.0000	1.0000	2.0000	4.0000
588	10	0.50	0.60	0.70	3.0000	1.0000	2.0000	4.0000
589	10	0.50	0.60	0.85	3.0000	1.0000	2.0000	4.0000
590	10	0.50	0.60	0.99	3.0000	1.0000	2.0000	4.0000

591	10	0.50	0.40	0.00	3.0000	1.0000	2.0000	4.0000
592	10	0.50	0.40	0.40	3.0000	1.0000	2.0000	4.0000
593	10	0.50	0.40	0.70	3.0000	1.0000	2.0000	4.0000
594	10	0.50	0.40	0.85	3.0000	1.0000	1.0000	4.0000
595	10	0.50	0.40	0.99	3.0000	1.0000	2.0000	4.0000
596	10	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
597	10	0.50	0.20	0.40	3.0000	1.0000	2.0000	4.0000
598	10	0.50	0.20	0.70	3.0000	1.0000	1.0000	4.0000
599	10	0.50	0.20	0.85	3.0000	1.0000	1.0000	4.0000
600	10	0.50	0.20	0.99	3.0000	1.0000	1.0000	4.0000
601	10	0.75	1.00	0.00	3.0000	1.0000	4.0000	1.0000
602	10	0.75	1.00	0.40	3.0000	1.0000	3.0000	2.0000
603	10	0.75	1.00	0.70	3.0000	1.0000	2.0000	3.0000
604	10	0.75	1.00	0.85	3.0000	1.0000	2.0000	4.0000
605	10	0.75	1.00	0.99	3.0000	1.0000	2.0000	3.0000
606	10	0.75	0.80	0.00	3.0000	1.0000	3.0000	2.0000
607	10	0.75	0.80	0.40	4.0000	1.0000	2.0000	2.0000
608	10	0.75	0.80	0.70	4.0000	1.0000	2.0000	3.0000
609	10	0.75	0.80	0.85	3.0000	1.0000	2.0000	3.0000
610	10	0.75	0.80	0.99	3.0000	1.0000	2.0000	3.0000
611	10	0.75	0.60	0.00	4.0000	1.0000	2.0000	2.0000
612	10	0.75	0.60	0.40	4.0000	1.0000	2.0000	3.0000
613	10	0.75	0.60	0.70	4.0000	1.0000	2.0000	3.0000
614	10	0.75	0.60	0.85	4.0000	1.0000	2.0000	3.0000
615	10	0.75	0.60	0.99	4.0000	1.0000	2.0000	3.0000
616	10	0.75	0.40	0.00	4.0000	1.0000	2.0000	3.0000
617	10	0.75	0.40	0.40	4.0000	1.0000	2.0000	3.0000
618	10	0.75	0.40	0.70	4.0000	1.0000	2.0000	3.0000
619	10	0.75	0.40	0.85	4.0000	1.0000	2.0000	3.0000
620	10	0.75	0.40	0.99	4.0000	1.0000	2.0000	3.0000
621	10	0.75	0.20	0.00	4.0000	1.0000	2.0000	3.0000
622	10	0.75	0.20	0.40	4.0000	1.0000	2.0000	3.0000
623	10	0.75	0.20	0.70	4.0000	1.0000	1.0000	3.0000
624	10	0.75	0.20	0.85	4.0000	1.0000	1.0000	3.0000
625	10	0.75	0.20	0.99	4.0000	1.0000	2.0000	3.0000
626	10	1.00	1.00	0.00	2.0000	2.0000	4.0000	1.0000
627	10	1.00	1.00	0.40	3.0000	1.0000	3.0000	1.0000
628	10	1.00	1.00	0.70	4.0000	1.0000	2.0000	3.0000
629	10	1.00	1.00	0.85	4.0000	1.0000	2.0000	3.0000
630	10	1.00	1.00	0.99	4.0000	1.0000	2.0000	3.0000
631	10	1.00	0.80	0.00	3.0000	2.0000	3.0000	1.0000
632	10	1.00	0.80	0.40	4.0000	1.0000	3.0000	1.0000
633	10	1.00	0.80	0.70	4.0000	1.0000	2.0000	3.0000
634	10	1.00	0.80	0.85	4.0000	1.0000	2.0000	3.0000
635	10	1.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
636	10	1.00	0.60	0.00	4.0000	1.0000	3.0000	1.0000
637	10	1.00	0.60	0.40	4.0000	1.0000	2.0000	2.0000
638	10	1.00	0.60	0.70	4.0000	1.0000	2.0000	3.0000
639	10	1.00	0.60	0.85	4.0000	1.0000	2.0000	3.0000
640	10	1.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
641	10	1.00	0.40	0.00	4.0000	1.0000	2.0000	2.0000
642	10	1.00	0.40	0.40	4.0000	1.0000	2.0000	2.0000
643	10	1.00	0.40	0.70	4.0000	1.0000	2.0000	2.0000
644	10	1.00	0.40	0.85	4.0000	1.0000	2.0000	2.0000
645	10	1.00	0.40	0.99	4.0000	1.0000	2.0000	2.0000
646	10	1.00	0.20	0.00	4.0000	1.0000	3.0000	2.0000
647	10	1.00	0.20	0.40	4.0000	1.0000	3.0000	1.0000
648	10	1.00	0.20	0.70	4.0000	1.0000	3.0000	1.0000
649	10	1.00	0.20	0.85	4.0000	1.0000	1.0000	1.0000
650	10	1.00	0.20	0.99	4.0000	1.0000	3.0000	1.0000
651	10	1.50	1.00	0.00	4.0000	2.0000	3.0000	1.0000
652	10	1.50	1.00	0.40	4.0000	2.0000	3.0000	1.0000
653	10	1.50	1.00	0.70	4.0000	1.0000	2.0000	2.0000
654	10	1.50	1.00	0.85	4.0000	1.0000	2.0000	3.0000
655	10	1.50	1.00	0.99	4.0000	1.0000	2.0000	2.0000
656	10	1.50	0.80	0.00	4.0000	2.0000	2.0000	1.0000
657	10	1.50	0.80	0.40	4.0000	2.0000	3.0000	1.0000
658	10	1.50	0.80	0.70	4.0000	1.0000	3.0000	1.0000
659	10	1.50	0.80	0.85	4.0000	1.0000	2.0000	2.0000
660	10	1.50	0.80	0.99	4.0000	1.0000	3.0000	1.0000
661	10	1.50	0.60	0.00	4.0000	2.0000	2.0000	1.0000
662	10	1.50	0.60	0.40	4.0000	2.0000	3.0000	1.0000
663	10	1.50	0.60	0.70	4.0000	2.0000	3.0000	1.0000
664	10	1.50	0.60	0.85	4.0000	2.0000	3.0000	1.0000
665	10	1.50	0.60	0.99	4.0000	2.0000	3.0000	1.0000
666	10	1.50	0.40	0.00	4.0000	2.0000	2.0000	1.0000
667	10	1.50	0.40	0.40	4.0000	2.0000	3.0000	1.0000
668	10	1.50	0.40	0.70	4.0000	2.0000	3.0000	1.0000
669	10	1.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000
670	10	1.50	0.40	0.99	4.0000	2.0000	3.0000	1.0000
671	10	1.50	0.20	0.00	4.0000	2.0000	3.0000	1.0000
672	10	1.50	0.20	0.40	4.0000	2.0000	3.0000	1.0000
673	10	1.50	0.20	0.70	4.0000	2.0000	3.0000	1.0000
674	10	1.50	0.20	0.85	4.0000	2.0000	3.0000	1.0000
675	10	1.50	0.20	0.99	4.0000	2.0000	3.0000	1.0000
676	10	2.00	1.00	0.00	4.0000	2.0000	2.0000	1.0000
677	10	2.00	1.00	0.40	4.0000	2.0000	2.0000	1.0000
678	10	2.00	1.00	0.70	4.0000	1.0000	1.0000	1.0000
679	10	2.00	1.00	0.85	4.0000	1.0000	1.0000	1.0000
680	10	2.00	1.00	0.99	4.0000	1.0000	3.0000	1.0000
681	10	2.00	0.80	0.00	4.0000	2.0000	2.0000	1.0000
682	10	2.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000

683	10	2.00	0.80	0.70	4.0000	2.0000	2.0000	1.0000
684	10	2.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
685	10	2.00	0.80	0.99	4.0000	2.0000	3.0000	1.0000
686	10	2.00	0.60	0.00	4.0000	2.0000	2.0000	1.0000
687	10	2.00	0.60	0.40	4.0000	2.0000	2.0000	1.0000
688	10	2.00	0.60	0.70	4.0000	2.0000	2.0000	1.0000
689	10	2.00	0.60	0.85	4.0000	2.0000	3.0000	1.0000
690	10	2.00	0.60	0.99	4.0000	2.0000	3.0000	1.0000
691	10	2.00	0.40	0.00	4.0000	2.0000	2.0000	1.0000
692	10	2.00	0.40	0.40	4.0000	2.0000	2.0000	1.0000
693	10	2.00	0.40	0.70	4.0000	2.0000	2.0000	1.0000
694	10	2.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
695	10	2.00	0.40	0.99	4.0000	2.0000	3.0000	1.0000
696	10	2.00	0.20	0.00	4.0000	2.0000	2.0000	1.0000
697	10	2.00	0.20	0.40	4.0000	2.0000	2.0000	1.0000
698	10	2.00	0.20	0.70	4.0000	2.0000	2.0000	1.0000
699	10	2.00	0.20	0.85	4.0000	2.0000	3.0000	1.0000
700	10	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000
701	15	0.00	1.00	0.00	1.0000	1.0000	1.0000	4.0000
702	15	0.00	1.00	0.40	1.0000	1.0000	1.0000	4.0000
703	15	0.00	1.00	0.70	3.0000	1.0000	1.0000	4.0000
704	15	0.00	1.00	0.85	1.0000	1.0000	1.0000	4.0000
705	15	0.00	1.00	0.99	1.0000	2.0000	2.0000	4.0000
706	15	0.00	0.80	0.00	1.0000	1.0000	1.0000	4.0000
707	15	0.00	0.80	0.40	1.0000	1.0000	1.0000	4.0000
708	15	0.00	0.80	0.70	3.0000	1.0000	1.0000	4.0000
709	15	0.00	0.80	0.85	1.0000	1.0000	1.0000	4.0000
710	15	0.00	0.80	0.99	1.0000	2.0000	2.0000	4.0000
711	15	0.00	0.60	0.00	2.0000	1.0000	2.0000	4.0000
712	15	0.00	0.60	0.40	3.0000	1.0000	1.0000	4.0000
713	15	0.00	0.60	0.70	3.0000	1.0000	1.0000	4.0000
714	15	0.00	0.60	0.85	1.0000	1.0000	1.0000	4.0000
715	15	0.00	0.60	0.99	1.0000	2.0000	2.0000	4.0000
716	15	0.00	0.40	0.00	3.0000	1.0000	2.0000	4.0000
717	15	0.00	0.40	0.40	3.0000	1.0000	1.0000	4.0000
718	15	0.00	0.40	0.70	1.0000	1.0000	1.0000	4.0000
719	15	0.00	0.40	0.85	1.0000	2.0000	2.0000	4.0000
720	15	0.00	0.40	0.99	1.0000	2.0000	2.0000	4.0000
721	15	0.00	0.20	0.00	1.0000	1.0000	3.0000	4.0000
722	15	0.00	0.20	0.40	1.0000	2.0000	2.0000	4.0000
723	15	0.00	0.20	0.70	1.0000	2.0000	2.0000	4.0000
724	15	0.00	0.20	0.85	1.0000	2.0000	2.0000	4.0000
725	15	0.00	0.20	0.99	1.0000	2.0000	2.0000	4.0000
726	15	0.25	1.00	0.00	1.0000	1.0000	1.0000	4.0000
727	15	0.25	1.00	0.40	1.0000	1.0000	1.0000	4.0000
728	15	0.25	1.00	0.70	3.0000	1.0000	1.0000	4.0000
729	15	0.25	1.00	0.85	3.0000	1.0000	1.0000	4.0000
730	15	0.25	1.00	0.99	1.0000	2.0000	2.0000	4.0000
731	15	0.25	0.80	0.00	1.0000	1.0000	1.0000	4.0000
732	15	0.25	0.80	0.40	3.0000	1.0000	1.0000	4.0000
733	15	0.25	0.80	0.70	3.0000	1.0000	1.0000	4.0000
734	15	0.25	0.80	0.85	3.0000	1.0000	1.0000	4.0000
735	15	0.25	0.80	0.99	1.0000	2.0000	2.0000	4.0000
736	15	0.25	0.60	0.00	3.0000	1.0000	2.0000	4.0000
737	15	0.25	0.60	0.40	3.0000	1.0000	1.0000	4.0000
738	15	0.25	0.60	0.70	3.0000	1.0000	1.0000	4.0000
739	15	0.25	0.60	0.85	3.0000	1.0000	1.0000	4.0000
740	15	0.25	0.60	0.99	1.0000	2.0000	2.0000	4.0000
741	15	0.25	0.40	0.00	3.0000	1.0000	2.0000	4.0000
742	15	0.25	0.40	0.40	3.0000	1.0000	1.0000	4.0000
743	15	0.25	0.40	0.70	3.0000	1.0000	1.0000	4.0000
744	15	0.25	0.40	0.85	1.0000	1.0000	1.0000	4.0000
745	15	0.25	0.40	0.99	1.0000	2.0000	2.0000	4.0000
746	15	0.25	0.20	0.00	2.0000	1.0000	2.0000	4.0000
747	15	0.25	0.20	0.40	1.0000	1.0000	1.0000	4.0000
748	15	0.25	0.20	0.70	1.0000	2.0000	2.0000	4.0000
749	15	0.25	0.20	0.85	1.0000	2.0000	2.0000	4.0000
750	15	0.25	0.20	0.99	1.0000	2.0000	2.0000	4.0000
751	15	0.50	1.00	0.00	1.0000	1.0000	1.0000	1.0000
752	15	0.50	1.00	0.40	1.0000	1.0000	1.0000	1.0000
753	15	0.50	1.00	0.70	3.0000	1.0000	1.0000	4.0000
754	15	0.50	1.00	0.85	3.0000	1.0000	1.0000	4.0000
755	15	0.50	1.00	0.99	3.0000	1.0000	1.0000	4.0000
756	15	0.50	0.80	0.00	1.0000	1.0000	1.0000	1.0000
757	15	0.50	0.80	0.40	2.0000	1.0000	1.0000	3.0000
758	15	0.50	0.80	0.70	3.0000	1.0000	1.0000	4.0000
759	15	0.50	0.80	0.85	3.0000	1.0000	1.0000	4.0000
760	15	0.50	0.80	0.99	3.0000	1.0000	1.0000	4.0000
761	15	0.50	0.60	0.00	3.0000	1.0000	1.0000	4.0000
762	15	0.50	0.60	0.40	3.0000	1.0000	1.0000	4.0000
763	15	0.50	0.60	0.70	3.0000	1.0000	1.0000	4.0000
764	15	0.50	0.60	0.85	3.0000	1.0000	1.0000	4.0000
765	15	0.50	0.60	0.99	3.0000	1.0000	1.0000	4.0000
766	15	0.50	0.40	0.00	3.0000	1.0000	1.0000	4.0000
767	15	0.50	0.40	0.40	3.0000	1.0000	1.0000	4.0000
768	15	0.50	0.40	0.70	3.0000	1.0000	1.0000	4.0000
769	15	0.50	0.40	0.85	3.0000	1.0000	1.0000	4.0000
770	15	0.50	0.40	0.99	3.0000	1.0000	1.0000	4.0000
771	15	0.50	0.20	0.00	3.0000	1.0000	2.0000	4.0000
772	15	0.50	0.20	0.40	3.0000	1.0000	1.0000	4.0000
773	15	0.50	0.20	0.70	3.0000	1.0000	1.0000	4.0000
774	15	0.50	0.20	0.85	3.0000	1.0000	1.0000	4.0000

775	15	0.50	0.20	0.99	3.0000	1.0000	1.0000	4.0000
776	15	0.75	1.00	0.00	1.0000	1.0000	1.0000	1.0000
777	15	0.75	1.00	0.40	1.0000	1.0000	1.0000	1.0000
778	15	0.75	1.00	0.70	3.0000	1.0000	1.0000	3.0000
779	15	0.75	1.00	0.85	3.0000	1.0000	1.0000	3.0000
780	15	0.75	1.00	0.99	3.0000	1.0000	1.0000	4.0000
781	15	0.75	0.80	0.00	1.0000	1.0000	1.0000	1.0000
782	15	0.75	0.80	0.40	4.0000	1.0000	1.0000	1.0000
783	15	0.75	0.80	0.70	4.0000	1.0000	1.0000	3.0000
784	15	0.75	0.80	0.85	3.0000	1.0000	1.0000	3.0000
785	15	0.75	0.80	0.99	4.0000	1.0000	1.0000	3.0000
786	15	0.75	0.60	0.00	4.0000	1.0000	1.0000	3.0000
787	15	0.75	0.60	0.40	4.0000	1.0000	1.0000	3.0000
788	15	0.75	0.60	0.70	4.0000	1.0000	1.0000	3.0000
789	15	0.75	0.60	0.85	4.0000	1.0000	1.0000	3.0000
790	15	0.75	0.60	0.99	4.0000	1.0000	1.0000	3.0000
791	15	0.75	0.40	0.00	4.0000	1.0000	1.0000	3.0000
792	15	0.75	0.40	0.40	4.0000	1.0000	1.0000	3.0000
793	15	0.75	0.40	0.70	4.0000	1.0000	1.0000	3.0000
794	15	0.75	0.40	0.85	4.0000	1.0000	1.0000	3.0000
795	15	0.75	0.40	0.99	4.0000	1.0000	1.0000	3.0000
796	15	0.75	0.20	0.00	4.0000	1.0000	2.0000	3.0000
797	15	0.75	0.20	0.40	4.0000	1.0000	1.0000	3.0000
798	15	0.75	0.20	0.70	4.0000	1.0000	1.0000	3.0000
799	15	0.75	0.20	0.85	4.0000	1.0000	1.0000	3.0000
800	15	0.75	0.20	0.99	4.0000	1.0000	1.0000	3.0000
801	15	1.00	1.00	0.00	2.0000	3.0000	3.0000	1.0000
802	15	1.00	1.00	0.40	2.0000	2.0000	2.0000	1.0000
803	15	1.00	1.00	0.70	4.0000	1.0000	1.0000	3.0000
804	15	1.00	1.00	0.85	4.0000	1.0000	1.0000	3.0000
805	15	1.00	1.00	0.99	4.0000	1.0000	1.0000	3.0000
806	15	1.00	0.80	0.00	2.0000	2.0000	2.0000	1.0000
807	15	1.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000
808	15	1.00	0.80	0.70	4.0000	1.0000	1.0000	3.0000
809	15	1.00	0.80	0.85	4.0000	1.0000	1.0000	3.0000
810	15	1.00	0.80	0.99	4.0000	1.0000	2.0000	3.0000
811	15	1.00	0.60	0.00	4.0000	2.0000	2.0000	1.0000
812	15	1.00	0.60	0.40	4.0000	1.0000	1.0000	1.0000
813	15	1.00	0.60	0.70	4.0000	1.0000	1.0000	3.0000
814	15	1.00	0.60	0.85	4.0000	1.0000	2.0000	3.0000
815	15	1.00	0.60	0.99	4.0000	1.0000	2.0000	3.0000
816	15	1.00	0.40	0.00	4.0000	1.0000	1.0000	1.0000
817	15	1.00	0.40	0.40	4.0000	1.0000	1.0000	1.0000
818	15	1.00	0.40	0.70	4.0000	1.0000	1.0000	3.0000
819	15	1.00	0.40	0.85	4.0000	1.0000	2.0000	3.0000
820	15	1.00	0.40	0.99	4.0000	1.0000	2.0000	3.0000
821	15	1.00	0.20	0.00	4.0000	1.0000	1.0000	1.0000
822	15	1.00	0.20	0.40	4.0000	1.0000	1.0000	1.0000
823	15	1.00	0.20	0.70	4.0000	1.0000	2.0000	2.0000
824	15	1.00	0.20	0.85	4.0000	1.0000	2.0000	2.0000
825	15	1.00	0.20	0.99	4.0000	1.0000	2.0000	2.0000
826	15	1.50	1.00	0.00	2.0000	3.0000	3.0000	1.0000
827	15	1.50	1.00	0.40	2.0000	2.0000	2.0000	1.0000
828	15	1.50	1.00	0.70	4.0000	1.0000	1.0000	1.0000
829	15	1.50	1.00	0.85	4.0000	1.0000	1.0000	3.0000
830	15	1.50	1.00	0.99	4.0000	1.0000	1.0000	3.0000
831	15	1.50	0.80	0.00	2.0000	2.0000	2.0000	1.0000
832	15	1.50	0.80	0.40	4.0000	2.0000	2.0000	1.0000
833	15	1.50	0.80	0.70	4.0000	1.0000	1.0000	1.0000
834	15	1.50	0.80	0.85	4.0000	1.0000	1.0000	1.0000
835	15	1.50	0.80	0.99	4.0000	1.0000	3.0000	1.0000
836	15	1.50	0.60	0.00	2.0000	2.0000	2.0000	1.0000
837	15	1.50	0.60	0.40	4.0000	2.0000	2.0000	1.0000
838	15	1.50	0.60	0.70	4.0000	2.0000	3.0000	1.0000
839	15	1.50	0.60	0.85	4.0000	2.0000	3.0000	1.0000
840	15	1.50	0.60	0.99	3.0000	2.0000	3.0000	1.0000
841	15	1.50	0.40	0.00	4.0000	2.0000	2.0000	1.0000
842	15	1.50	0.40	0.40	4.0000	2.0000	2.0000	1.0000
843	15	1.50	0.40	0.70	4.0000	2.0000	3.0000	1.0000
844	15	1.50	0.40	0.85	4.0000	2.0000	3.0000	1.0000
845	15	1.50	0.40	0.99	2.0000	2.0000	4.0000	1.0000
846	15	1.50	0.20	0.00	2.0000	2.0000	2.0000	1.0000
847	15	1.50	0.20	0.40	2.0000	2.0000	2.0000	1.0000
848	15	1.50	0.20	0.70	2.0000	2.0000	4.0000	1.0000
849	15	1.50	0.20	0.85	2.0000	3.0000	4.0000	1.0000
850	15	1.50	0.20	0.99	2.0000	3.0000	4.0000	1.0000
851	15	2.00	1.00	0.00	4.0000	2.0000	2.0000	1.0000
852	15	2.00	1.00	0.40	4.0000	2.0000	2.0000	1.0000
853	15	2.00	1.00	0.70	4.0000	1.0000	1.0000	1.0000
854	15	2.00	1.00	0.85	4.0000	1.0000	1.0000	1.0000
855	15	2.00	1.00	0.99	4.0000	1.0000	3.0000	1.0000
856	15	2.00	0.80	0.00	4.0000	2.0000	2.0000	1.0000
857	15	2.00	0.80	0.40	4.0000	2.0000	2.0000	1.0000
858	15	2.00	0.80	0.70	4.0000	2.0000	2.0000	1.0000
859	15	2.00	0.80	0.85	4.0000	2.0000	3.0000	1.0000
860	15	2.00	0.80	0.99	4.0000	2.0000	3.0000	1.0000
861	15	2.00	0.60	0.00	4.0000	2.0000	2.0000	1.0000
862	15	2.00	0.60	0.40	4.0000	2.0000	2.0000	1.0000
863	15	2.00	0.60	0.70	4.0000	2.0000	3.0000	1.0000
864	15	2.00	0.60	0.85	4.0000	2.0000	3.0000	1.0000
865	15	2.00	0.60	0.99	4.0000	2.0000	3.0000	1.0000
866	15	2.00	0.40	0.00	4.0000	2.0000	2.0000	1.0000

867	15	2.00	0.40	0.40	4.0000	2.0000	2.0000	1.0000
868	15	2.00	0.40	0.70	4.0000	2.0000	3.0000	1.0000
869	15	2.00	0.40	0.85	4.0000	2.0000	3.0000	1.0000
870	15	2.00	0.40	0.99	4.0000	2.0000	3.0000	1.0000
871	15	2.00	0.20	0.00	4.0000	2.0000	2.0000	1.0000
872	15	2.00	0.20	0.40	4.0000	2.0000	2.0000	1.0000
873	15	2.00	0.20	0.70	4.0000	2.0000	3.0000	1.0000
874	15	2.00	0.20	0.85	4.0000	2.0000	3.0000	1.0000
875	15	2.00	0.20	0.99	4.0000	2.0000	3.0000	1.0000

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Vita

Captain William L. Tongue was born on 4 August 1956 in Portsmouth, Virginia, to the Reverend Wrightson S. Tongue, Sr. and Elizabeth M. Tongue. He graduated from Mt Vernon High School in Alexandria, Virginia in 1974, and received his Bachelor of Arts in English Literature from George Mason University, Fairfax, Virginia, in 1978. In 1979 he married Sharon Kay Fick and together they celebrated the birth of their son, Wesley Christopher, in 1984. In 1985 he was commissioned into the United States Air Force and assigned to Minot Air Force Base as a Deputy Missile Combat Crew Commander. In 1986 he became an Instructor, Deputy Missile Combat Crew Commander, and developed training materials identified by the IG as one of only four notable areas on the entire base. He assumed command of his first Missile Combat Crew in 1987, was a distinguished graduate of Squadron Officer's School in 1988, and received his Masters of Business Administration from the University of North Dakota in 1989. In 1988, he and Sharon welcomed their daughter Kaylee Erin into the world. As an Emergency War Order (EWO) Instructor, his statistical quality analysis moved the 200 officers he trained from last in 1989 to first place in 1991 among the six missile wings in the USAF, garnering the best unit in SAC award for 1991. In August of 1991, he entered the Graduate of Operations Research Program, School of Engineering, Air Force Institute of Technology, Wright-Patterson AFB, OH.

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This study compared five CEP estimation techniques under the assumption that the crossrange and downrange miss distances of the sample data follow a bivariate normal distribution. The analysis determined the sensitivities of these models to changes in sample size, bias, correlation, and ellipticity in terms of three measures of effectiveness: Mean relative error (RE), variance of RE, and mean squared error (MSE) of RE. In general, it was found that sample size was the most significant parameter in determining the best CEP method. Mean RE provided a "strong" distinction between estimators, while variance and MSE provided "weak" distinctions between estimators. An attempt to improve one of the better estimation techniques using least squares regression proved quite successful.

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