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THE SELECTION OF APPROXIMATING FUNCTIONS FOR TABULATED NUMERICAL DATA

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Aero-Astrodynamics Laboratory

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16. ABSTRACT

In scientific work the scientist often needs to use tabulated numerical data in mathematical simulations. In many cases, it is desirable to represent the tabulated numerical data by an approximate function containing arbitrary constant coefficients, which can be chosen to obtain the best possible "curve fit" of the given data. In this report a computer program is developed that selects (from a list of candidate functions) the approximating functions and associated coefficients which result in the "best curve fit" of a given set of numerical data. The advantages of the approach used here are: (1) multivariable approximations can be performed, (2) flexibility with respect to the type of approximations used is available, (3) the program is designed to choose the "best terms" to be used in the approximation from an arbitrary list of possible terms so that little knowledge of the proper approximating form is required, and (4) recursion relations are used in determining the coefficients of the approximating functions which reduces the computer execution time of the program.

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INTRODUCTION

In scientific work the scientist is often confronted with having to use tabulated numerical data. In many cases, it is desirable to represent the tabulated data by an approximate function containing arbitrary constant coefficients, so as to obtain the "best" fit to the given data. This report is concerned with the development of a computer program that selects (from a list of candidate functions) the approximating functions and associated coefficients which, when combined into a weighted sum, results in the "best" fit of the numerical data.

The "best" fit of a set of numerical data is defined to be the one which minimizes the sum of the squares of the differences in the tabulated values and the corresponding values of the independent variable. Elementary matrix operations and vector methods are the techniques used to determine the recursion relations which yield the coefficients of the selected approximating functions. The advantages of this "curve fitting" program are as follows: (1) multivariable approximations can be performed, (2) flexibility with respect to the type of approximations used, (3) the program is designed to choose the "best" terms to be used in the approximation from an arbitrary list of possible terms so that little knowledge of the proper approximating form is required; and (4) recursion relations are used in determining the coefficients of the approximating functions, which reduces the computer execution time of the program.

Included is a discussion of the problem, a method of solution, derivation of the recursion relations of the coefficients, mathematical justification of the solution, a listing of the computer programs, and a section showing results from the use of the program.

DISCUSSION OF THE PROBLEM

From a set of n data points for m independent variables and one dependent variable, denoted as $(y_i, x_{i1}, x_{i2}, \ldots, x_{im})$ where $i = 1, 2, \ldots, n$, a table may be constructed similar to the following matrix:

y_1	x_{11}	x_{12}	. . .	x_{1m}
y_2	x_{21}	x_{22}	. . .	x_{2m}
.	.	.		.
.	.	.	. . .	.
.	.	.		.
y_n	x_{n1}	x_{n2}	. . .	x_{nm}

Such a table is assumed to define a function $y = f(x_1, x_2, \ldots, x_m)$ over a region including the n data points. The desired approximation could be the sum of N specified functions where N is an arbitrary integer. In this case, the approximating function would have the form $y_a = a_1 f_1(x_1, x_2, \ldots, x_m) + a_2 f_2(x_1, x_2, \ldots, x_m) + \ldots + a_N f_N(x_1, x_2, \ldots, x_m)$ where, $f_i(x_1, x_2, \ldots, x_m)$, for $i = 1, 2, \ldots, N$ are arbitrarily specified functions which must be defined over the region including the n data points. The coefficients, a_i, of the specified functions in the approximations are to be determined as similar to those in "curve-fitting" problems. The first task accomplished by this report establishes the "best" L (where L is an integer such that $3 \leq L \leq N$) approximating functions which are chosen from the total list of N possible functions. This allows much greater flexibility than the standard "curve-fitting" approaches because many different types of functions can be included in the list of N functions, and a selection of L functions, which produce the "best" fit to the data, is made automatically. In Reference 1 a similar problem is solved but the computational scheme developed here is much more efficient than the one described in Reference 1. In the next section the conditions which determine the coefficients for a fixed number of approximating functions are derived. In the following section recursion relations are derived, and the method for selecting the "best" L terms is explained. The succeeding section contains the numerical results followed by the conclusion.

METHOD OF SOLUTION

Once the tables from the n data points of m independent variables and one dependent variable have been made and the choice of the N arbitrary functions, to be used in the approximation has been decided, a second table may be constructed similar to the following matrix:

$$\begin{vmatrix} y_1 & f_{11} & f_{21} & \cdots & f_{N1} \\ y_2 & f_{12} & f_{22} & \cdots & f_{N2} \\ y_3 & f_{13} & f_{23} & \cdots & f_{N3} \\ \cdot & \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdot & \cdots & \cdot \\ y_n & f_{1n} & f_{2n} & \cdots & f_{Nn} \end{vmatrix} ;$$

where, the i^{th} function (f_i) evaluated at the j^{th} data point is denoted as f_{ij} $(1 \leq i \leq N$ and $1 \leq j \leq n)$. Now, each of the columns in the preceding table may be used to define a vector as shown below:

$$\bar{y} = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ \cdot \\ \cdot \\ \cdot \\ y_n \end{bmatrix} \quad \bar{g}_1 = \begin{bmatrix} f_{11} \\ f_{12} \\ f_{13} \\ \cdot \\ \cdot \\ \cdot \\ f_{1n} \end{bmatrix} \quad \bar{g}_2 = \begin{bmatrix} f_{21} \\ f_{22} \\ f_{23} \\ \cdot \\ \cdot \\ \cdot \\ f_{2n} \end{bmatrix} \quad \cdots \quad \bar{g}_N = \begin{bmatrix} f_{N1} \\ f_{N2} \\ f_{N3} \\ \cdot \\ \cdot \\ \cdot \\ f_{Nn} \end{bmatrix} .$$

The set of vectors $\bar{g}_i$, where $1 \leq i \leq N$, is assumed to be a set of linearly independent vectors. Thus, after the choice of the N arbitrary functions to be used in the approximation has been determined and the components of the set of vectors denoted as $\bar{g}_i$ have been calculated, an approximation to $\bar{y}$ may be written as

$$\bar{y}_a = a_1\bar{g}_1 + a_2\bar{g}_2 + \cdots + a_N\bar{g}_N$$

or

$$\bar{y}_a = \sum_{i=1}^{N} a_i \bar{g}_i \quad . \tag{1}$$

Now, define a quantity $D(\bar{a})$ in the following manner:

Let

$$D(\bar{a}) = (\bar{y} - \bar{y}_a) \cdot (\bar{y} - \bar{y}_a) \quad , \tag{2}$$

where, "." denotes the dot (scalar) product of vectors and

$$\bar{a} = \begin{bmatrix} a_1 \\ a_2 \\ a_3 \\ \cdot \\ \cdot \\ \cdot \\ a_N \end{bmatrix} \quad .$$

Note: $D(\bar{a})$ as defined by equation (2) is an indication of the error between $\bar{y}$ and the approximation $\bar{y}_a$. By substituting equation (1) into the right member of equation (2), $D(\bar{a})$ may be written as

$$D(\bar{a}) = \left(\bar{y} - \sum_{i=1}^{N} a_i \bar{g}_i\right) \cdot \left(\bar{y} - \sum_{i=1}^{N} a_i \bar{g}_i\right) \quad , \tag{3}$$

and since the dot product of vectors is distributive over addition, equation (3) becomes

$$D(\bar{a}) = \bar{y} \cdot \bar{y} - 2 \sum_{i=1}^{N} a_i (\bar{y} \cdot \bar{g}_i) + \sum_{i=1}^{N} \sum_{j=1}^{N} a_i a_j (\bar{g}_i \cdot \bar{g}_j) \quad . \tag{4}$$

Before continuing, matrix notation will be employed to simplify the expression involved. Equation (4) may be expressed in terms of matrices as will be shown. A column vector, for example $\bar{a}$, may be considered as a matrix whose dimension is $N \times 1$. Similarly, a row vector may be considered as a matrix whose dimension is $1 \times N$. Let G be the $N \times N$ matrix whose elements are dot products of the g_i vectors, $1 \leq i \leq N$; i.e.,

$$G = \left[\bar{g}_i \cdot \bar{g}_j\right] \text{ with } i = 1, 2, \ldots, N \text{ and } j = 1, 2, \ldots, N .$$

Furthermore, define the following quantities as shown below. Let

$$\bar{z} = \begin{bmatrix} \bar{y} \cdot \bar{g}_1 \\ \bar{y} \cdot \bar{g}_2 \\ \vdots \\ \bar{y} \cdot \bar{g}_N \end{bmatrix} ,$$

and, with $\bar{z}^T$ denoting the transpose of the $N \times 1$ matrix $\bar{z}$; i.e.

$$\bar{z}^T = \left[\bar{y} \cdot \bar{g}_1 \quad \bar{y} \cdot \bar{g}_2 \ldots \bar{y} \cdot \bar{g}_N\right] ,$$

and similarly

$$\bar{a}^T = \left[a_1, a_2, \ldots, a_N\right] .$$

Thus, by use of the above definitions, equation (4) may be written as

$$D(\bar{a}) = \bar{y}^T \bar{y} - 2\, \bar{a}^T \bar{z} + \bar{a}^T G \bar{a} . \qquad (5)$$

It is desired to minimize $D(\bar{a})$, which is an indication of the error between $\bar{y}$ and $\bar{y}_a$, with respect to the coefficients, a_i $(i = 1, 2, \ldots, N)$, or with respect to $\bar{a}$. To show that this may be accomplished, $D(\bar{a})$ will be expanded in a Taylor series about an arbitrary point, $\bar{a}^*$, where

$$\bar{a}^* = \begin{bmatrix} a_1^* \\ a_2^* \\ . \\ . \\ . \\ a_N^* \end{bmatrix} .$$

The Taylor series will have the form

$$D(\bar{a}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

$$+ \frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

$$+ \text{higher order terms} \quad . \tag{6}$$

The partial matrices in equation (6) can be readily computed from equation (5). Therefore, by use of equation (5),

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right] = -2\bar{z}^T + 2\bar{a}^T G \quad , \tag{7}$$

and

$$\left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\} = 2G \quad . \tag{8}$$

Thus, the higher order terms vanish. That is, all terms involving the k^{th} partial derivatives of $D(\bar{a})$, where $k = 3, 4, \ldots$, are zero because G is independent of $\bar{a}$ or equivalently, the $a_i (i = 1, 2, \ldots, N)$. Hence, the Taylor series of $D(\bar{a})$, equation (6), may be written as

$$D(\bar{a}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

$$+ \frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \qquad (9)$$

and by substituting equations (7) and (8) into equation (9), the Taylor series of $D(\bar{a})$ becomes

$$D(\bar{a}) = D(\bar{a}^*) + \left(-2\bar{z}^T + 2\bar{a}^{*T}G\right)(\bar{a} - \bar{a}^*) + \frac{1}{2}\left[(\bar{a} - \bar{a}^*)^T 2G(\bar{a} - \bar{a}^*)\right]. \qquad (10)$$

In the following discussion it will be shown that equation (10) is equivalent to equation (5). That is, the truncated Taylor series of $D(\bar{a})$ about the arbitrary point $\bar{a}^*$ is a precise representation of $D(\bar{a})$. Thus, the minimization of equation (10) is equivalent to the minimization of $D(\bar{a})$. To show this, consider the right member of equation (10) which is shown below:

$$D(\bar{a}^*) + \left(-2\bar{z}^T + 2\bar{a}^{*T}G\right)(\bar{a} - \bar{a}^*) + \left[(\bar{a} - \bar{a}^*)^T G(\bar{a} - \bar{a}^*)\right]. \qquad (11)$$

When all the terms are expanded, expression (11) can be written as:

$$D(\bar{a}^*) \; -2\bar{z}^T\bar{a} + 2\bar{a}^{*T}G\bar{a} + 2\bar{z}^T\bar{a}^* \; -2\bar{a}^{*T}G\bar{a}^* + \bar{a}^TG\bar{a}$$

$$- \bar{a}^{*T}G\bar{a} - \bar{a}^TG\bar{a}^* + \bar{a}^{*T}G\bar{a}^* \quad . \tag{12}$$

Since $\bar{a}^{*T}G\bar{a}$ may be considered as a 1×1 matrix (a scalar) it is equal to its transpose. Therefore

$$\bar{a}^{*T}G\bar{a} = \left(\bar{a}^{*T}G\bar{a}\right)^T = \bar{a}^TG^T\left(\bar{a}^{*T}\right)^T \quad ,$$

but $(\bar{a}^{*T})^T = \bar{a}^*$ and since G is a symmetric matrix

$$\bar{a}^{*T}G\bar{a} = \bar{a}^TG\bar{a}^* \quad .$$

Thus, by collecting like terms, expression (12) becomes

$$D(\bar{a}^*) \; - 2\bar{z}^T\bar{a} + 2\bar{z}^T\bar{a}^* \; - \bar{a}^{*T}G\bar{a}^* + \bar{a}^TG\bar{a} \quad . \tag{13}$$

Now, an expression for $D(\bar{a}^*)$ may be obtained from equation (5). Thus, expression (13) may be written as shown below:

$$\bar{y} \cdot \bar{y} - 2\bar{a}^{*T}\bar{z} + \bar{a}^{*T}G\bar{a}^* - 2\bar{z}^T\bar{a} + 2\bar{z}^T\bar{a}^* - \bar{a}^{*T}G\bar{a}^* + \bar{a}^TG\bar{a} \quad . \tag{14}$$

As before, because $\bar{a}^{*T}\bar{z}$ is a 1×1 matrix, it is equal to its transpose. Thus

$$\bar{a}^{*T}\bar{z} = \left(\bar{a}^{*T}\bar{z}\right)^T = \bar{z}^T\left(\bar{a}^{*T}\right)^T = \bar{z}^T\bar{a}^* \quad ,$$

since

$$\left(\bar{a}^{*T}\right)^T = \bar{a}^* \quad ,$$

and by collecting like terms, expression (14) becomes

$$\bar{y} \cdot \bar{y} - 2\bar{z}^T\bar{a} + \bar{a}^T G\bar{a} \quad ,$$

which is $D(\bar{a})$ as shown in equation (5). Thus, equation (10) is equivalent to equation (5).

As mentioned previously, it is desirable to minimize $D(\bar{a})$ [equation (5)] with respect to $\bar{a}$; but since it has been shown that equation (10) is equivalent to equation (5), equation (10) will be minimized with respect to $\bar{a}$. Recall that

$$D(\bar{a}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

$$+ \frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \quad ,$$

where

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right] = -2\bar{z}^T + 2\bar{a}^T G \quad ,$$

and

$$\left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\} = 2G \quad .$$

To minimize $D(\bar{a})$ as given by the above expression, consider the two cases where

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} = \bar{0}$$

and

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} \neq \bar{0} \quad .$$

In the first case where

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} = \bar{0} \quad ,$$

it can be seen that the vector $\bar{a}^*$ will produce the minimum value of $D(\bar{a})$ equal to $D(\bar{a}^*)$ if it can be shown that the quadratic form

$$\frac{1}{2}(\bar{a}-\bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \quad ,$$

is positive for any choice of $\bar{a}$ other than $\bar{a} = \bar{a}^*$. To see that this quadratic form is, in fact, positive for any choice of $\bar{a}$ such that $\bar{a} \neq \bar{a}^*$ note that

$$\left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} = 2G \quad ,$$

as shown in equation (8). Thus,

$$\frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) = \bar{x}^T G \bar{x} \quad , \qquad (15)$$

where $\bar{x} = \bar{a} - \bar{a}^* \neq \bar{0}$. Now, the quadratic form $\bar{x}^T G\bar{x}$, can be written in its matrix form as follows:

$$\bar{x}^T G \bar{x} = \left[x_1, x_2, \ldots, x_N \right] \begin{bmatrix} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \cdots & \bar{g}_1 \cdot \bar{g}_N \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \cdots & \bar{g}_2 \cdot \bar{g}_N \\ \vdots & \vdots & \cdots & \vdots \\ \bar{g}_N \cdot \bar{g}_1 & \bar{g}_N \cdot \bar{g}_2 & \cdots & \bar{g}_N \cdot \bar{g}_N \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_N \end{bmatrix} \qquad (16)$$

where $x_i = a_i - a_i^*$ for $i = 1, 2, \ldots, N$. By performing the indicated operations in equation (16), the right hand side can be expressed as

$$\left[\sum_{j=1}^{N} x_j(\bar{g}_i \cdot \bar{g}_1) \quad \sum_{j=1}^{N} x_j(g_j \cdot \bar{g}_2) \quad \cdots \quad \sum_{j=1}^{N} x_j(\bar{g}_j \cdot \bar{g}_N) \right] \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_N \end{bmatrix} , \qquad (17)$$

which is equal to

$$\left[\sum_{j=1}^{N} x_j(\bar{g}_j \cdot \bar{g}_1)\ x_1 + \sum_{j=1}^{N} x_j(\bar{g}_j \cdot \bar{g}_2)\ x_2 + \ldots + \sum_{j=1}^{N} x_j(\bar{g}_j \cdot \bar{g}_N)\ x_N\right]. \tag{18}$$

Since the $x_j (j=1, 2, \ldots, N)$ are scalars, expression (18) may be written as

$$\left[\sum_{j=1}^{N} (x_1\bar{g}_1 \cdot x_j\bar{g}_j) + \sum_{j=1}^{N} (x_2\bar{g}_2 \cdot x_j\bar{g}_j) + \ldots + \sum_{j=1}^{N} (x_N\bar{g}_N \cdot x_j\bar{g}_j)\right], \tag{19}$$

and because the dot product of vectors is distributive over addition, expression (19) becomes

$$\left[\left(\sum_{j=1}^{N} x_j\bar{g}_j\right) \cdot (x_1\bar{g}_1 + x_2\bar{g}_2 + \ldots + x_N\bar{g}_N)\right] = \left[\left(\sum_{j=1}^{N} x_j\bar{g}_j\right) \cdot \left(\sum_{j=1}^{N} x_j\bar{g}_j\right)\right], \tag{20}$$

which is the square of the magnitude of the vector,

$$\sum_{j=1}^{N} x_j\bar{g}_j \quad ;$$

that is

$$\left|\sum_{j=1}^{N} x_j\bar{g}_j\right|^2 \tag{21}$$

Thus,

$$\bar{x}^T G \bar{x} = \left| \sum_{j=1}^{N} x_j \bar{g}_j \right|^2 > 0 \quad ,$$

since for some i such that $1 \leq i \leq N$ and $x_i \neq 0$ and the set of vectors $\bar{g}_i$ $(i = 1, 2, \ldots, N)$ is a linearly independent set. Therefore

$$\frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

is always positive for arbitrary $\bar{a} \neq \bar{a}^*$. So, when

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} = \bar{0} \quad ,$$

the desired minimum of

$$D(\bar{a}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

$$+ \frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \quad ,$$

is obtained at $\bar{a}^*$.

Now, to investigate the second case,

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} \neq \bar{0} \quad , \tag{22}$$

it will be shown that, should

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} \neq \bar{0} \quad ,$$

then $D(\bar{a})$ cannot obtain a minimum at $\bar{a}^*$. This will be shown to be the case by proving the following. If

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} \neq \bar{0} \quad ,$$

then there exists $\hat{\bar{a}} \neq \bar{a}^*$ such that

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) < 0$$

and

$$\left|\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*)\right| > \left|\frac{1}{2} (\hat{\bar{a}} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}} (\hat{\bar{a}} - \bar{a}^*)\right| .$$

Once this result is proven, then by equation (9) it is easily seen that

$$D(\hat{\bar{a}}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*)$$

$$+ \frac{1}{2}(\hat{\bar{a}} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) \quad ,$$

which implies that $D(\hat{\bar{a}}) < D(\bar{a}^*)$; therefore, $D(\bar{a})$ does not attain a minimum at $\bar{a}=\bar{a}^*$. To show this, suppose $\bar{a}\neq\bar{a}^*$ and let g be the absolute value of the largest element in the $N \times N$ matrix,

$$\left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} .$$

Let $N_\epsilon(\bar{a}^*)$ be an ϵ- neighborhood $(\epsilon > 0)$ of $\bar{a}^*$ and $\bar{a} \in N_\epsilon(\bar{a}^*)$. Therefore, $|\bar{a} - \bar{a}^*| < \epsilon$ but, $\bar{a} - \bar{a}^* \neq \bar{0}$. Then

$$\frac{1}{2} N^2 g \epsilon^2 \geq \left| \frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \right| \quad . \quad (23)$$

The equality holds only when $g = 0$ but, since it has been shown that the term involving

$$\left\{\frac{\partial}{\partial \bar{a}}\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]\right\} \quad ,$$

is positive, the inequality is strictly "greater than."

To see that inequality (23) is true, note that the right side is a scalar and g is maximum of the absolute values of the elements in

$$\left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} .$$

Thus, by performing the indicated operations on the right side, a summation of N^2 terms results. The left side of inequality (23) may be written as the summation of N^2 terms as shown below:

$$\frac{1}{2} N^2 g\epsilon^2 = \frac{1}{2} (g\epsilon^2 + g\epsilon^2 + \ldots + g\epsilon^2) . \quad (N^2 \text{ terms})$$

Thus, term-wise, the left side of inequality (23) dominates the right side.

Now, since

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} \neq \bar{0} ,$$

there exists some component, say the i^{th}, such that

$$\left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} \neq 0 .$$

If

$$\left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} < 0 ,$$

then it is possible to make

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) < 0 \quad ,$$

by letting $a_i = a_i^* + \frac{\epsilon}{2}$ and $a_j = a_j^*$ where $i \neq j$ and $j = 1, 2, \ldots, N$. Now, should

$$\left[\frac{\partial D(\bar{a})}{\partial a_i}\right]_{\bar{a}=\bar{a}^*} > 0 \quad ,$$

then it is possible to make

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) < 0 \quad ;$$

by letting $a_i = a_i^* - \frac{\epsilon}{2}$ and $a_j = a_j^*$ where $i \neq j$ and $j = 1, 2, \ldots, N$. Thus, if

$$\left[\frac{\partial D(\bar{a})}{\partial a_i}\right]_{\bar{a}=\bar{a}^*} < 0 \quad ,$$

define

$$\underset{\sim}{\Delta}_{\bar{a}} = \begin{bmatrix} a_1^* \\ a_2^* \\ \cdot \\ \cdot \\ \cdot \\ a_i^* + \frac{\epsilon}{2} \\ a_{i+1}^* \\ \cdot \\ \cdot \\ \cdot \\ a_N^* \end{bmatrix} ,$$

and if

$$\left[\frac{\partial D(\bar{a})}{\partial a_i}\right]_{\bar{a}=\bar{a}^*} > 0 ,$$

define

$$\hat{\bar{a}} = \begin{bmatrix} a_1^* \\ a_2^* \\ \vdots \\ a_i^* - \frac{\epsilon}{2} \\ a_{i+1}^* \\ \vdots \\ a_N^* \end{bmatrix} ,$$

to obtain $\hat{\bar{a}} \in N_\epsilon(\bar{a}^*)$, such that

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) < 0 \quad .$$

It should be pointed out that

$$\hat{\bar{a}} - \bar{a}^* = \begin{bmatrix} a_1^* \\ a_2^* \\ \vdots \\ a_i^* \pm \frac{\epsilon}{2} \\ a_{i+1}^* \\ \vdots \\ a_N^* \end{bmatrix} - \begin{bmatrix} a_1^* \\ a_2^* \\ \vdots \\ a_i^* \\ a_{i+1}^* \\ \vdots \\ a_N^* \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ \vdots \\ \pm \frac{\epsilon}{2} \\ 0 \\ \vdots \\ 0 \end{bmatrix} .$$

Therefore

$$\left| \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) \right| = \left| \left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} (\pm \frac{\epsilon}{2}) \right|$$

$$= \left| \left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} \right| \frac{\epsilon}{2} \quad . \qquad (24)$$

Thus, for any ϵ, such that

$$\epsilon < \frac{\left| \left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} \right|}{2N^2 g} \quad ,$$

then

$$\left| \left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} \right| \frac{\epsilon}{2} > N^2 g \epsilon^2 \quad .$$

But, from inequality (23),

$$N^2 g \epsilon^2 > \left| \frac{1}{2} (\hat{\bar{a}} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*) \right| \quad ,$$

and since

$$\left| \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) \right| = \left| \left[\frac{\partial D(\bar{a})}{\partial a_i} \right]_{\bar{a}=\bar{a}^*} \right| \frac{\epsilon}{2} ,$$

as shown in equation (24), it follows that

$$\left| \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) \right| > \left| \frac{1}{2} (\bar{a} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) \right| \tag{25}$$

Since,

$$D(\hat{\bar{a}}) = D(\bar{a}^*) + \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*)$$

$$+ \frac{1}{2} (\hat{\bar{a}} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\hat{\bar{a}} - \bar{a}^*) ,$$

the result just derived shows that $D(\hat{\bar{a}}) - D(\bar{a}^*) < 0$. Thus, $\bar{a}^*$ is not the point at which $D(\bar{a})$ is minimized. Therefore, if $\bar{a}^*$ is the point at which $D(\bar{a})$ is minimized, it is necessary and sufficient that

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right]_{\bar{a}=\bar{a}^*} = \bar{0} .$$

The preceding derivation and others to follow use many results found in many books on vector and matrix analyses. References 2, 3, and 4 are suggested for those unfamilar with these results.

When the conditions previously derived to minimize $D(\bar{a})$ are satisified, they may be used to compute the coefficients as shown below. From equation (7)

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right] = -2\bar{z}^T + 2\bar{a}^T G \quad .$$

Thus, it can be seen that $\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]$ will be the zero vector when $\bar{a}$ satisfies the following relation:

$$\bar{a}^T G = \bar{z}^T \quad , \tag{26}$$

which is equivalent to

$$\sum_{j=1}^{N} a_j(\bar{g}_i \cdot \bar{g}_j) = \bar{y} \cdot \bar{g}_i \quad . \tag{27}$$

Thus, by solving equation (26) or (27) for a_i where $i = 1, 2, \ldots, N$, a unique set of values for $\bar{a}$ may be determined which will make $\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right] = \bar{0}$. These values can be used as $\bar{a}^*$ so that

$$\left[\frac{\partial D(\bar{a})}{\partial \bar{a}}\right]_{\bar{a}=\bar{a}^*}$$

will be the zero vector. Then $D(\bar{a}^*)$ will be the minimum value of $D(\bar{a})$, since it has been shown that

$$\frac{1}{2}(\bar{a} - \bar{a}^*)^T \left\{ \frac{\partial}{\partial \bar{a}} \left[\frac{\partial D(\bar{a})}{\partial \bar{a}} \right] \right\}_{\bar{a}=\bar{a}^*} (\bar{a} - \bar{a}^*)$$

is always positive. From equation (4), it is known that

$$D(\bar{a}) = \bar{y} \cdot \bar{y} - 2 \sum_{i=1}^{N} a_i (\bar{y} \cdot \bar{g}_i) + \sum_{i=1}^{N} \sum_{j=1}^{N} a_i a_j (\bar{g}_i \cdot \bar{g}_j) \quad .$$

By factoring, it is possible to obtain

$$D(\bar{a}) = \bar{y} \cdot \bar{y} + \sum_{i=1}^{N} a_i \left[\sum_{j=1}^{N} a_j (\bar{g}_i \cdot \bar{g}_j) - 2(\bar{y} \cdot \bar{g}_i) \right] \quad . \quad (28)$$

Since the necessary conditions to minimize $D(\bar{a})$ [equation (27)] are that

$$\sum_{j=1}^{N} a_j (\bar{g}_i \cdot \bar{g}_j) = \bar{y} \cdot \bar{g}_i \quad , \quad (29)$$

they may be substituted into equation (28) to obtain

$$D(\bar{a}^*) = \bar{y} \cdot \bar{y} - \sum_{i=1}^{N} a_i^* (\bar{y} \cdot \bar{g}_i) \quad , \quad (30)$$

where the elements $\bar{a}^*$ are the values of $\bar{a}$ which satisfy equation (29). Equation (30) may be used to indicate the error involved in the approximation.

At this point it should be noted that, for a fixed value of N, equation (26) could be used to compute the coefficients of an N-term approximation by use of the inverse of the matrix denoted as G; i.e., $\bar{a}^T = \bar{z}^T [G]^{-1}$ where $[G]^{-1}$ denotes the inverse of the matrix G. Note that this is for a fixed value of N which, in turn, places a limitation on the type of approximation, since N is the number of terms and corresponding to this is the dimension of G. So, for an N-term approximation, the above equation could be used to compute the $a_i (i = 1, 2, \ldots, N)$; however, any other approximation (involving N_0 terms where $N_0 < N$) would require computing the inverse of the G Matrix each time N is changed. This is true because each change in the number of terms of the approximation causes a corresponding change in the dimension of the G-matrix.

As the number (N) of terms in the approximating function increases, the computer execution time of an algorithm using equation (27) to determine values of $\bar{a}^*$ for an N + 1 term approximating function increases. For this reason, recursion relations have been developed which allow values of $\bar{a}^*$ to be computed for an N + 1 term approximation using a large part of the work done in obtaining the coefficients $\bar{a}^*$ for the N-term approximation. Then the error in the approximation as given by equation (30) and the preceding recursion relations which will be derived in detail in the section to follow are combined into an algorithm for determining the "best" L terms from a list of N possible terms to be used in the approximation (where $3 \leq L \leq N$). During each step of this algorithm, an indication of the error in the approximation may easily be calculated by use of equation (30). The first time through the computation, each of the $\bar{g}_i (i = 1, 2, \ldots, N)$ vectors are used as $\bar{g}_1$. The particular $\bar{g}_i$ that results in the minimum error is then saved or stored as $\bar{g}_1$. The next time through the computation, each of the remaining $\bar{g}_i$ vectors are used as $\bar{g}_2$. As done previously, the $\bar{g}_i$ resulting in the minimum error is then saved as $\bar{g}_2$. The remaining N - 2 vectors are then used as $\bar{g}_3$ and the procedure is repeated. The process is continued until the desired number L of the N (where $3 \leq L \leq N$) possible terms or functions have been chosen.

RECURSION RELATIONS FOR THE COEFFICIENTS

To derive general recursion relations which allow the computation of an n-term approximation to a given function (where $n = 1, 2, \ldots, N$), the development for the cases n = 1, 2, and 3 will be shown in detail. Then

using the results for $n = 1$, 2, and 3 and also the results for $n = 4$ and 5 which are not included, due to length and complexity, the general recursion relations which are listed can be obtained.

To start this development, consider the case where $n = 1$. Then equation (27) would have the form

$$(\bar{g}_1 \cdot \bar{g}_1)(a_{11}) = \bar{y} \cdot \bar{g}_1 \quad .$$

Therefore, the coefficient would be given by

$$a_{11} = \frac{\bar{y} \cdot \bar{g}_1}{\bar{g}_1 \cdot \bar{g}_1} = \frac{\bar{y} \cdot \bar{g}_1}{B_{11}} \quad , \tag{31}$$

where $B_{11} = \bar{g}_1 \cdot \bar{g}_1$.

$\underline{n = 2}$

For the two-term approximation, equation (27) has the following form:

$$\begin{bmatrix} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 \end{bmatrix} \begin{bmatrix} a_{21} \\ a_{22} \end{bmatrix} = \begin{bmatrix} \bar{y} \cdot \bar{g}_1 \\ \bar{y} \cdot \bar{g}_2 \end{bmatrix} \quad .$$

As before, it is desired to determine the coefficients in terms of $\bar{g}_1 \cdot \bar{g}_1$, $\bar{g}_1 \cdot \bar{g}_2$, $\bar{g}_2 \cdot \bar{g}_1$, $\bar{g}_2 \cdot \bar{g}_2$, $\bar{y} \cdot \bar{g}_1$, $\bar{y} \cdot \bar{g}_2$. This is to be accomplished by use of the augmented matrix from the above system of equations. The augmented matrix is of the form:

$$\left[\begin{array}{cc|c} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_1 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_2 \end{array}\right] \quad , \tag{32}$$

where elementary row operations will be performed on the matrix to obtain an equivalent matrix of the system which will eventually yield the desired relations for the coefficients. The operations will be indicated to the right of the matrix on which they are performed. Note that $B_{11} \equiv \bar{g}_1 \cdot \bar{g}_1$ was computed in the previous section. From expression (32), multiply row one of the augmented matrix by $\frac{1}{B_{11}}$ to obtain an equivalent matrix as shown below:

$$\left[\begin{array}{cc|c} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_1 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_2 \end{array}\right]_{\frac{1}{B_{11}}(r_1)} \sim \left[\begin{array}{cc|c} 1 & B_{12} & a_{11} \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_2 \end{array}\right],$$

where "$\sim$" denotes "is row equivalent to" and

$$B_{12} = \frac{\bar{g}_1 \cdot \bar{g}_2}{B_{11}} .$$

Note that $a_{11} = \frac{\bar{y} \cdot \bar{g}_1}{B_{11}}$ was computed in the previous section. Define $B_{21} \equiv \bar{g}_2 \cdot \bar{g}_1$ and perform the elementary row operations as indicated below:

$$\left[\begin{array}{cc|c} 1 & B_{12} & a_{11} \\ B_{21} & \bar{g}_2 \cdot \bar{g}_2 & \bar{y} \cdot \bar{g}_2 \end{array}\right]_{r_2 - (B_{21})\, r_1} \sim \left[\begin{array}{cc|c} 1 & B_{12} & a_{11} \\ 0 & B_{22} & \bar{y} \cdot \bar{g}_2 - a_{11} B_{21} \end{array}\right],$$

where

$$B_{22} = \bar{g}_2 \cdot \bar{g}_2 - B_{21} B_{12} .$$

Finally,

$$\left[\begin{array}{cc|c} 1 & B_{12} & a_{11} \\ 0 & B_{22} & \bar{y} \cdot \bar{g}_2 - a_{11} B_{21} \end{array}\right]_{\left(\frac{1}{B_{22}}\right) r_2} \sim \left[\begin{array}{cc|c} 1 & B_{12} & a_{11} \\ 0 & 1 & \frac{\bar{y}_1 \bar{g}_2 - a_{11} B_{21}}{B_{22}} \end{array}\right],$$

which is the desired form of the augmented matrix. Hence, coefficients for the two-term approximation are given by

$$a_{22} = \frac{\bar{y} \cdot \bar{g}_2 - a_{11} B_{21}}{B_{22}} \quad ,$$

and

$$a_{21} = a_{11} - B_{12} a_{22} \quad .$$

n = 3

Now, for a three-term approximation, the system of equations expressed in matrix notation is shown below :

$$\begin{bmatrix} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \bar{g}_1 \cdot \bar{g}_3 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{g}_2 \cdot \bar{g}_3 \\ \bar{g}_3 \cdot \bar{g}_1 & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 \end{bmatrix} \begin{bmatrix} a_{31} \\ a_{32} \\ a_{33} \end{bmatrix} = \begin{bmatrix} \bar{y} \cdot \bar{g}_1 \\ \bar{y} \cdot \bar{g}_2 \\ \bar{y} \cdot \bar{g}_3 \end{bmatrix} \quad .$$

The augmented matrix may be written as

$$\left[\begin{array}{ccc|c} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \bar{g}_1 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_1 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{g}_2 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_2 \\ \bar{g}_3 \cdot \bar{g}_1 & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] \quad . \qquad (33)$$

Elementary row operations are to be performed on the augmented matrix, shown on line (33), until it is in a form which will allow the coefficients a_{31}, a_{32}, and a_{33} to be determined easily. As before, $B_{11} = \bar{g}_1 \cdot \bar{g}_1$. Therefore

$$\left[\begin{array}{ccc|c} \bar{g}_1 \cdot \bar{g}_1 & \bar{g}_1 \cdot \bar{g}_2 & \bar{g}_1 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_1 \\ \bar{g}_2 \cdot \bar{g}_1 & \bar{g}_2 \cdot \bar{g}_2 & \bar{g}_2 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_2 \\ \bar{g}_3 \cdot \bar{g}_1 & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] \overset{\left(\frac{1}{B_{11}}\right) r_1}{\sim} \left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ B_{21} & \bar{g}_2 \cdot \bar{g}_2 & \bar{g}_2 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_2 \\ B_{31} & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] ,$$

where

$$B_{12} = \frac{\bar{g}_1 \cdot \bar{g}_2}{B_{11}}$$

$$B_{13} = \frac{\bar{g}_1 \cdot \bar{g}_3}{B_{11}}$$

$$a_{11} = \frac{\bar{y} \cdot \bar{g}_1}{B_{11}}$$

$$B_{21} = \bar{g}_2 \cdot \bar{g}_1$$

$$B_{31} = \bar{g}_3 \cdot \bar{g}_1 \quad .$$

Note that B_{12}, B_{21}, and a_{11} have been computed previously; thus, only B_{13} and B_{31} are required to be computed here. Therefore

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ B_{21} & \bar{g}_2 \cdot \bar{g}_2 & \bar{g}_2 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_2 \\ B_{31} & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] \sim \begin{matrix} \\ \\ r_2 - B_{21} r_1 \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & B_{22} & \bar{g}_2 \cdot \bar{g}_3 - B_{21} B_{13} & \bar{y} \cdot \bar{g}_2 - B_{21} a_{11} \\ B_{31} & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] ,$$

with $B_{22} = \bar{g}_2 \cdot \bar{g}_2 - B_{12}B_{21}$ which has been previously computed.

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & B_{22} & \bar{g}_2 \cdot \bar{g}_3 - B_{21} B_{13} & \bar{y} \cdot \bar{g}_2 - B_{21} a_{11} \\ B_{31} & \bar{g}_3 \cdot \bar{g}_2 & \bar{g}_3 \cdot \bar{g}_3 & \bar{y} \cdot \bar{g}_3 \end{array}\right] \sim \begin{matrix} \\ \\ r_3 - B_{31} r_1 \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & B_{22} & \bar{g}_2 \cdot \bar{g}_3 - B_{21} B_{13} & \bar{y} \cdot \bar{g}_2 - B_{21} a_{11} \\ 0 & \bar{g}_3 \cdot \bar{g}_2 - B_{31} B_{12} & \bar{g}_3 \cdot \bar{g}_3 - B_{31} B_{13} & \bar{y} \cdot \bar{g}_3 - B_{31} a_{11} \end{array}\right],$$

Continuing,

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & B_{22} & \bar{g}_2 \cdot \bar{g}_3 - B_{21} B_{13} & \bar{y} \cdot \bar{g}_2 - B_{21} a_{11} \\ 0 & \bar{g}_3 \cdot \bar{g}_2 - B_{31} B_{12} & \bar{g}_3 \cdot \bar{g}_3 - B_{31} B_{13} & \bar{y} \cdot \bar{g}_3 - B_{31} a_{11} \end{array}\right] \sim \begin{matrix} \\ \\ \left(\frac{1}{B_{22}}\right) r_2 \end{matrix}$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & 1 & B_{23} & a_{22} \\ 0 & B_{32} & \bar{g}_3 \cdot \bar{g}_3 - B_{31} B_{13} & \bar{y} \cdot \bar{g}_3 - B_{31} a_{11} \end{array}\right],$$

with $a_{22} = \dfrac{\bar{y} \cdot \bar{g}_2 - B_{21} a_{11}}{B_{22}}$, which has been previously computed, and defining

$$B_{23} = \frac{\bar{g}_2 \cdot \bar{g}_3 - B_{21} B_{13}}{B_{22}} \quad , \qquad \text{and}$$

$$B_{32} = \bar{g}_3 \cdot \bar{g}_2 - B_{31} B_{12} \quad . \qquad \text{Therefore,}$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & 1 & B_{23} & a_{22} \\ 0 & B_{32} & \bar{g}_3 \cdot \bar{g}_3 - B_{31} B_{13} & \bar{y} \cdot \bar{g}_3 - B_{31} a_{11} \end{array}\right] \sim_{r_3 - B_{32} r_2}$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & 1 & B_{23} & a_{22} \\ 0 & 0 & B_{33} & \bar{y} \cdot \bar{g}_3 - B_{31} a_{11} - B_{32} a_{22} \end{array}\right]$$

with

$$B_{33} = \bar{g}_3 \cdot \bar{g}_3 - B_{31} B_{13} - B_{32} B_{23} \quad .$$

Thus,

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & 1 & B_{23} & a_{22} \\ 0 & 0 & B_{33} & \bar{y} \cdot \bar{g} - B_{31}\, a_{11} - B_{32}\, a_{22} \end{array}\right] \sim \left(\frac{1}{B_{33}}\right) r_3$$

$$\left[\begin{array}{ccc|c} 1 & B_{12} & B_{13} & a_{11} \\ 0 & 1 & B_{23} & a_{22} \\ 0 & 0 & 1 & a_{33} \end{array}\right] ,$$

which is the desired form of the augmented matrix and where

$$a_{33} = \frac{\bar{y} \cdot \bar{g}_3 - B_{31}\, a_{11} - B_{32}\, a_{22}}{B_{33}} \quad .$$

Hence, the remaining coefficients may readily be computed as shown below:

$$a_{32} = a_{22} - B_{23}\, a_{33} \quad ,$$

and

$$a_{31} = a_{11} - B_{12}\, a_{32} - B_{13}\, a_{33} \quad .$$

The relations for four and five-term approximations were developed in a similar manner. Due to the complexity and length of the expressions involved, the development will not be given here. However, by reviewing the previous cases a recursion relation may be written as follows; for n = 1,

$$B_{11} = \bar{g}_1 \cdot \bar{g}_1$$

$$a_{11} = \frac{\bar{y} \cdot \bar{g}_1}{B_{11}} \quad .$$

For n = 2

$$B_{21} = \bar{g}_2 \cdot \bar{g}_1$$

$$B_{12} = \frac{B_{21}}{B_{11}}$$

$$B_{22} = \bar{g}_2 \cdot \bar{g}_2 - B_{12} B_{21}$$

$$a_{22} = \frac{\bar{y} \cdot \bar{g}_2 - a_{11} B_{21}}{B_{22}}$$

$$a_{21} = a_{11} - a_{22} B_{12} \quad .$$

For i = 3, 4, 5, . . . , N, where N is a positive integer, the relations are given by

$$B_{i1} = \bar{g}_i \cdot \bar{g}_1$$

$$B_{1i} = \frac{B_{i1}}{B_{11}}$$

$$B_{ij} = \bar{g}_i \cdot \bar{g}_j - \sum_{k=1}^{j-1} B_{kj} B_{ik}$$

$$B_{ji} = \frac{B_{ij}}{B_{jj}}$$

$$j = 2, 3, \ldots, i-1$$

$$B_{ii} = \bar{g}_i \cdot \bar{g}_i - \sum_{k=1}^{i-1} B_{ki} B_{ik}$$

$$a_{ii} = \frac{\bar{y} \cdot \bar{g}_i - \sum_{k=1}^{i-1} a_{kk} B_{ik}}{B_{ii}}$$

$$a_{i,\, i-j} = a_{i-j,\, i-j} - \sum_{k=1}^{j} a_{i,\, i-j+k} B_{i-j,\, i-j+k}$$

$$j = 1, 2, \ldots, i-1 \quad .$$

As previously mentioned, and as indicated above, quantities used in determining the coefficients of a $(k - 1)$ -term approximation are also used in determining the coefficients of a k-term approximation, $(2 \leq k \leq N)$; hence, they need not be recomputed.

To illustrate the use of the general recursion relations, let $i = 3$ and substitute it into the general relations to see if they do agree with the quantities as calculated using elementary row operations on the three term matrix. For $i = 3$, $B_{i1} = \bar{g}_i \cdot \bar{g}_1$ as given by the recursion relations. Therefore, $B_{31} = \bar{g}_3 \cdot \bar{g}_1$, which agrees with B_{31} as determined by elementary row operations. Also,

$$B_{1i} = \frac{B_{i1}}{B11} \quad ,$$

by the recursion relations; therefore

$$B_{13} = \frac{B_{31}}{B_{11}} \text{ but, } B_{31} = \bar{g}_3 \cdot \bar{g}_1 \quad .$$

Therefore

$$B_{13} = \frac{\bar{g}_3 \cdot \bar{g}_1}{B_{11}} \quad ,$$

which agrees with the results obtained using elementary row operations. Then continuing through the recursion relations, where $j = 2, 3, \ldots, i - 1$,

$$B_{ij} = \bar{g}_i \cdot \bar{g}_j - \sum_{k=1}^{j-1} B_{kj} B_{ik} \quad .$$

Therefore

$$B_{32} = \bar{g}_3 \cdot \bar{g}_2 - B_{12} B_{31} \quad ,$$

agrees with the derived value

$$B_{ji} = \frac{B_{ij}}{B_{jj}} \quad ,$$

where $j = 2, 3, \ldots, i - 1$.

Therefore

$$B_{23} = \frac{B_{32}}{B_{22}} \quad .$$

But

$$B_{32} = \bar{g}_3 \cdot \bar{g}_2 - B_{12} B_{31} \quad ,$$

therefore

$$B_{23} = \frac{\bar{g}_3 \cdot \bar{g}_2 - B_{12} B_{31}}{B_{22}} \quad ,$$

where

$$B_{31} = \bar{g}_3 \cdot \bar{g}_1 \quad ,$$

$$B_{12} = \frac{\bar{g}_1 \cdot \bar{g}_2}{B_{11}} \quad ,$$

and

$$\bar{g}_1 \cdot \bar{g}_2 = \bar{g}_2 \cdot \bar{g}_1 \quad .$$

Therefore

$$B_{23} = \frac{\bar{g}_3 \cdot \bar{g}_2 - \left(\frac{\bar{g}_1 \cdot \bar{g}_2}{B_{11}}\right)(\bar{g}_3 \cdot \bar{g}_1)}{B_{22}} = \frac{\bar{g}_3 \cdot \bar{g}_2 - (\bar{g}_2 \cdot \bar{g}_1)\left(\frac{\bar{g}_3 \cdot \bar{g}_1}{B_{11}}\right)}{B_{22}}$$

and since, $B_{21} = \bar{g}_2 \cdot \bar{g}_1$

$$B_{23} = \frac{\bar{g}_3 \cdot \bar{g}_2 - B_{21}\left(\frac{\bar{g}_3 \cdot \bar{g}_1}{B_{11}}\right)}{B_{22}} \quad .$$

But

$$\bar{g}_3 \cdot \bar{g}_1 = \bar{g}_1 \cdot \bar{g}_3 \text{ and } \bar{g}_3 \cdot \bar{g}_2 = \bar{g}_2 \cdot \bar{g}_3 \quad .$$

Therefore

$$B_{23} = \frac{\bar{g}_2 \cdot \bar{g}_3 - B_{21}\left(\frac{\bar{g}_1 \cdot \bar{g}_3}{B_{11}}\right)}{B_{22}} \quad ,$$

where

$$B_{13} = \frac{\bar{g}_1 \cdot \bar{g}_3}{B_{11}} \quad .$$

Therefore

$$B_{23} = \frac{\bar{g}_2 \cdot \bar{g}_3 - B_{21}\, B_{13}}{B_{22}} \quad ,$$

which agrees with the derived value.

$$B_{ii} = \bar{g}_i \cdot \bar{g}_i - \sum_{k=1}^{j-1} B_{ki}\, B_{ik} \quad .$$

Therefore

$$B_{33} = \bar{g}_3 \cdot \bar{g}_3 - B_{13}\, B_{31} - B_{23}\, B_{32} \quad ,$$

which agrees with the derived value.

$$a_{ii} = \frac{\bar{y} \cdot \bar{g}_i - \sum_{k=1}^{j-1} a_{kk}\, B_{ik}}{B_{ii}} \quad .$$

Therefore

$$a_{33} = \frac{\bar{y} \cdot \bar{g}_3 - a_{11}\, B_{31} - a_{22}\, B_{32}}{B_{33}} \quad ,$$

which agrees with derived value.

The remaining coefficients are obtained from the following relation;

$$a_{i,i-j} = a_{i-j,i-j} - \sum_{k=1}^{j} a_{i,i-j+k}\, B_{i-j,i-j+k} \quad ,$$

where $j = 1, 2, \ldots i - 1$.

Therefore, $a_{32} = a_{22} - B_{23}\, a_{33}$ and $a_{31} = a_{11} - B_{12}\, a_{32} - B_{13}\, a_{33}$ which agrees with the derived value.

Thus, the recursion relations are valid for a three-term approximation, as shown above. If interested, one may derive the quantities for a four and five-term approximation in a manner similar to the one, two, and three-term approximations, which have been shown. As a result the reader can verify that the recursion relations hold for $n = 4$ and $n = 5$. And an induction type of proof could be constructed to show that the recursion relations are, in

fact, true for any $N \geq 3$ where N is an integer. The Appendix is a listing of a printout of the programming of the recursion relations and the logic for selecting the "best" L terms from a possible list of N terms where $(3 \leq L \leq N)$.

NUMERICAL RESULTS

In order to show how the computer program works, examples of two types of approximations to a function of one independent variable will be included in this section. The numerical data to be used for these examples are a tabular function where η(ETA) is the dependent variable and Mach is the independent variable. These numerical data are a particular set of aerodynamic data which are often used in trajectory simulation programs. In Tables 1 and 2 the actual numbers indicating how η varies with Mach are given. In Figures 1 through 20, plots of this tabular data are given. For clarity, the following definitions are used to assist in reading Tables 1 and 2:

Y	nominal value of the dependent variable
X1	value of the independent variable
CY	computed value as calculated by the approximation
DIFF	Y-CY; i.e., nominal value minus the computed value
PDIF	percent difference, DIFF/Y
DENOM	value of the denominator; for polynomial approximations, DENOM = 1
DDD	the sum of the squares of the differences
RMS	root mean square; i.e., $\sqrt{DDD/M}$ where M is the number of data points
ERR1	DDD/YDY where YDY is the sum of the squares of Y
ERROR	$\sqrt{ERR1/M}$

The two types of approximations to be considered are polynomial approximations (case 1) and rational function approximations (case 2). In each, a table printout and plotting of the approximations were initiated after the sixth-term approximation was made (i.e., NP = 6). For case 1, the sample printout of all the polynomial approximations will be referred to as Table 1 and the sample printout for case 2, the rational function approximations, will be referred to as Table 2. The process was terminated after the fifteenth-term had been chosen by the program (NT = 15).

Consider case 1, that is, the polynomial approximations. The functions chosen to be used as terms in the approximations are listed below and may be seen in the program listed as the Appendix.

$G(1) = 1$

$G(2) = x$, where, x is the independent variable

$G(3) = x^2$

$G(4) = x^3$

.
.
.

$G(19) = x^{18}$

$G(20) = x^{19}$

So, from the above functions, the program will determine polynomial approximations ranging from one-term through NT-terms, as may be seen in Table 1, where (NT = 15). The approximations will be of the form

$$y \equiv F(x) = \sum_{J=1}^{NT} CA(J) \cdot AFN(J) \quad ,$$

where AFN denotes approximating function number and CA is the computed coefficients of the corresponding approximating function. As may be seen from Table 1, the following functions were chosen in the order shown below for a six-term polynomial approximation.

TABLE 1. POLYNOMIAL APPROXIMATIONS FOR η

```
THE NUMBER OF DATA POINTS USED IN THIS FIT IS   66
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS IN THE NUMERATOR IS   20
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS IN THE DENOMINATOR IS    0
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS TO BE SELECTED IS   15
THE CONSTANT ADDED TO THE DEPENDENT VARIABLE IS    .0000
INITIATION OF PLOTTING IS APPROXIMATING FUNCTION NUMBER    6

APPROXIMATING FUNCTION NUMBER  1 IS G( 1)

CA(1) =   .150993181818181+01
DDD   =   .8532348444850922-01      RMS  =   .3595525090166463-01      HM  =   .1504730103068182+03

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

APPROXIMATING FUNCTION NUMBER  2 IS G( 2)

CA( 1) =   .1120178088511637+01
CA( 2) =   .3680078134224882-01
DDD    =   .4539341502746907-01      RMS  =   .2622554128264492-01      HM  =   .1570418875496339+03
```

TABLE 1. (Continued)

```
APPROXIMATING FUNCTION NUMBER  3 IS G( 3)

CA( 1) =   .77582676954178910+00
CA( 2) =   .13519287377071670+00
CA( 3) =  -.37580373801552120-02
DDD    =   .18300808145182230-01      RMS   =   .16651875927255180-01      MM  =   .16149887977073500+03

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

APPROXIMATING FUNCTION NUMBER  4 IS G( 4)

CA( 1) =   .50978282801577400+00
CA( 2) =   .28848610632798480+00
CA( 3) =  -.18316132215566780-01
CA( 4) =   .34581417399214870-03
DDD    =   .45542050274724010-02      RMS   =   .83068108487466220-02      MM  =   .16376032708838900+03

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

APPROXIMATING FUNCTION NUMBER  5 IS G( 5)

CA( 1) =   .38769680803238890+00
```

TABLE 1. (Continued)

```
CA( 2) =   .4107701942998519+00
CA( 3) =  -.4001959674875233-01
CA( 4) =   .1586162515383394-02
CA( 5) =  -.2196927389272789-04
DDD    =   .1306312254828176-02      RMS   =   .4448888616456815-02      MM  =   .1642946364254542+03

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

APPROXIMATING FUNCTION NUMBER  6 IS G(10)

CA( 1) =   .3633551733860099+00
CA( 2) =   .4452805637032931+00
CA( 3) =  -.4826696357426569-01
CA( 4) =   .2213696405455170-02
CA( 5) =  -.3696033107572816-04
CA( 6) =   .8652009407108565-13
DDD    =   .1070115272641774-02      RMS   =   .4026644728219712-02      MM  =   .1643334930816935+03

  Y  =  .5400+00  X1  =  .0000    CY  =  .36335517+00  DIFF=  .17664483+00  PDIF=  .32712005+00  DENOM =  .10000000+01
  Y  =  .5410+00  X1  =  .1000+00  CY  =  .40740277+00  DIFF=  .13359723+00  PDIF=  .24694497+00  DENOM =  .10000000+01
  Y  =  .5420+00  X1  =  .2000+00  CY  =  .45049826+00  DIFF=  .91501742-01  PDIF=  .16882240+00  DENOM =  .10000000+01
  Y  =  .5430+00  X1  =  .3000+00  CY  =  .49265479+00  DIFF=  .50345214-01  PDIF=  .92716784-01  DENOM =  .10000000+01
  Y  =  .5460+00  X1  =  .4000+00  CY  =  .53388542+00  DIFF=  .12114585-01  PDIF=  .22187884-01  DENOM =  .10000000+01
  Y  =  .5490+00  X1  =  .5000+00  CY  =  .57420312+00  DIFF= -.25203116-01  PDIF= -.45907316-01  DENOM =  .10000000+01
  Y  =  .5530+00  X1  =  .6000+00  CY  =  .61362077+00  DIFF= -.60620773-01  PDIF= -.10962165+00  DENOM =  .10000000+01
```

TABLE 1. (Continued)

Y	=	.5565+00	X1	=	.7000+00	CY	=	.65215118+00	DIFF=	-.95651180-01	PDIF=	-.17187993+00	DENOM	=	.10000000+01
Y	=	.5800+00	X1	=	.8000+00	CY	=	.68980704+00	DIFF=	-.10980704+00	PDIF=	-.18932248+00	DENOM	=	.10000000+01
Y	=	.6200+00	X1	=	.1000+01	CY	=	.76254551+00	DIFF=	-.14254551+00	PDIF=	-.22991211+00	DENOM	=	.10000000+01
Y	=	.7000+00	X1	=	.1200+01	CY	=	.83193605+00	DIFF=	-.13193605+00	PDIF=	-.18848007+00	DENOM	=	.10000000+01
Y	=	.8200+00	X1	=	.1500+01	CY	=	.92995946+00	DIFF=	-.10995946+00	PDIF=	-.13409691+00	DENOM	=	.10000000+01
Y	=	.1000+01	X1	=	.2000+01	CY	=	.10779667+01	DIFF=	-.77966652-01	PDIF=	-.77966652-01	DENOM	=	.10000000+01
Y	=	.1170+01	X1	=	.2500+01	CY	=	.12080333+01	DIFF=	-.38033304-01	PDIF=	-.32507097-01	DENOM	=	.10000000+01
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13215702+01	DIFF=	.84297898-02	PDIF=	.63381878-02	DENOM	=	.10000000+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13626621+01	DIFF=	.17337895-01	PDIF=	.12563692-01	DENOM	=	.10000000+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14014110+01	DIFF=	.28589022-01	PDIF=	.19992323-01	DENOM	=	.10000000+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14378997+01	DIFF=	.42100333-01	PDIF=	.28446171-01	DENOM	=	.10000000+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.14722096+01	DIFF=	.47790407-01	PDIF=	.31441057-01	DENOM	=	.10000000+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15044208+01	DIFF=	.55579241-01	PDIF=	.35627719-01	DENOM	=	.10000000+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15346117+01	DIFF=	.55388253-01	PDIF=	.34835380-01	DENOM	=	.10000000+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.15628597+01	DIFF=	.57140280-01	PDIF=	.35271778-01	DENOM	=	.10000000+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.15892404+01	DIFF=	.50759575-01	PDIF=	.30950961-01	DENOM	=	.10000000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16138282+01	DIFF=	.46171813-01	PDIF=	.27814345-01	DENOM	=	.10000000+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16579151+01	DIFF=	.32084901-01	PDIF=	.18985148-01	DENOM	=	.10000000+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.16775558+01	DIFF=	.27444188-01	PDIF=	.16096298-01	DENOM	=	.10000000+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.16956867+01	DIFF=	.24313294-01	PDIF=	.14135636-01	DENOM	=	.10000000+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17276866+01	DIFF=	.12313427-01	PDIF=	.70766820-02	DENOM	=	.10000000+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17603613+01	DIFF=	-.36129280-03	PDIF=	-.20528000-03	DENOM	=	.10000000+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17857975+01	DIFF=	-.57975077-02	PDIF=	-.32570268-02	DENOM	=	.10000000+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.18049076+01	DIFF=	-.14907570-01	PDIF=	-.83282514-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.18185487+01	DIFF=	-.18548670-01	PDIF=	-.10304817-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.18275230+01	DIFF=	-.27522953-01	PDIF=	-.15290529-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.18325777+01	DIFF=	-.32577664-01	PDIF=	-.18098702-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18344053+01	DIFF=	-.34405344-01	PDIF=	-.19114080-01	DENOM	=	.10000000+01

TABLE 1. (Continued)

Y	=	.1800+01	X1	=	.1000+02	CY	=	.18336441+01	DIFF=	-.33644068-01	PDIF=	-.18691149-01	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18308777+01	DIFF=	-.30877746-01	PDIF=	-.17154304-01	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18266365+01	DIFF=	-.26636500-01	PDIF=	-.14798055-01	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18213971+01	DIFF=	-.21397110-01	PDIF=	-.11887284-01	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18155836+01	DIFF=	-.15583571-01	PDIF=	-.86575396-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18095677+01	DIFF=	-.95677451-02	PDIF=	-.53154140-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18036701+01	DIFF=	-.36701467-02	PDIF=	-.20389704-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17981609+01	DIFF=	.18391329-02	PDIF=	.10217405-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17932607+01	DIFF=	.67393416-02	PDIF=	.37440787-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17891422+01	DIFF=	.10857802-01	PDIF=	.60321122-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17859316+01	DIFF=	.14068445-01	PDIF=	.78158025-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17837099+01	DIFF=	.16290118-01	PDIF=	.90500655-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17825154+01	DIFF=	.17484647-01	PDIF=	.97136930-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1650+02	CY	=	.17823454+01	DIFF=	.17654618-01	PDIF=	.98081213-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1700+02	CY	=	.17831591+01	DIFF=	.16840854-01	PDIF=	.93560301-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1750+02	CY	=	.17848804+01	DIFF=	.15119559-01	PDIF=	.83997549-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1800+02	CY	=	.17874009+01	DIFF=	.12599092-01	PDIF=	.69994955-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1850+02	CY	=	.17905837+01	DIFF=	.94163415-02	PDIF=	.52313009-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1900+02	CY	=	.17942673+01	DIFF=	.57326577-02	PDIF=	.31848098-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1950+02	CY	=	.17982707+01	DIFF=	.17293094-02	PDIF=	.96072743-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2000+02	CY	=	.18023976+01	DIFF=	-.23975774-02	PDIF=	-.13319875-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2100+02	CY	=	.18101975+01	DIFF=	-.10197522-01	PDIF=	-.56652901-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2200+02	CY	=	.18160303+01	DIFF=	-.16030260-01	PDIF=	-.89057000-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2300+02	CY	=	.18184485+01	DIFF=	-.18448462-01	PDIF=	-.10249146-01	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2400+02	CY	=	.18164754+01	DIFF=	-.16475426-01	PDIF=	-.91530147-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2500+02	CY	=	.18099420+01	DIFF=	-.99420071-02	PDIF=	-.55233373-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2600+02	CY	=	.17998874+01	DIFF=	.11260885-03	PDIF=	.62560472-04	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2700+02	CY	=	.17890324+01	DIFF=	.10967599-01	PDIF=	.60931106-02	DENOM =	.10000000+01

TABLE 1. (Continued)

```
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17823348+01  DIFF=  .17665246-01  PDIF=  .98140256-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17876365+01  DIFF=  .12363502-01  PDIF=  .68686120-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18164147+01  DIFF= -.16414655-01  PDIF= -.91192529-02  DENOM =  .10000000+01

 DDD =   .17604417+00  RMS =   .51646257-01  YDY =   .16450954+03  ERR1 =   .10701153-02  ERROR =   .40266447-02

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

APPROXIMATING FUNCTION NUMBER  7 IS G( 6)

CA( 1) =   .3717697689554089+00
CA( 2) =   .4285953226750205+00
CA( 3) =  -.4254612921707475-01
CA( 4) =   .1511825258097522-02
CA( 5) =  -.9848731125524149-06
CA( 6) =   .1569131066347600-12
CA( 7) =  -.6674786650998801-06
DDD    =   .1058631539825036-02      RMS   =   .4004980875800888-02      HM  =   .1643353822652651+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .37176977+00  DIFF=  .16823023+00  PDIF=  .31153746+00  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .41420535+00  DIFF=  .12679465+00  PDIF=  .23437088+00  DENOM =  .10000000+01
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .45579908+00  DIFF=  .86200919-01  PDIF=  .15904229+00  DENOM =  .10000000+01
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .49656002+00  DIFF=  .46439976-01  PDIF=  .85524818-01  DENOM =  .10000000+01
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .53649724+00  DIFF=  .95027579-02  PDIF=  .17404318-01  DENOM =  .10000000+01
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .57561979+00  DIFF= -.26619794-01  PDIF= -.48487785-01  DENOM =  .10000000+01
 Y  =  .5530+00  X1  =  .6000+00  CY  =  .61393673+00  DIFF= -.60936731-01  PDIF= -.11019300+00  DENOM =  .10000000+01
```

TABLE 1. (Continued)

Y	=	.5565+00	X1	=	.7000+00	CY	=	.65145710+00	DIFF=	-.94957099-01	PDIF=	-.17063270+00	DENOM	=	.10000000+01
Y	=	.5800+00	X1	=	.8000+00	CY	=	.68818994+00	DIFF=	-.10818994+00	PDIF=	-.18653437+00	DENOM	=	.10000000+01
Y	=	.6200+00	X1	=	.1000+01	CY	=	.75932914+00	DIFF=	-.13932914+00	PDIF=	-.22472441+00	DENOM	=	.10000000+01
Y	=	.7000+00	X1	=	.1200+01	CY	=	.82742646+00	DIFF=	-.12742646+00	PDIF=	-.18203780+00	DENOM	=	.10000000+01
Y	=	.8200+00	X1	=	.1500+01	CY	=	.92402632+00	DIFF=	-.10402632+00	PDIF=	-.12686136+00	DENOM	=	.10000000+01
Y	=	.1000+01	X1	=	.2000+01	CY	=	.10708334+01	DIFF=	-.70833382-01	PDIF=	-.70833382-01	DENOM	=	.10000000+01
Y	=	.1170+01	X1	=	.2500+01	CY	=	.12008634+01	DIFF=	-.30863383-01	PDIF=	-.26378960-01	DENOM	=	.10000000+01
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13152179+01	DIFF=	.14782113-01	PDIF=	.11114371-01	DENOM	=	.10000000+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13568147+01	DIFF=	.23185306-01	PDIF=	.16800947-01	DENOM	=	.10000000+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.13961465+01	DIFF=	.33853482-01	PDIF=	.23673764-01	DENOM	=	.10000000+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14332818+01	DIFF=	.46718189-01	PDIF=	.31566344-01	DENOM	=	.10000000+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.14682886+01	DIFF=	.51711447-01	PDIF=	.34020689-01	DENOM	=	.10000000+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15012342+01	DIFF=	.58765776-01	PDIF=	.37670369-01	DENOM	=	.10000000+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15321858+01	DIFF=	.57814220-01	PDIF=	.36361145-01	DENOM	=	.10000000+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.15612096+01	DIFF=	.58790374-01	PDIF=	.36290354-01	DENOM	=	.10000000+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.15883716+01	DIFF=	.51628404-01	PDIF=	.31480734-01	DENOM	=	.10000000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16137369+01	DIFF=	.46263082-01	PDIF=	.27869326-01	DENOM	=	.10000000+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16593354+01	DIFF=	.30664607-01	PDIF=	.18144738-01	DENOM	=	.10000000+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.16796958+01	DIFF=	.25304223-01	PDIF=	.14841187-01	DENOM	=	.10000000+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.16985139+01	DIFF=	.21486072-01	PDIF=	.12491902-01	DENOM	=	.10000000+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17317702+01	DIFF=	.82298194-02	PDIF=	.47297813-02	DENOM	=	.10000000+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17657509+01	DIFF=	-.57509160-02	PDIF=	-.32675659-02	DENOM	=	.10000000+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17921561+01	DIFF=	-.12156097-01	PDIF=	-.68292682-02	DENOM	=	.10000000+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.18118722+01	DIFF=	-.21872201-01	PDIF=	-.12219107-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.18257497+01	DIFF=	-.25749692-01	PDIF=	-.14305384-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.18346007+01	DIFF=	-.34600724-01	PDIF=	-.19222624-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.18391969+01	DIFF=	-.39196911-01	PDIF=	-.21776062-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18402672+01	DIFF=	-.40267168-01	PDIF=	-.22370649-01	DENOM	=	.10000000+01

TABLE 1. (Continued)

Y	=	.1800+01	X1	=	.1000+02	CY	=	.18384956+01	DIFF=	-.38495648-01	PDIF=	-.21386471-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18345198+01	DIFF=	-.34519783-01	PDIF=	-.19177657-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18289285+01	DIFF=	-.28928461-01	PDIF=	-.16071367-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18222603+01	DIFF=	-.22260338-01	PDIF=	-.12366854-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18150023+01	DIFF=	-.15002337-01	PDIF=	-.83346316-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18075883+01	DIFF=	-.75883364-02	PDIF=	-.42157424-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18003981+01	DIFF=	-.39808606-03	PDIF=	-.22115892-03	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17937564+01	DIFF=	.62436188-02	PDIF=	.34686771-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17879325+01	DIFF=	.12067474-01	PDIF=	.67041522-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17831401+01	DIFF=	.16859875-01	PDIF=	.93665975-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17795372+01	DIFF=	.20462764-01	PDIF=	.11368202-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17772269+01	DIFF=	.22773063-01	PDIF=	.12651701-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17762583+01	DIFF=	.23741657-01	PDIF=	.13189810-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1650+02	CY	=	.17766281+01	DIFF=	.23371882-01	PDIF=	.12984379-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1700+02	CY	=	.17782826+01	DIFF=	.21717446-01	PDIF=	.12065248-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1750+02	CY	=	.17811202+01	DIFF=	.18879759-01	PDIF=	.10488755-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1800+02	CY	=	.17849954+01	DIFF=	.15004578-01	PDIF=	.83358765-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1850+02	CY	=	.17897221+01	DIFF=	.10277937-01	PDIF=	.57099652-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1900+02	CY	=	.17950787+01	DIFF=	.49212772-02	PDIF=	.27340429-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.1950+02	CY	=	.18008143+01	DIFF=	-.81429601-03	PDIF=	-.45238667-03	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2000+02	CY	=	.18066547+01	DIFF=	-.66546847-02	PDIF=	-.36970470-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2100+02	CY	=	.18174858+01	DIFF=	-.17485834-01	PDIF=	-.97143522-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2200+02	CY	=	.18252402+01	DIFF=	-.25240195-01	PDIF=	-.14022330-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2300+02	CY	=	.18278327+01	DIFF=	-.27832699-01	PDIF=	-.15462611-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2400+02	CY	=	.18238548+01	DIFF=	-.23854780-01	PDIF=	-.13252656-01	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2500+02	CY	=	.18131053+01	DIFF=	-.13105333-01	PDIF=	-.72807407-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2600+02	CY	=	.17972375+01	DIFF=	.27625337-02	PDIF=	.15347409-02	DENOM = .10000000+01
Y	=	.1800+01	X1	=	.2700+02	CY	=	.17805368+01	DIFF=	.19463213-01	PDIF=	.10812896-01	DENOM = .10000000+01

TABLE 1. (Continued)

```
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17708483+01  DIFF=  .29151676-01  PDIF=  .16195376-01  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17806706+01  DIFF=  .19329376-01  PDIF=  .10738542-01  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18284370+01  DIFF= -.28437017-01  PDIF= -.15798343-01  DENOM =  .10000000+01

 DDD =   .17415498+00  RMS =   .51368394-01  YDY =   .16450954+03  ERR1 =   .10586315-02  ERROR =   .40049809-02

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

APPROXIMATING FUNCTION NUMBER  8 IS G( 7)

CA( 1) =   .4296402349451360+00
CA( 2) =   .2767237434650267+00
CA( 3) =   .2888191195540538-01
CA( 4) =  -.1137446274002818-01
CA( 5) =   .1088091103154567-02
CA( 6) =  -.1960208780330338-11
CA( 7) =  -.4487379865503825-04
CA( 8) =   .7157945194428894-06
DDD    =   .6748275977548866-03      RMS   =   .3197602316118084-02      MM  =   .164398521674698+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .42964023+00  DIFF=  .11035977+00  PDIF=  .20436994+00  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .45759016+00  DIFF=  .83409838-01  PDIF=  .15417715+00  DENOM =  .10000000+01
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .48605099+00  DIFF=  .55949009-01  PDIF=  .10322695+00  DENOM =  .10000000+01
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .51495832+00  DIFF=  .28041675-01  PDIF=  .51642128-01  DENOM =  .10000000+01
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .54425027+00  DIFF=  .17497288-02  PDIF=  .32046315-02  DENOM =  .10000000+01
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .57386739+00  DIFF= -.24867391-01  PDIF= -.45295795-01  DENOM =  .10000000+01
```

TABLE 1. (Continued)

Y	=	.5530+00	X1	=	.6000+00	CY	=	.60375265+00	DIFF=	-.50752646-01	PDIF=	-.91776937-01	DENOM	=	.10000000+01
Y	=	.5565+00	X1	=	.7000+00	CY	=	.63385134+00	DIFF=	-.77351344-01	PDIF=	-.13899613+00	DENOM	=	.10000000+01
Y	=	.5800+00	X1	=	.8000+00	CY	=	.66411109+00	DIFF=	-.84111094-01	PDIF=	-.14501913+00	DENOM	=	.10000000+01
Y	=	.6200+00	X1	=	.1000+01	CY	=	.72491536+00	DIFF=	-.10491536+00	PDIF=	-.16921832+00	DENOM	=	.10000000+01
Y	=	.7000+00	X1	=	.1200+01	CY	=	.78579035+00	DIFF=	-.85790351-01	PDIF=	-.12255764+00	DENOM	=	.10000000+01
Y	=	.8200+00	X1	=	.1500+01	CY	=	.87649719+00	DIFF=	-.56497194-01	PDIF=	-.68899018-01	DENOM	=	.10000000+01
Y	=	.1000+01	X1	=	.2000+01	CY	=	.10236390+01	DIFF=	-.23638974-01	PDIF=	-.23638974-01	DENOM	=	.10000000+01
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11625317+01	DIFF=	.74683381-02	PDIF=	.63831950-02	DENOM	=	.10000000+01
Y	=	.1330+01	X1	=	.3000+01	CY	=	.12903910+01	DIFF=	.39608999-01	PDIF=	.29781202-01	DENOM	=	.10000000+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13379946+01	DIFF=	.42005420-01	PDIF=	.30438710-01	DENOM	=	.10000000+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.13834366+01	DIFF=	.46563445-01	PDIF=	.32561849-01	DENOM	=	.10000000+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14266503+01	DIFF=	.53349661-01	PDIF=	.36047068-01	DENOM	=	.10000000+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.14675866+01	DIFF=	.52413400-01	PDIF=	.34482500-01	DENOM	=	.10000000+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15062121+01	DIFF=	.53787882-01	PDIF=	.34479412-01	DENOM	=	.10000000+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15425087+01	DIFF=	.47491336-01	PDIF=	.29868765-01	DENOM	=	.10000000+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.15764719+01	DIFF=	.43528078-01	PDIF=	.26869184-01	DENOM	=	.10000000+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16081104+01	DIFF=	.31889559-01	PDIF=	.19444853-01	DENOM	=	.10000000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16374446+01	DIFF=	.22555388-01	PDIF=	.13587583-01	DENOM	=	.10000000+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16893348+01	DIFF=	.66517173-03	PDIF=	.39359274-03	DENOM	=	.10000000+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17119822+01	DIFF=	-.69821797-02	PDIF=	-.40951201-02	DENOM	=	.10000000+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17325060+01	DIFF=	-.12505988-01	PDIF=	-.72709232-02	DENOM	=	.10000000+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17674513+01	DIFF=	-.27451340-01	PDIF=	-.15776632-01	DENOM	=	.10000000+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.18004815+01	DIFF=	-.40481492-01	PDIF=	-.23000848-01	DENOM	=	.10000000+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.18229256+01	DIFF=	-.42925618-01	PDIF=	-.24115516-01	DENOM	=	.10000000+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.18362352+01	DIFF=	-.46235234-01	PDIF=	-.25829740-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.18419223+01	DIFF=	-.41922293-01	PDIF=	-.23290163-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.18415051+01	DIFF=	-.41505080-01	PDIF=	-.23058378-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.18364614+01	DIFF=	-.36461378-01	PDIF=	-.20256321-01	DENOM	=	.10000000+01

TABLE 1. (Continued)

Y	=	.1800+01	X1	=	.9500+01	CY	=	.18281887+01	DIFF=	-.28188728-01	PDIF=	-.15660404-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1000+02	CY	=	.18179716+01	DIFF=	-.17971602-01	PDIF=	-.99842232-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18069553+01	DIFF=	-.69552711-02	PDIF=	-.38640395-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.17961261+01	DIFF=	.38738683-02	PDIF=	.21521491-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.17862982+01	DIFF=	.13701777-01	PDIF=	.76120985-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.17781056+01	DIFF=	.21894353-01	PDIF=	.12163529-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.17720006+01	DIFF=	.27999429-01	PDIF=	.15555239-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.17682564+01	DIFF=	.31743550-01	PDIF=	.17635306-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17669761+01	DIFF=	.33023900-01	PDIF=	.18346611-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17681042+01	DIFF=	.31895804-01	PDIF=	.17719891-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17714437+01	DIFF=	.28556262-01	PDIF=	.15864590-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17766760+01	DIFF=	.23323990-01	PDIF=	.12957772-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17833835+01	DIFF=	.16616505-01	PDIF=	.92313914-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17910752+01	DIFF=	.89248117-02	PDIF=	.49582287-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1650+02	CY	=	.17992137+01	DIFF=	.78630433-03	PDIF=	.43683574-03	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1700+02	CY	=	.18072435+01	DIFF=	-.72434830-02	PDIF=	-.40241572-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1750+02	CY	=	.18146196+01	DIFF=	-.14619574-01	PDIF=	-.81219854-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1800+02	CY	=	.18208360+01	DIFF=	-.20835969-01	PDIF=	-.11575539-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1850+02	CY	=	.18254530+01	DIFF=	-.25453010-01	PDIF=	-.14140561-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1900+02	CY	=	.18281228+01	DIFF=	-.28122845-01	PDIF=	-.15623803-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1950+02	CY	=	.18286121+01	DIFF=	-.28612145-01	PDIF=	-.15895636-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2000+02	CY	=	.18268211+01	DIFF=	-.26821124-01	PDIF=	-.14900624-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2100+02	CY	=	.18167471+01	DIFF=	-.16747101-01	PDIF=	-.93039449-02	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2200+02	CY	=	.18001676+01	DIFF=	-.16764941-03	PDIF=	-.93138560-04	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2300+02	CY	=	.17817149+01	DIFF=	.18285092-01	PDIF=	.10158385-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2400+02	CY	=	.17677147+01	DIFF=	.32285322-01	PDIF=	.17936290-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2500+02	CY	=	.17647639+01	DIFF=	.35236066-01	PDIF=	.19575592-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.2600+02	CY	=	.17773772+01	DIFF=	.22622840-01	PDIF=	.12568244-01	DENOM	=	.10000000+01

TABLE 1. (Continued)

Y =	.1705+01	X1 =	.5400+01	CY =	.17173857+01	DIFF=	-.12385684-01	PDIF=	-.72643305-02	DENOM =	.10000000+01
Y =	.1720+01	X1 =	.5600+01	CY =	.17297136+01	DIFF=	-.97136024-02	PDIF=	-.56474433-02	DENOM =	.10000000+01
Y =	.1740+01	X1 =	.6000+01	CY =	.17488243+01	DIFF=	-.88243463-02	PDIF=	-.50714634-02	DENOM =	.10000000+01
Y =	.1760+01	X1 =	.6500+01	CY =	.17647501+01	DIFF=	-.47501433-02	PDIF=	-.26989451-02	DENOM =	.10000000+01
Y =	.1780+01	X1 =	.7000+01	CY =	.17747419+01	DIFF=	.52580945-02	PDIF=	.29539857-02	DENOM =	.10000000+01
Y =	.1790+01	X1 =	.7500+01	CY =	.17812063+01	DIFF=	.87936987-02	PDIF=	.49126808-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.8000+01	CY =	.17858253+01	DIFF=	.14174706-01	PDIF=	.78748364-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.8500+01	CY =	.17896450+01	DIFF=	.10355019-01	PDIF=	.57527884-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.9000+01	CY =	.17931990+01	DIFF=	.68009699-02	PDIF=	.37783166-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.9500+01	CY =	.17966449+01	DIFF=	.33551087-02	PDIF=	.18639493-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1000+02	CY =	.17998967+01	DIFF=	.10332400-03	PDIF=	.57402221-04	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1050+02	CY =	.18027436+01	DIFF=	-.27435610-02	PDIF=	-.15242005-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1100+02	CY =	.18049467+01	DIFF=	-.49467216-02	PDIF=	-.27481787-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1150+02	CY =	.18063113+01	DIFF=	-.63112534-02	PDIF=	-.35062519-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1200+02	CY =	.18067323+01	DIFF=	-.67323262-02	PDIF=	-.37401812-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1250+02	CY =	.18062170+01	DIFF=	-.62169895-02	PDIF=	-.34538831-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1300+02	CY =	.18048847+01	DIFF=	-.48846628-02	PDIF=	-.27137015-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1350+02	CY =	.18029505+01	DIFF=	-.29504531-02	PDIF=	-.16391406-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1400+02	CY =	.18006961+01	DIFF=	-.69609630-03	PDIF=	-.38672017-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1450+02	CY =	.17984336+01	DIFF=	.15664339-02	PDIF=	.87024103-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1500+02	CY =	.17964663+01	DIFF=	.35336999-02	PDIF=	.19631666-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1550+02	CY =	.17950526+01	DIFF=	.49474121-02	PDIF=	.27485623-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1600+02	CY =	.17943750+01	DIFF=	.56249725-02	PDIF=	.31249847-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1650+02	CY =	.17945191+01	DIFF=	.54808883-02	PDIF=	.30449380-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1700+02	CY =	.17954630+01	DIFF=	.45369698-02	PDIF=	.25205388-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1750+02	CY =	.17970797+01	DIFF=	.29203004-02	PDIF=	.16223891-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1800+02	CY =	.17991509+01	DIFF=	.84907512-03	PDIF=	.47170840-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1850+02	CY =	.18013925+01	DIFF=	-.13925047-02	PDIF=	-.77361372-03	DENOM =	.10000000+01

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TABLE 1. (Continued)

```
 Y  =  .1800+01  X1  =  .1900+02  CY  =  .18034881+01  DIFF= -.34880615-02  PDIF= -.19378120-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1950+02  CY  =  .18051285+01  DIFF= -.51284720-02  PDIF= -.28491511-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2000+02  CY  =  .18060530+01  DIFF= -.60530327-02  PDIF= -.33627959-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2100+02  CY  =  .18051778+01  DIFF= -.51777704-02  PDIF= -.28765391-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2200+02  CY  =  .18009916+01  DIFF= -.99161258-03  PDIF= -.55089588-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2300+02  CY  =  .17957337+01  DIFF=  .42663351-02  PDIF=  .23701862-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2400+02  CY  =  .17929146+01  DIFF=  .70853567-02  PDIF=  .39363093-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .17952765+01  DIFF=  .47234596-02  PDIF=  .26241442-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .18021533+01  DIFF= -.21533207-02  PDIF= -.11962893-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .18078318+01  DIFF= -.78317959-02  PDIF= -.43509977-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .18039023+01  DIFF= -.39022752-02  PDIF= -.21679307-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17904269+01  DIFF=  .95731015-02  PDIF=  .53183897-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18030932+01  DIFF= -.30931571-02  PDIF= -.17184206-02  DENOM =  .10000000+01

 DDD =   .4093420Z-02  RMS =   .78753741-02  YDY =   .16450954+03  ERR1 =   .24882571-04  ERROR =   .61401030-03

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

APPROXIMATING FUNCTION NUMBER 12 IS G(12)

CA( 1) =   .5631890027754443+00
CA( 2) =  -.2507405317478584+00
CA( 3) =   .4734939768184859+00
CA( 4) =  -.1717487777856301+00
CA( 5) =   .3250543906928479-01
CA( 6) =  -.1125070987544931-07
CA( 7) =  -.3803630038906988-02
```

CA(8) = .2925213734305323-03

CA(9) = -.1507393897424169-04

CA(10) = .5158573598823549-06

CA(11) = .1415373854415325-09

CA(12) = -.7815600951142738-12

DDD = .1784171389276716-04 RMS = .5199317247247565-03 HH = .164506602117903&+03

TABLE 1. (Continued)

Y =	.5400+00	X1 =	.0000	CY =	.56318900+00	DIFF=	-.23189003-01	PDIF=	-.42942598-01	DENOM =	.10000000+01
Y =	.5410+00	X1 =	.1000+00	CY =	.54268135+00	DIFF=	-.16813534-02	PDIF=	-.31078621-02	DENOM =	.10000000+01
Y =	.5420+00	X1 =	.2000+00	CY =	.53065748+00	DIFF=	.11342525-01	PDIF=	.20927167-01	DENOM =	.10000000+01
Y =	.5430+00	X1 =	.3000+00	CY =	.52619835+00	DIFF=	.16801655-01	PDIF=	.30942274-01	DENOM =	.10000000+01
Y =	.5460+00	X1 =	.4000+00	CY =	.52845427+00	DIFF=	.17545732-01	PDIF=	.32135039-01	DENOM =	.10000000+01
Y =	.5490+00	X1 =	.5000+00	CY =	.53664082+00	DIFF=	.12359185-01	PDIF=	.22512176-01	DENOM =	.10000000+01
Y =	.5530+00	X1 =	.6000+00	CY =	.55003495+00	DIFF=	.29650515-02	PDIF=	.53617568-02	DENOM =	.10000000+01
Y =	.5565+00	X1 =	.7000+00	CY =	.56797133+00	DIFF=	-.11471331-01	PDIF=	-.20613353-01	DENOM =	.10000000+01
Y =	.5800+00	X1 =	.8000+00	CY =	.58983881+00	DIFF=	-.98388092-02	PDIF=	-.16963464-01	DENOM =	.10000000+01
Y =	.6200+00	X1 =	.1000+01	CY =	.64317343+00	DIFF=	-.23173431-01	PDIF=	-.37376502-01	DENOM =	.10000000+01
Y =	.7000+00	X1 =	.1200+01	CY =	.70611005+00	DIFF=	-.61100454-02	PDIF=	-.87286363-02	DENOM =	.10000000+01
Y =	.8200+00	X1 =	.1500+01	CY =	.81154974+00	DIFF=	.84502570-02	PDIF=	.10305191-01	DENOM =	.10000000+01
Y =	.1000+01	X1 =	.2000+01	CY =	.99698283+00	DIFF=	.30171657-02	PDIF=	.30171657-02	DENOM =	.10000000+01
Y =	.1170+01	X1 =	.2500+01	CY =	.11733573+01	DIFF=	-.33573410-02	PDIF=	-.28695222-02	DENOM =	.10000000+01
Y =	.1330+01	X1 =	.3000+01	CY =	.13273074+01	DIFF=	.26926479-02	PDIF=	.20245473-02	DENOM =	.10000000+01
Y =	.1380+01	X1 =	.3200+01	CY =	.13812800+01	DIFF=	-.12800359-02	PDIF=	-.92756222-03	DENOM =	.10000000+01
Y =	.1430+01	X1 =	.3400+01	CY =	.14307437+01	DIFF=	-.74365369-03	PDIF=	-.52003755-03	DENOM =	.10000000+01
Y =	.1480+01	X1 =	.3600+01	CY =	.14757407+01	DIFF=	.42593303-02	PDIF=	.28779259-02	DENOM =	.10000000+01
Y =	.1520+01	X1 =	.3800+01	CY =	.15163930+01	DIFF=	.36069605-02	PDIF=	.23730003-02	DENOM =	.10000000+01
Y =	.1560+01	X1 =	.4000+01	CY =	.15528832+01	DIFF=	.71168456-02	PDIF=	.45620805-02	DENOM =	.10000000+01

TABLE 1. (Continued)

Y	=	.1590+01	X1	=	.4200+01	CY	=	.15854376+01	DIFF=	.45624199-02	PDIF=	.28694465-02	DENOM =	.10000000+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16143133+01	DIFF=	.56867014-02	PDIF=	.35103095-02	DENOM =	.10000000+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16397862+01	DIFF=	.21381935-03	PDIF=	.13037765-03	DENOM =	.10000000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16621414+01	DIFF=	-.21414406-02	PDIF=	-.12900245-02	DENOM =	.10000000+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16986415+01	DIFF=	-.86414502-02	PDIF=	-.51132842-02	DENOM =	.10000000+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17133407+01	DIFF=	-.83407198-02	PDIF=	-.48919178-02	DENOM =	.10000000+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17260228+01	DIFF=	-.60227718-02	PDIF=	-.35016115-02	DENOM =	.10000000+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17462896+01	DIFF=	-.62895636-02	PDIF=	-.36146917-02	DENOM =	.10000000+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17642145+01	DIFF=	-.42144928-02	PDIF=	-.23945982-02	DENOM =	.10000000+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17763824+01	DIFF=	.36176485-02	PDIF=	.20323868-02	DENOM =	.10000000+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17847589+01	DIFF=	.52410505-02	PDIF=	.29279612-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17906827+01	DIFF=	.93173049-02	PDIF=	.51762805-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17949950+01	DIFF=	.50049529-02	PDIF=	.27805294-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17981778+01	DIFF=	.18222157-02	PDIF=	.10123421-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18004791+01	DIFF=	-.47909296-03	PDIF=	-.26616276-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1000+02	CY	=	.18020180+01	DIFF=	-.20180295-02	PDIF=	-.11211275-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18028627+01	DIFF=	-.28626856-02	PDIF=	-.15903809-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18030816+01	DIFF=	-.30816284-02	PDIF=	-.17120158-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18027711+01	DIFF=	-.27711189-02	PDIF=	-.15395105-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18020625+01	DIFF=	-.20624501-02	PDIF=	-.11458056-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18011147+01	DIFF=	-.11146885-02	PDIF=	-.61927138-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18000983+01	DIFF=	-.98323165-04	PDIF=	-.54623981-04	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17991750+01	DIFF=	.82499866-03	PDIF=	.45833259-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17984778+01	DIFF=	.15221964-02	PDIF=	.84566465-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17980955+01	DIFF=	.19044769-02	PDIF=	.10580427-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17980633+01	DIFF=	.19367184-02	PDIF=	.10759547-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17983606+01	DIFF=	.16393510-02	PDIF=	.91075057-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17989173+01	DIFF=	.10826819-02	PDIF=	.60148994-03	DENOM =	.10000000+01

TABLE 1. (Continued)

```
 Y  =  .1800+01  X1  =  .1650+02  CY  =  .17996254+01  DIFF=  .37459931-03  PDIF=  .20811073-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1700+02  CY  =  .18003566+01  DIFF= -.35661538-03  PDIF= -.19811966-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1750+02  CY  =  .18009821+01  DIFF= -.98207310-03  PDIF= -.54559617-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1800+02  CY  =  .18013921+01  DIFF= -.13920645-02  PDIF= -.77336915-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1850+02  CY  =  .18015132+01  DIFF= -.15132289-02  PDIF= -.84068271-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1900+02  CY  =  .18013207+01  DIFF= -.13207354-02  PDIF= -.73374188-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .1950+02  CY  =  .18008436+01  DIFF= -.84361457-03  PDIF= -.46867476-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2000+02  CY  =  .18001621+01  DIFF= -.16211821-03  PDIF= -.90065673-04  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2100+02  CY  =  .17986908+01  DIFF=  .13091507-02  PDIF=  .72730597-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2200+02  CY  =  .17979948+01  DIFF=  .20051837-02  PDIF=  .11139910-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2300+02  CY  =  .17987330+01  DIFF=  .12670103-02  PDIF=  .70389463-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2400+02  CY  =  .18005024+01  DIFF= -.50243319-03  PDIF= -.27912955-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .18018384+01  DIFF= -.18383716-02  PDIF= -.10213176-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .18012234+01  DIFF= -.12233996-02  PDIF= -.67966645-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .17988992+01  DIFF=  .11008265-02  PDIF=  .61157028-03  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17980523+01  DIFF=  .19476895-02  PDIF=  .10820497-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .18018506+01  DIFF= -.18505947-02  PDIF= -.10281081-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .17995696+01  DIFF=  .43035786-03  PDIF=  .23908770-03  DENOM =  .10000000+01

 DDD =   .29364585-02  RMS =   .66702170-02  YDY =   .16450954+03  ERR1 =   .17849777-04  ERROR =   .52004919-03

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

APPROXIMATING FUNCTION NUMBER 13 IS G(20)


CA( 1) =   .56370851420307l3+00

CA( 2) =  -.25448406064350 22+00
```

TABLE 1. (Continued)

```
CA( 3) =   .47921872495768l9+00
CA( 4) =  -.17518020036285b6+00
CA( 5) =   .3356414071960353-01
CA( 6) =  -.1341053281403196-07
CA( 7) =  -.3994787836009381-02
CA( 8) =   .3141038943558319-03
CA( 9) =  -.1664418419273776-04
CA(10) =   .5895579264487142-06
CA(11) =   .1775674685741838-09
CA(12) =  -.1043646960112629-11
CA(13) =   .6056340716911597-27
DDD    =   .1778797948956759-04      RMS  =   .5191481876603482-03      HM  =   .1645066109577256+03

 Y  =  .5400+00  X1 =  .0000    CY =  .56370851+00  DIFF= -.23708514-01  PDIF= -.43904656-01  DENOM =  .10000000+01
 Y  =  .5410+00  X1 =  .1000+00 CY =  .54288043+00  DIFF= -.18804320-02  PDIF= -.34758447-02  DENOM =  .10000000+01
 Y  =  .5420+00  X1 =  .2000+00 CY =  .53063145+00  DIFF=  .11368546-01  PDIF=  .20975178-01  DENOM =  .10000000+01
 Y  =  .5430+00  X1 =  .3000+00 CY =  .52602550+00  DIFF=  .16974497-01  PDIF=  .31260583-01  DENOM =  .10000000+01
 Y  =  .5460+00  X1 =  .4000+00 CY =  .52819795+00  DIFF=  .17802052-01  PDIF=  .32604491-01  DENOM =  .10000000+01
 Y  =  .5490+00  X1 =  .5000+00 CY =  .53635134+00  DIFF=  .12648658-01  PDIF=  .23039450-01  DENOM =  .10000000+01
 Y  =  .5530+00  X1 =  .6000+00 CY =  .54975137+00  DIFF=  .32486279-02  PDIF=  .58745531-02  DENOM =  .10000000+01
 Y  =  .5565+00  X1 =  .7000+00 CY =  .56772300+00  DIFF= -.11223001-01  PDIF= -.20167118-01  DENOM =  .10000000+01
 Y  =  .5800+00  X1 =  .8000+00 CY =  .58964679+00  DIFF= -.96467941-02  PDIF= -.16632404-01  DENOM =  .10000000+01
 Y  =  .6200+00  X1 =  .1000+01 CY =  .64313037+00  DIFF= -.23130367-01  PDIF= -.37307044-01  DENOM =  .10000000+01
 Y  =  .7000+00  X1 =  .1200+01 CY =  .70623025+00  DIFF= -.62302478-02  PDIF= -.89003541-02  DENOM =  .10000000+01
 Y  =  .8200+00  X1 =  .1500+01 CY =  .81188248+00  DIFF=  .81175171-02  PDIF=  .98994110-02  DENOM =  .10000000+01
 Y  =  .1000+01  X1 =  .2000+01 CY =  .99748316+00  DIFF=  .25168354-02  PDIF=  .25168354-02  DENOM =  .10000000+01
 Y  =  .1170+01  X1 =  .2500+01 CY =  .11737848+01  DIFF= -.37848328-02  PDIF= -.32348999-02  DENOM =  .10000000+01
```

TABLE 1. (Continued)

Y =	.1330+01	X1 =	.3000+01	CY =	.13275167+01	DIFF=	.24832603-02	PDIF=	.18671130-02	DENOM =	.10000000+01
Y =	.1380+01	X1 =	.3200+01	CY =	.13813889+01	DIFF=	-.13888723-02	PDIF=	-.10064292-02	DENOM =	.10000000+01
Y =	.1430+01	X1 =	.3400+01	CY =	.14307550+01	DIFF=	-.75495560-03	PDIF=	-.52794098-03	DENOM =	.10000000+01
Y =	.1480+01	X1 =	.3600+01	CY =	.14756632+01	DIFF=	.43368201-02	PDIF=	.29302839-02	DENOM =	.10000000+01
Y =	.1520+01	X1 =	.3800+01	CY =	.15162400+01	DIFF=	.37599742-02	PDIF=	.24736672-02	DENOM =	.10000000+01
Y =	.1560+01	X1 =	.4000+01	CY =	.15526712+01	DIFF=	.73288415-02	PDIF=	.46979753-02	DENOM =	.10000000+01
Y =	.1590+01	X1 =	.4200+01	CY =	.15851852+01	DIFF=	.48148146-02	PDIF=	.30281853-02	DENOM =	.10000000+01
Y =	.1620+01	X1 =	.4400+01	CY =	.16140400+01	DIFF=	.59600299-02	PDIF=	.36790308-02	DENOM =	.10000000+01
Y =	.1640+01	X1 =	.4600+01	CY =	.16395112+01	DIFF=	.48878415-03	PDIF=	.29803912-03	DENOM =	.10000000+01
Y =	.1660+01	X1 =	.4800+01	CY =	.16618831+01	DIFF=	-.18830584-02	PDIF=	-.11343725-02	DENOM =	.10000000+01
Y =	.1690+01	X1 =	.5200+01	CY =	.16984630+01	DIFF=	-.84629560-02	PDIF=	-.50076663-02	DENOM =	.10000000+01
Y =	.1705+01	X1 =	.5400+01	CY =	.17132202+01	DIFF=	-.82202428-02	PDIF=	-.48212568-02	DENOM =	.10000000+01
Y =	.1720+01	X1 =	.5600+01	CY =	.17259683+01	DIFF=	-.59682769-02	PDIF=	-.34699284-02	DENOM =	.10000000+01
Y =	.1740+01	X1 =	.6000+01	CY =	.17463779+01	DIFF=	-.63779262-02	PDIF=	-.36654748-02	DENOM =	.10000000+01
Y =	.1760+01	X1 =	.6500+01	CY =	.17644699+01	DIFF=	-.44699195-02	PDIF=	-.25397270-02	DENOM =	.10000000+01
Y =	.1780+01	X1 =	.7000+01	CY =	.17767548+01	DIFF=	.32451825-02	PDIF=	.18231362-02	DENOM =	.10000000+01
Y =	.1790+01	X1 =	.7500+01	CY =	.17851735+01	DIFF=	.48264668-02	PDIF=	.26963501-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.8000+01	CY =	.17910577+01	DIFF=	.89422789-02	PDIF=	.49679327-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.8500+01	CY =	.17952591+01	DIFF=	.47409085-02	PDIF=	.26338381-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.9000+01	CY =	.17982828+01	DIFF=	.17172200-02	PDIF=	.95401112-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.9500+01	CY =	.18004079+01	DIFF=	-.40789287-03	PDIF=	-.22660715-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1000+02	CY =	.18017859+01	DIFF=	-.17858909-02	PDIF=	-.99216159-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1050+02	CY =	.18025131+01	DIFF=	-.25131136-02	PDIF=	-.13961742-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1100+02	CY =	.18026778+01	DIFF=	-.26777735-02	PDIF=	-.14876519-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1150+02	CY =	.18023844+01	DIFF=	-.23844213-02	PDIF=	-.13246785-02	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1200+02	CY =	.18017605+01	DIFF=	-.17604517-02	PDIF=	-.97802870-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1250+02	CY =	.18009499+01	DIFF=	-.94989525-03	PDIF=	-.52771959-03	DENOM =	.10000000+01
Y =	.1800+01	X1 =	.1300+02	CY =	.18000997+01	DIFF=	-.99738773-04	PDIF=	-.55410430-04	DENOM =	.10000000+01

TABLE 1. (Continued)

```
Y = .1800+01  X1 = .1350+02  CY = .17993435+01  DIFF= .65649151-03  PDIF= .36471751-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1400+02  CY = .17987860+01  DIFF= .12139941-02  PDIF= .67444119-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1450+02  CY = .17984920+01  DIFF= .15079592-02  PDIF= .83775510-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1500+02  CY = .17984809+01  DIFF= .15191105-02  PDIF= .84395028-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1550+02  CY = .17987271+01  DIFF= .12728876-02  PDIF= .70715980-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1600+02  CY = .17991674+01  DIFF= .83261215-03  PDIF= .46256230-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1650+02  CY = .17997122+01  DIFF= .28778893-03  PDIF= .15988274-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1700+02  CY = .18002607+01  DIFF= -.26072071-03  PDIF= -.14484484-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1750+02  CY = .18007166+01  DIFF= -.71657791-03  PDIF= -.39809884-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1800+02  CY = .18010027+01  DIFF= -.10027370-02  PDIF= -.55707612-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1850+02  CY = .18010731+01  DIFF= -.10731128-02  PDIF= -.59617376-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1900+02  CY = .18009195+01  DIFF= -.91953763-03  PDIF= -.51085424-03  DENOM = .10000000+01
Y = .1800+01  X1 = .1950+02  CY = .18005730+01  DIFF= -.57297883-03  PDIF= -.31832157-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2000+02  CY = .18000987+01  DIFF= -.98695061-04  PDIF= -.54830590-04  DENOM = .10000000+01
Y = .1800+01  X1 = .2100+02  CY = .17991325+01  DIFF= .86754852-03  PDIF= .48197140-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2200+02  CY = .17987394+01  DIFF= .12606401-02  PDIF= .70035563-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2300+02  CY = .17992576+01  DIFF= .74240522-03  PDIF= .41244735-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2400+02  CY = .18003225+01  DIFF= -.32251586-03  PDIF= -.17917548-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2500+02  CY = .18010221+01  DIFF= -.10221049-02  PDIF= -.56783606-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2600+02  CY = .18006086+01  DIFF= -.60856613-03  PDIF= -.33809229-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2700+02  CY = .17994211+01  DIFF= .57890200-03  PDIF= .32161222-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2800+02  CY = .17991166+01  DIFF= .88344706-03  PDIF= .49080392-03  DENOM = .10000000+01
Y = .1800+01  X1 = .2900+02  CY = .18008206+01  DIFF= -.82062358-03  PDIF= -.45590199-03  DENOM = .10000000+01
Y = .1800+01  X1 = .3000+02  CY = .17998174+01  DIFF= .18264356-03  PDIF= .10146865-03  DENOM = .10000000+01

DDD = .29279401-02  RMS = .66605352-02  YDY = .16450954+03  ERR1 = .17797996-04  ERROR = .51929434-03
```

TABLE 1. (Continued)

```
APPROXIMATING FUNCTION NUMBER 14 IS G(13)


CA( 1) =   .5600267429782804+00
CA( 2) =  -.2237848299121126+00
CA( 3) =   .4252589152347439+00
CA( 4) =  -.1377087731843651+00
CA( 5) =   .2001476937336607-01
CA( 6) =   .7573715012481185-07
CA( 7) =  -.1084585249277293-02
CA( 8) =  -.8450989334774716-04
CA( 9) =   .1950684247421471-04
CA(10) =  -.1611344596101396-05
CA(11) =  -.2132620107556841-08
CA(12) =   .3373027244484526-10
CA(13) =   .1526541650203731-25
CA(14) =  -.2323108058159091-12
DDD    =   .1641988581393104-04      RMS   =   .4987846716729824-03      MM  =   .1645068360221831+03


 Y  =  .5400+00  X1  =  .0000     CY  =  .56002674+00  DIFF= -.20026743-01  PDIF= -.37086561-01  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .54176513+00  DIFF= -.76513091-03  PDIF= -.14142900-02  DENOM =  .10000000+01
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .53121013+00  DIFF=  .10789865-01  PDIF=  .19907500-01  DENOM =  .10000000+01
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .52760589+00  DIFF=  .15394114-01  PDIF=  .28350118-01  DENOM =  .10000000+01
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .53024183+00  DIFF=  .15758167-01  PDIF=  .28861112-01  DENOM =  .10000000+01
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .53845132+00  DIFF=  .10548684-01  PDIF=  .19214361-01  DENOM =  .10000000+01
 Y  =  .5530+00  X1  =  .6000+00  CY  =  .55161011+00  DIFF=  .13898869-02  PDIF=  .25133578-02  DENOM =  .10000000+01
```

TABLE 1. (Continued)

Y	=	.8565+00	X1	=	.7000+00	CY	=	.56913496+00	DIFF=	-.12634955-01	PDIF=	-.22704322-01	DENOM	=	.10000000+01				
Y	=	.5800+00	X1	=	.8000+00	CY	=	.59048202+00	DIFF=	-.10482022-01	PDIF=	-.18072452-01	DENOM	=	.10000000+01				
Y	=	.6200+00	X1	=	.1000+01	CY	=	.64265570+00	DIFF=	-.22655698-01	PDIF=	-.36541449-01	DENOM	=	.10000000+01				
Y	=	.7000+00	X1	=	.1200+01	CY	=	.70451186+00	DIFF=	-.45118563-02	PDIF=	-.64455089-02	DENOM	=	.10000000+01				
Y	=	.8200+00	X1	=	.1500+01	CY	=	.80883582+00	DIFF=	.11164185-01	PDIF=	.13614859-01	DENOM	=	.10000000+01				
Y	=	.1000+01	X1	=	.2000+01	CY	=	.99406454+00	DIFF=	.59354592-02	PDIF=	.59354592-02	DENOM	=	.10000000+01				
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11717281+01	DIFF=	-.17280911-02	PDIF=	-.14770009-02	DENOM	=	.10000000+01				
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13273601+01	DIFF=	.26399046-02	PDIF=	.19848907-02	DENOM	=	.10000000+01				
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13819026+01	DIFF=	-.19025700-02	PDIF=	-.13786739-02	DENOM	=	.10000000+01				
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14318169+01	DIFF=	-.18168589-02	PDIF=	-.12705307-02	DENOM	=	.10000000+01				
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14771236+01	DIFF=	.28764301-02	PDIF=	.19435339-02	DENOM	=	.10000000+01				
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15179353+01	DIFF=	.20647003-02	PDIF=	.13583554-02	DENOM	=	.10000000+01				
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15544362+01	DIFF=	.55638452-02	PDIF=	.35665674-02	DENOM	=	.10000000+01				
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15868637+01	DIFF=	.31362960-02	PDIF=	.19725132-02	DENOM	=	.10000000+01				
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16154932+01	DIFF=	.45067540-02	PDIF=	.27819469-02	DENOM	=	.10000000+01				
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16406243+01	DIFF=	-.62425774-03	PDIF=	-.38064496-03	DENOM	=	.10000000+01				
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16625689+01	DIFF=	-.25688820-02	PDIF=	-.15475193-02	DENOM	=	.10000000+01				
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16981549+01	DIFF=	-.81548713-02	PDIF=	-.48253676-02	DENOM	=	.10000000+01				
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17124058+01	DIFF=	-.74057801-02	PDIF=	-.43435661-02	DENOM	=	.10000000+01				
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17246782+01	DIFF=	-.46782101-02	PDIF=	-.27198896-02	DENOM	=	.10000000+01				
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17443198+01	DIFF=	-.43197649-02	PDIF=	-.24826235-02	DENOM	=	.10000000+01				
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17619536+01	DIFF=	-.19536401-02	PDIF=	-.11100228-02	DENOM	=	.10000000+01				
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17744208+01	DIFF=	.55791661-02	PDIF=	.31343630-02	DENOM	=	.10000000+01				
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17835847+01	DIFF=	.64153335-02	PDIF=	.35839852-02	DENOM	=	.10000000+01				
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17905700+01	DIFF=	.94300292-02	PDIF=	.52389051-02	DENOM	=	.10000000+01				
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17959574+01	DIFF=	.40425565-02	PDIF=	.22458647-02	DENOM	=	.10000000+01				
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17999841+01	DIFF=	.15931173-04	PDIF=	.88506519-05	DENOM	=	.10000000+01				
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18027198+01	DIFF=	-.27198215-02	PDIF=	-.15110120-02	DENOM	=	.10000000+01				

TABLE 1. (Continued)

Y	=	.1800+01	X1	=	.1000+02	CY	=	.18042030+01	DIFF=	-.42030137-02	PDIF=	-.23350076-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18045270+01	DIFF=	-.45270273-02	PDIF=	-.25150152-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18038794+01	DIFF=	-.38794406-02	PDIF=	-.21552448-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18025406+01	DIFF=	-.25405892-02	PDIF=	-.14114385-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18008524+01	DIFF=	-.85241401-03	PDIF=	-.47356334-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.17991702+01	DIFF=	.82979975-03	PDIF=	.46099986-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.17978097+01	DIFF=	.21902516-02	PDIF=	.12168064-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17970010+01	DIFF=	.29990195-02	PDIF=	.16661220-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17968564+01	DIFF=	.31436467-02	PDIF=	.17464704-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17973591+01	DIFF=	.26408587-02	PDIF=	.14671437-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17983731+01	DIFF=	.16269278-02	PDIF=	.90384877-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17996714+01	DIFF=	.32863912-03	PDIF=	.18257729-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.18009802+01	DIFF=	-.98022955-03	PDIF=	-.54457197-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1650+02	CY	=	.18020298+01	DIFF=	-.20298395-02	PDIF=	-.11276886-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1700+02	CY	=	.18026044+01	DIFF=	-.26043959-02	PDIF=	-.14468866-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1750+02	CY	=	.18025832+01	DIFF=	-.25831616-02	PDIF=	-.14350898-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1800+02	CY	=	.18019652+01	DIFF=	-.19652426-02	PDIF=	-.10918014-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1850+02	CY	=	.18008732+01	DIFF=	-.87320665-03	PDIF=	-.48511481-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1900+02	CY	=	.17995337+01	DIFF=	.46633590-03	PDIF=	.25907550-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.1950+02	CY	=	.17982366+01	DIFF=	.17634389-02	PDIF=	.97968828-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2000+02	CY	=	.17972787+01	DIFF=	.27212909-02	PDIF=	.15118283-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2100+02	CY	=	.17972273+01	DIFF=	.27727182-02	PDIF=	.15403990-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2200+02	CY	=	.17997028+01	DIFF=	.29715915-03	PDIF=	.16508842-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2300+02	CY	=	.18026221+01	DIFF=	-.26220856-02	PDIF=	-.14567142-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2400+02	CY	=	.18029145+01	DIFF=	-.29145463-02	PDIF=	-.16191924-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2500+02	CY	=	.17996972+01	DIFF=	.30279902-03	PDIF=	.16822168-03	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2600+02	CY	=	.17965838+01	DIFF=	.34162440-02	PDIF=	.18979133-02	DENOM =	.10000000+01
Y	=	.1800+01	X1	=	.2700+02	CY	=	.17989102+01	DIFF=	.10898209-02	PDIF=	.60545605-03	DENOM =	.10000000+01

TABLE 1. (Continued)

```
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .18042118+01  DIFF= -.42118042-02  PDIF= -.23398912-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17977068+01  DIFF=  .22932027-02  PDIF=  .12740015-02  DENOM =  .10000000+01
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18003973+01  DIFF= -.39731010-03  PDIF= -.22072783-03  DENOM =  .10000000+01

 DDD =   .27153961-02  RMS =   .64142314-02  YDY =   .16450954+03  ERR1 =   .16506010-04  ERROR =   .50009105-03

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

APPROXIMATING FUNCTION NUMBER IS IS G(19)

CA( 1) =  -.231557711328605+01
CA( 2) =   .262031493335767+02
CA( 3) =  -.505176437912032+02
CA( 4) =   .389331547240777+02
CA( 5) =  -.156680036414134+02
CA( 6) =   .191823094909465-03
CA( 7) =   .376089283954835+01
CA( 8) =  -.578751712801751+00
CA( 9) =   .593486170328503-01
CA(10) =  -.411709782304641+02
CA(11) =  -.578575017789777-05
CA(12) =   .102907625243493-06
CA(13) =  -.387642496483429-21
CA(14) =  -.828738914522472-09
CA(15) =   .211803323027703-19
DDD    =   .147654758710080-02      RMS =   .472989779359883-02      HM =   .164752443410281+03
```

TABLE 1. (Continued)

Y	=	.5400+00	X1	=	.0000	CY	=	-.23155771+01	DIFF=	.28555771+01	PDIF=	.52881058+01	DENOM	=	.10000000+01
Y	=	.5410+00	X1	=	.1000+00	CY	=	-.16303523+00	DIFF=	.70403523+00	PDIF=	.13013590+01	DENOM	=	.10000000+01
Y	=	.5420+00	X1	=	.2000+00	CY	=	.11919106+01	DIFF=	-.64991063+00	PDIF=	-.11990971+01	DENOM	=	.10000000+01
Y	=	.5430+00	X1	=	.3000+00	CY	=	.19317939+01	DIFF=	-.13887939+01	PDIF=	-.25576314+01	DENOM	=	.10000000+01
Y	=	.5460+00	X1	=	.4000+00	CY	=	.22097162+01	DIFF=	-.16637162+01	PDIF=	-.30470992+01	DENOM	=	.10000000+01
Y	=	.5490+00	X1	=	.5000+00	CY	=	.21529136+01	DIFF=	-.16039136+01	PDIF=	-.29215183+01	DENOM	=	.10000000+01
Y	=	.5530+00	X1	=	.6000+00	CY	=	.18659878+01	DIFF=	-.13129878+01	PDIF=	-.23742998+01	DENOM	=	.10000000+01
Y	=	.5565+00	X1	=	.7000+00	CY	=	.14338279+01	DIFF=	-.87732791+00	PDIF=	-.15765102+01	DENOM	=	.10000000+01
Y	=	.5800+00	X1	=	.8000+00	CY	=	.92424504+00	DIFF=	-.34424504+00	PDIF=	-.59352593+00	DENOM	=	.10000000+01
Y	=	.6200+00	X1	=	.1000+01	CY	=	-.12736170+00	DIFF=	.74736170+00	PDIF=	.12054221+01	DENOM	=	.10000000+01
Y	=	.7000+00	X1	=	.1200+01	CY	=	-.10038157+01	DIFF=	.17038157+01	PDIF=	.24340224+01	DENOM	=	.10000000+01
Y	=	.8200+00	X1	=	.1500+01	CY	=	-.17129271+01	DIFF=	.25329271+01	PDIF=	.30889355+01	DENOM	=	.10000000+01
Y	=	.1000+01	X1	=	.2000+01	CY	=	-.12590707+01	DIFF=	.22590707+01	PDIF=	.22590707+01	DENOM	=	.10000000+01
Y	=	.1170+01	X1	=	.2500+01	CY	=	.35436168+00	DIFF=	.81563832+00	PDIF=	.69712677+00	DENOM	=	.10000000+01
Y	=	.1330+01	X1	=	.3000+01	CY	=	.19438679+01	DIFF=	-.61386794+00	PDIF=	-.46155484+00	DENOM	=	.10000000+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.23886990+01	DIFF=	-.10086990+01	PDIF=	-.73094129+00	DENOM	=	.10000000+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.26862697+01	DIFF=	-.12562697+01	PDIF=	-.87851030+00	DENOM	=	.10000000+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.28313085+01	DIFF=	-.13513085+01	PDIF=	-.91304628+00	DENOM	=	.10000000+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.28306532+01	DIFF=	-.13106532+01	PDIF=	-.86227186+00	DENOM	=	.10000000+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.27007568+01	DIFF=	-.11407568+01	PDIF=	-.73125439+00	DENOM	=	.10000000+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.24650679+01	DIFF=	-.87506786+00	PDIF=	-.55035715+00	DENOM	=	.10000000+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.21514668+01	DIFF=	-.53146683+00	PDIF=	-.32806594+00	DENOM	=	.10000000+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.17898905+01	DIFF=	-.14989053+00	PDIF=	-.91396665-01	DENOM	=	.10000000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.14102348+01	DIFF=	.24976522+00	PDIF=	.15046098+00	DENOM	=	.10000000+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.70585458+00	DIFF=	.98414542+00	PDIF=	.58233457+00	DENOM	=	.10000000+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.42668342+00	DIFF=	.12783166+01	PDIF=	.74974579+00	DENOM	=	.10000000+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.21884140+00	DIFF=	.15011586+01	PDIF=	.87276663+00	DENOM	=	.10000000+01

TABLE 1. (Continued)

Y	=	.1740+01	X1	=	.6000+01	CY	=	.53980828-01	DIFF=	.16860192+01	PDIF=	.96897654+00	DENOM	=	.10000000+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.32802029+00	DIFF=	.14319797+01	PDIF=	.81362483+00	DENOM	=	.10000000+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.10251939+01	DIFF=	.75480612+00	PDIF=	.42404838+00	DENOM	=	.10000000+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.19240284+01	DIFF=	-.13402840+00	PDIF=	-.74876204-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.27693398+01	DIFF=	-.96933977+00	PDIF=	-.53852210+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.33431359+01	DIFF=	-.15431359+01	PDIF=	-.85729770+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.35143372+01	DIFF=	-.17143372+01	PDIF=	-.95240956+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.32606840+01	DIFF=	-.14606840+01	PDIF=	-.81149110+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1000+02	CY	=	.26630682+01	DIFF=	-.86306821+00	PDIF=	-.47948234+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18777754+01	DIFF=	-.77775394-01	PDIF=	-.43208552-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.10953533+01	DIFF=	.70464671+00	PDIF=	.39147039+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1150+02	CY	=	.49600601+00	DIFF=	.13039940+01	PDIF=	.72444111+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1200+02	CY	=	.21075392+00	DIFF=	.15892461+01	PDIF=	.88291449+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1250+02	CY	=	.29550573+00	DIFF=	.15044943+01	PDIF=	.83583015+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1300+02	CY	=	.72216420+00	DIFF=	.10778358+01	PDIF=	.59879767+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1350+02	CY	=	.13874818+01	DIFF=	.41251820+00	PDIF=	.22917678+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1400+02	CY	=	.21371277+01	DIFF=	-.33712766+00	PDIF=	-.18729314+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1450+02	CY	=	.27997857+01	DIFF=	-.99978566+00	PDIF=	-.55543648+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1500+02	CY	=	.32244293+01	DIFF=	-.14244293+01	PDIF=	-.79134963+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1550+02	CY	=	.33134256+01	DIFF=	-.15134256+01	PDIF=	-.84079198+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1600+02	CY	=	.30448640+01	DIFF=	-.12448640+01	PDIF=	-.69159109+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1650+02	CY	=	.24793868+01	DIFF=	-.67938678+00	PDIF=	-.37743710+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1700+02	CY	=	.17495467+01	DIFF=	.50453254-01	PDIF=	.28029586-01	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1750+02	CY	=	.10329590+01	DIFF=	.76704097+00	PDIF=	.42613387+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1800+02	CY	=	.51375337+00	DIFF=	.12862466+01	PDIF=	.71458146+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1850+02	CY	=	.33954527+00	DIFF=	.14604547+01	PDIF=	.81136374+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1900+02	CY	=	.58281473+00	DIFF=	.12171853+01	PDIF=	.67621404+00	DENOM	=	.10000000+01
Y	=	.1800+01	X1	=	.1950+02	CY	=	.12157752+01	DIFF=	.58422482+00	PDIF=	.32456935+00	DENOM	=	.10000000+01

TABLE 1. (Concluded)

```
Y  =  .1800+01  X1  =  .2000+02  CY  =  .21062579+01  DIFF= -.30625787+00  PDIF= -.17014326+00  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2100+02  CY  =  .37600420+01  DIFF= -.19600420+01  PDIF= -.10889122+01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2200+02  CY  =  .37515537+01  DIFF= -.19515537+01  PDIF= -.10841965+01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2300+02  CY  =  .16940555+01  DIFF=  .10594445+00  PDIF=  .58858030-01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2400+02  CY  = -.36524023+00  DIFF=  .21652402+01  PDIF=  .12029112+01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2500+02  CY  =  .39259760+00  DIFF=  .14074024+01  PDIF=  .78189022+00  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2600+02  CY  =  .35376649+01  DIFF= -.17376649+01  PDIF= -.96536940+00  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2700+02  CY  =  .37612367+01  DIFF= -.19612367+01  PDIF= -.10895759+01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2800+02  CY  = -.10499524+01  DIFF=  .28499524+01  PDIF=  .15833069+01  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .2900+02  CY  = -.30148579+01  DIFF= -.12148579+01  PDIF= -.67492104+00  DENOM =  .10000000+01
Y  =  .1800+01  X1  =  .3000+02  CY  =  .16196207+01  DIFF=  .18037933+00  PDIF=  .10021074+00  DENOM =  .10000000+01

DDD =  .11591588+03  RMS =  .13252551+01  YDY =  .16450954+03  ERR1 =  .70461495+00  ERROR =  .10332465+00

 PROGRAM CONTINGENCY AT  013546
 MAXIMUM TIME
 ERROR  EXIT.  EXECUTION TIME:        139347 MILLISECONDS.
  ERRS 023773 00

     A                  000000 052037  000000 052163  000000 052147  000000 001761  000000 114650  000000 045560  000000 114650
          000000 735530  000000 114572  000000 123133  000144 030060  177750 573642  546213 601316  600030 165377  541175 721573
     A    177750 573642  546213 601316  600030 165377  541175 721573  203647 650057  243325 077727  000000 000000  500366 070474
          200052 344437  015335 263625  177365 473517  471306 604624  177777 722277  116513 102100  177573 676262  400052 576745
          000000 000071  000000 000000
     R                  177243 264125  424561 275567  000144 043741  777777 777776  606060 606060  000000 000000  000000 000000
          000000 000000  000000 225441  000000 000061  000000 000061  000000 000000  000000 000304  000000 000305  000000 000001
 RUNSTREAM ANALYSIS TERMINATED


     RUNID:  BARPLT   ACCOUNT: 310820          PROJECT: AVARITBIN412

       5337   - MAX TIME

     TIME: 00:03:00.415    IN: 2109   OUT: 0        PAGES:   102

     INITIATION  TIME:   13:09:39-NOV 26,1971

     TERMINATION TIME:   13:15:19-NOV 26,1971
```

AFN(1) is $G(1) \equiv 1$

AFN(2) is $G(2) \equiv x$

AFN(3) is $G(3) \equiv x^2$

AFN(4) is $G(4) \equiv x^3$

AFN(5) is $G(5) \equiv x^4$

AFN(6) is $G(10) \equiv x^9$

Thus, a six-term polynomial approximation (Table 1 and Figure 1) would have the form

$$y \equiv F(x) = \sum_{J=1}^{6} CA(J) \cdot AFN(J)$$

or

$$y = CA(1) = CA(2)\,x + CA(3)\,x^2 + CA(4)\,x^3 + CA(5)\,x^4 + CA(6)\,x^9 \quad ,$$

where the coefficients obtained from Table 1 are given below.

CA(1) = 0.3633551733860099 + 00

CA(2) = 0.4452805637032931 + 00

CA(3) = 0.4826696357426569 - 01

CA(4) = 0.2213696405455174 - 02

CA(5) = 0.3696033107572816 - 04

CA(6) = 0.8652009407108565 - 13

If desired, the reader may determine approximations through 15-terms from Table 1 by following a procedure similar to the one just described for a 6-term approximation. Indications of the quality of an approximation are the graphs (Figures 1 through 20), and the error-term, as given on the printout, Table 1, for each of the 15 different polynomial approximating functions. The graphs of all the polynomial approximating functions follow and are identified as Figures 1 through 10. Figure 1 is a plot of the actual variation of η with respect to Mach, which is shown as a solid line, and the 6-term approximation, which is plotted with asterisks. Figures 2 through 10 are similar plots for the 7- through 15-term approximation.

As may be seen from Figures 7, 8, and 9, the 12, 13, and 14-term polynomial approximations appear to be better approximations than the 6-term polynomial approximation. Hence, from Table 1, it may be seen that the error does decrease as the number of terms in the approximations increases to 14, at which time the smallest value of the error is reached (0.5×10^{-3}). Thus, of all the polynomial approximations considered in this example, the 14-term approximation would be considered the most accurate. From Figure 10, it can be seen that the graph of the 15-term approximation consists of many "spikes." Also, from Table 1 (15-term approximation; AFN = 15), note that the value of the error is approximately 0.1033. This is an increase compared to the 14-term approximation error and is due to a numerical precision problem. To overcome this, there has been developed a version of this program in which calculations are performed to 40 places [5].

Now, consider case 2, the rational function approximations to the same data considered in case 1. For this case, there are twenty functions designated for use in the numerator of the approximation and nineteen designated for use in the denominator. All of these functions are listed together below.

$$G(1) = 1$$

$$G(2) = x$$

$$G(3) = x^2$$

$$G(4) = x^3$$

$$\vdots$$

$$G(20) = x^{19}$$

$$G(21) = -xy$$

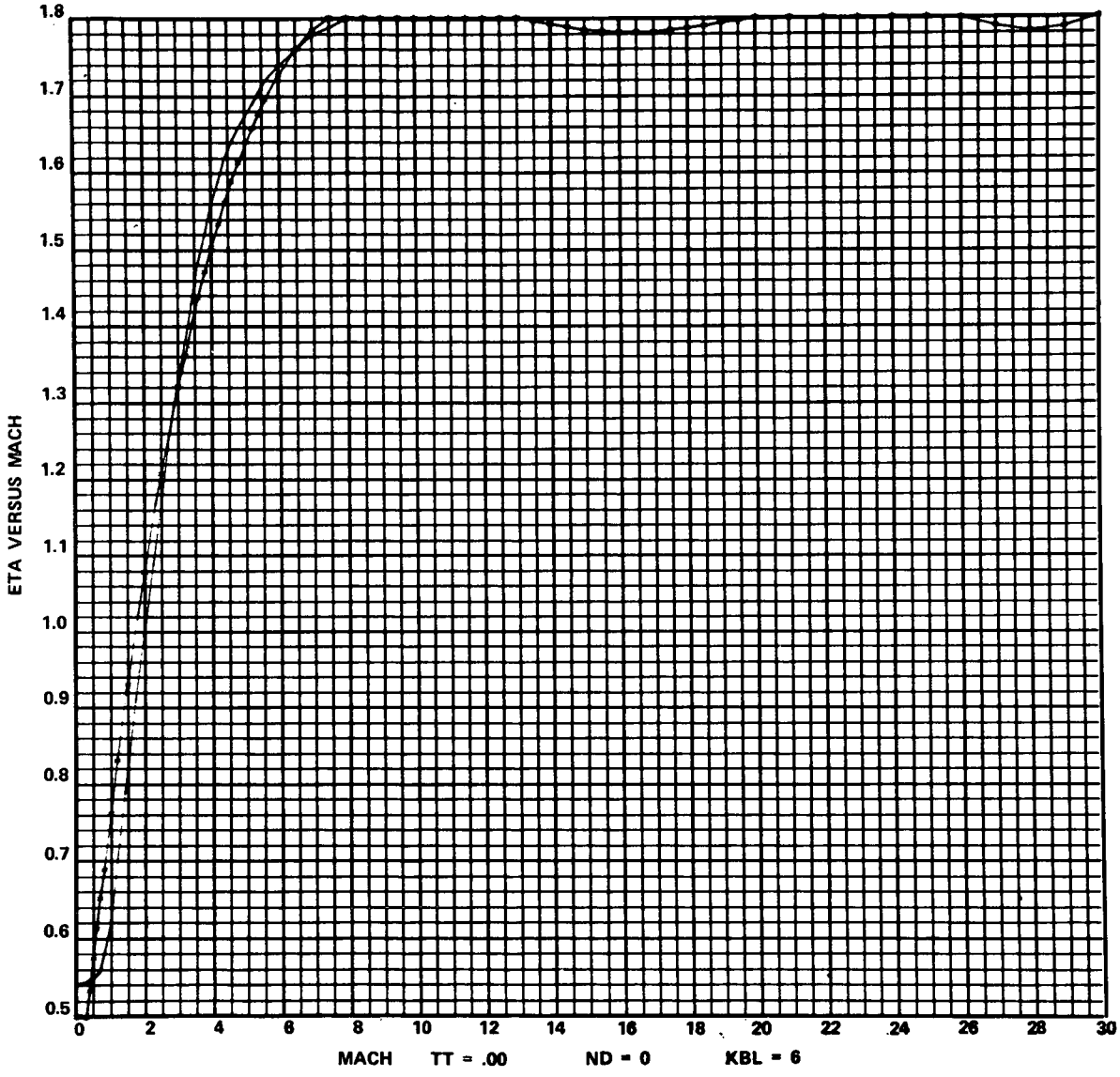

Figure 1. The six-term polynomial approximation.

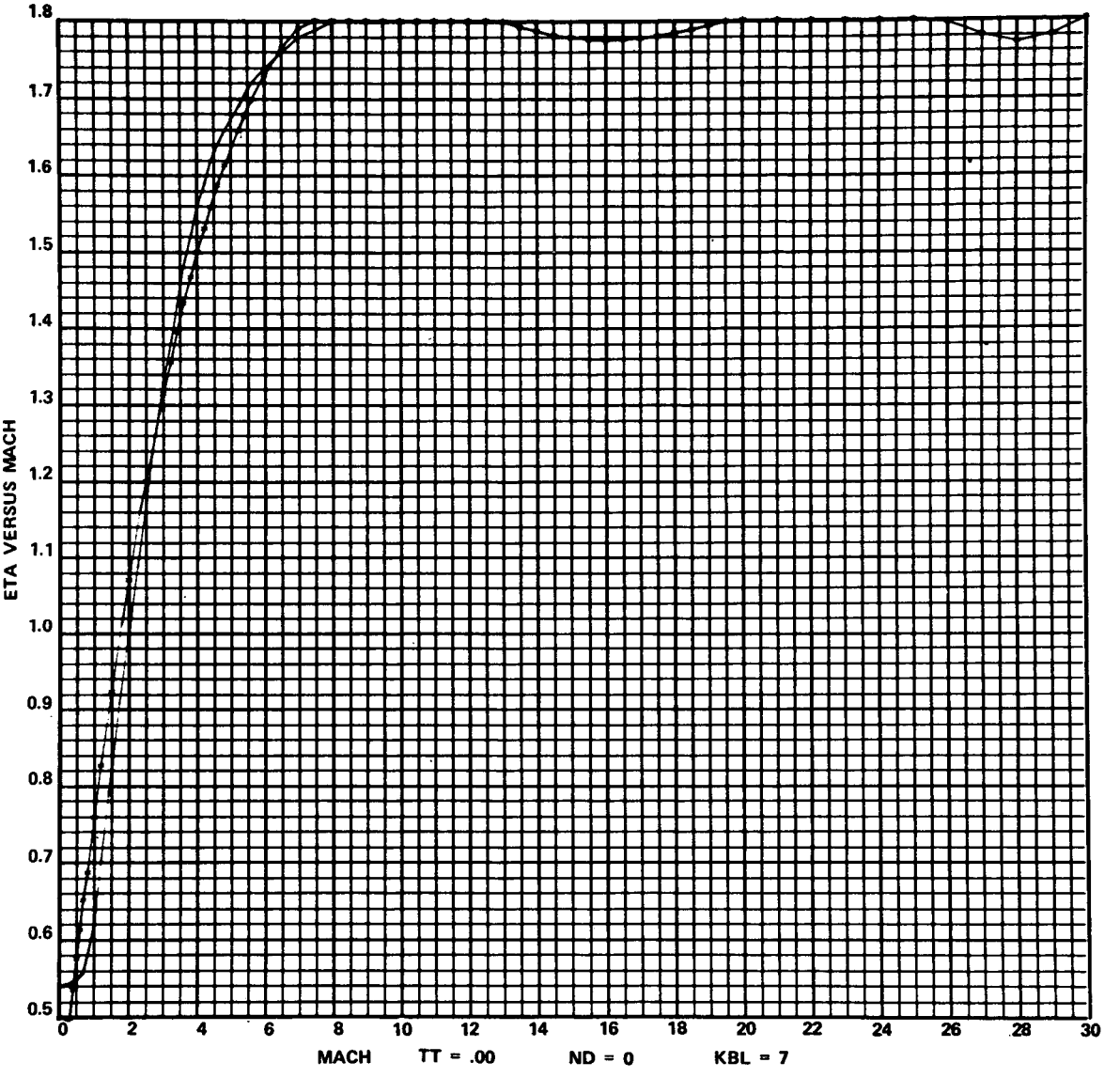

Figure 2. The seven-term polynomial approximation.

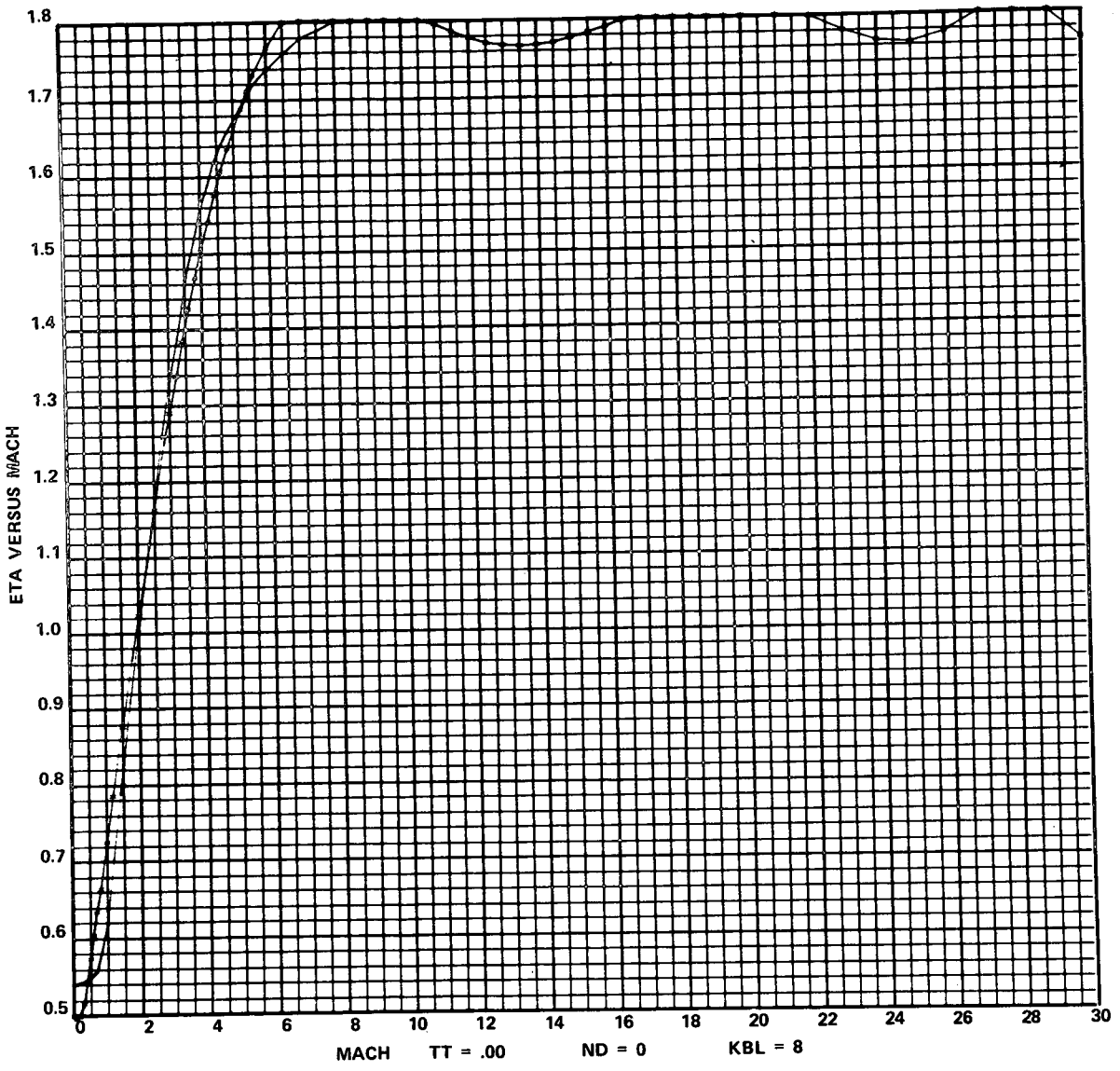

Figure 3. The eight-term polynomial approximation.

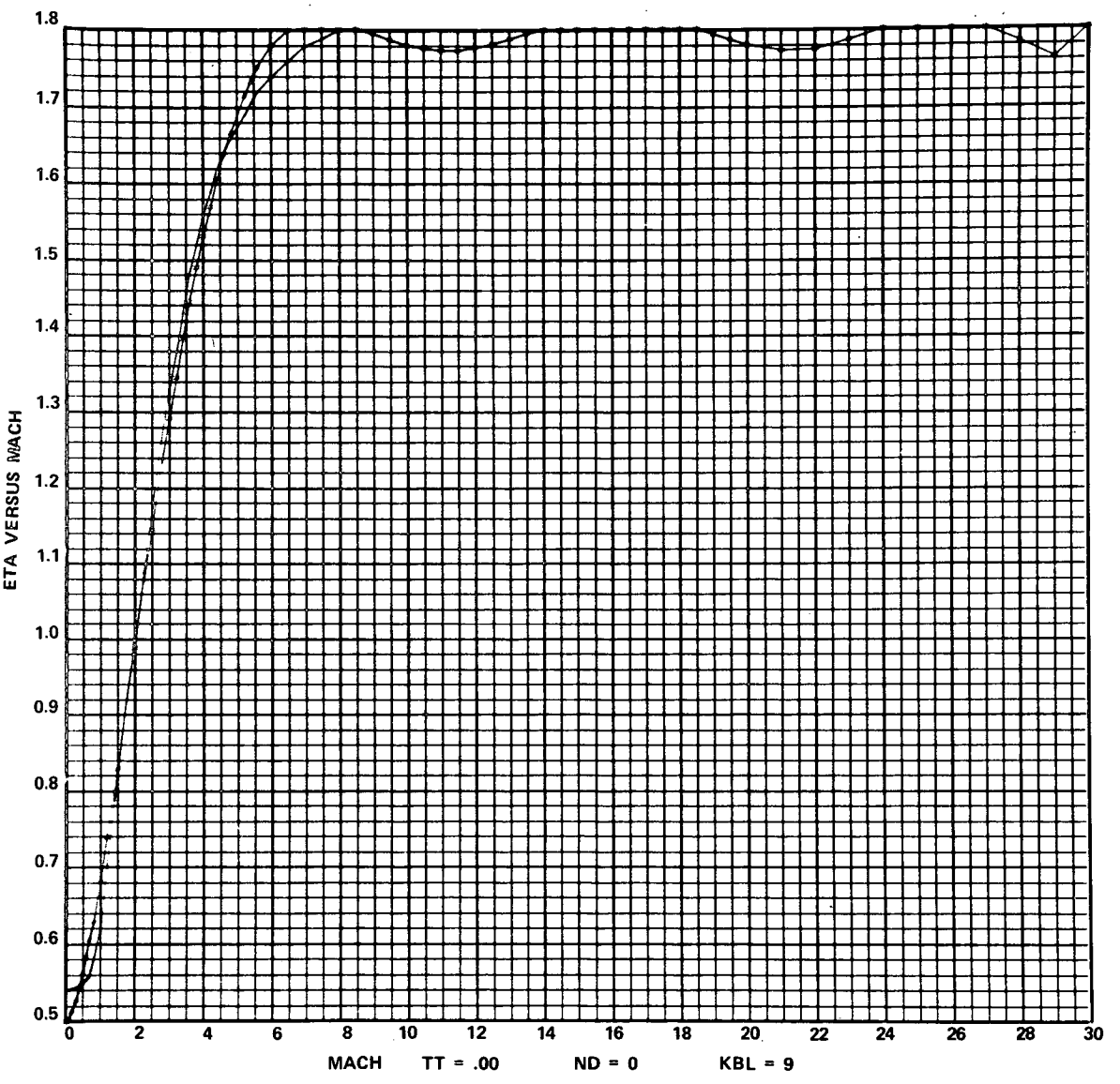

Figure 4. The nine-term polynomial approximation.

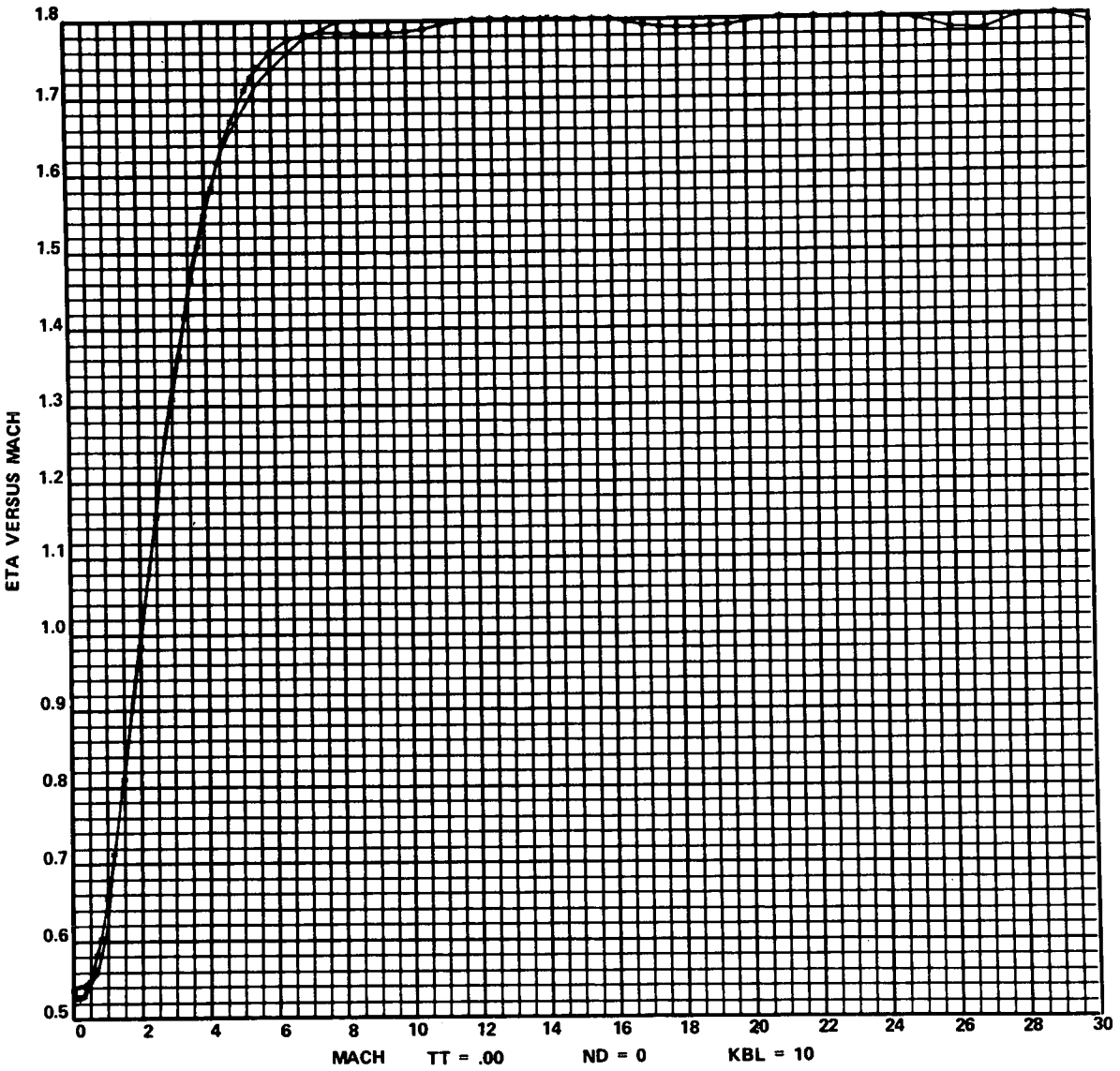

Figure 5. The 10-term polynomial approximation.

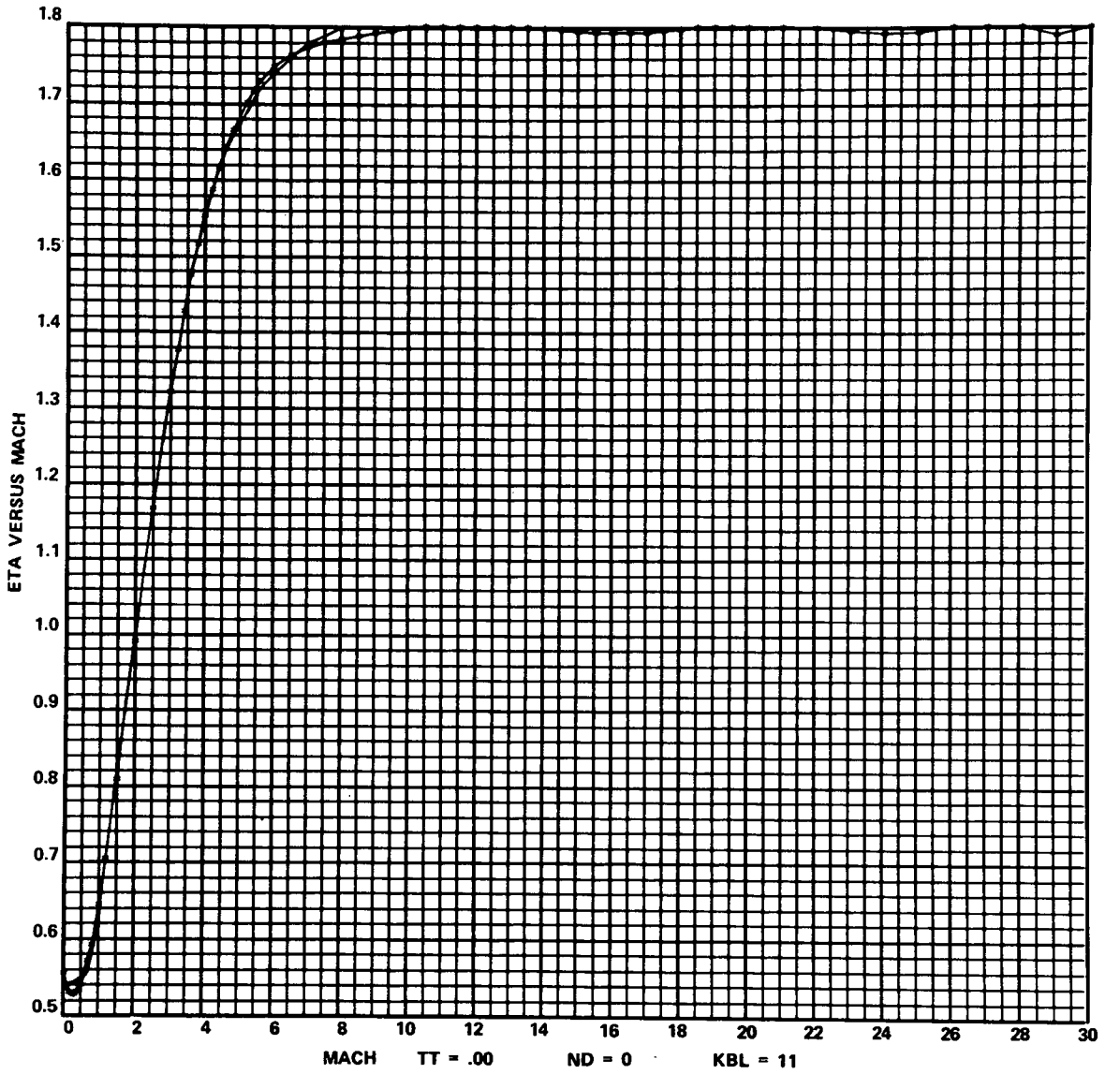

Figure 6. The 11-term polynomial approximation.

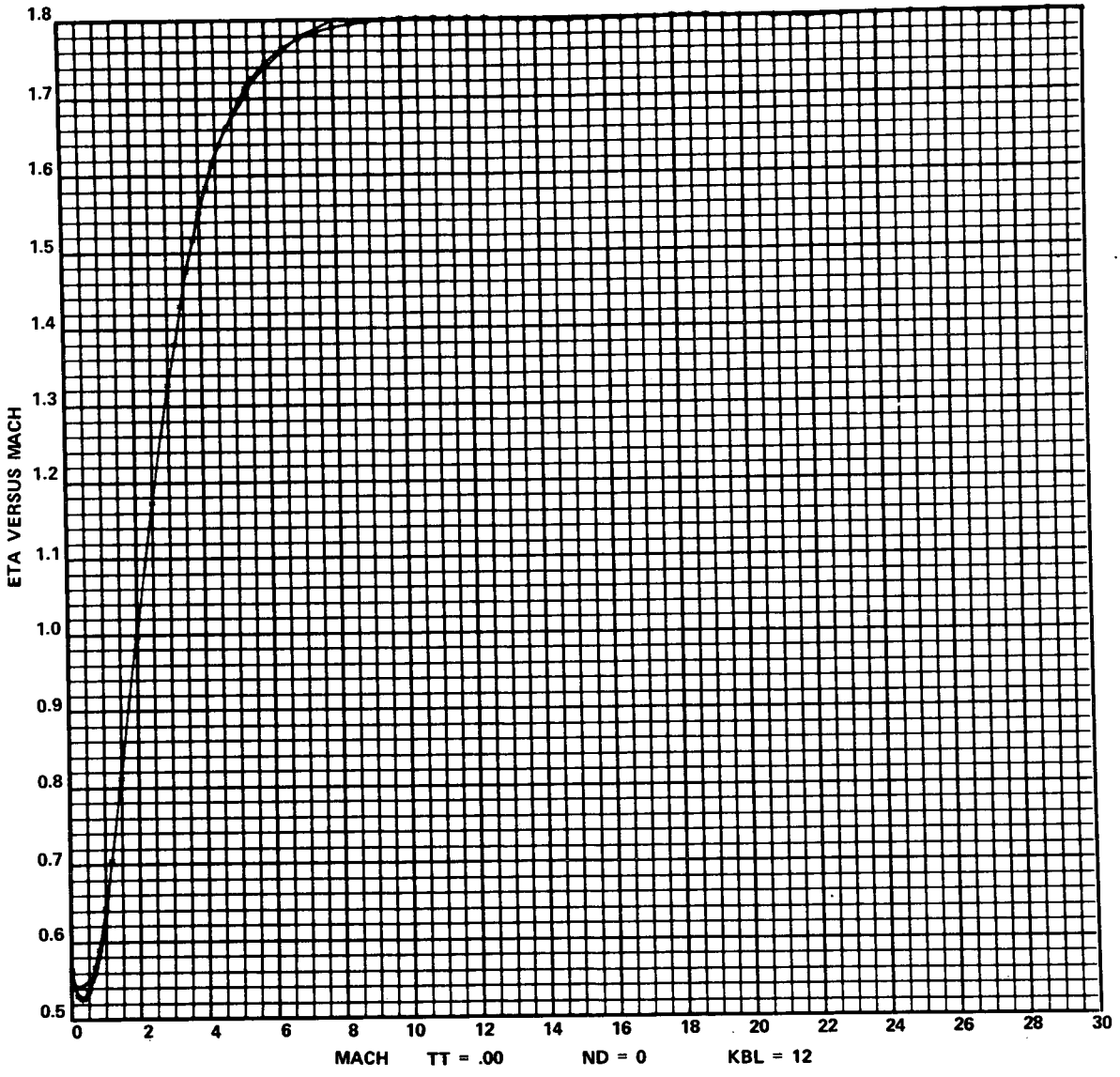

Figure 7. The 12-term polynomial approximation.

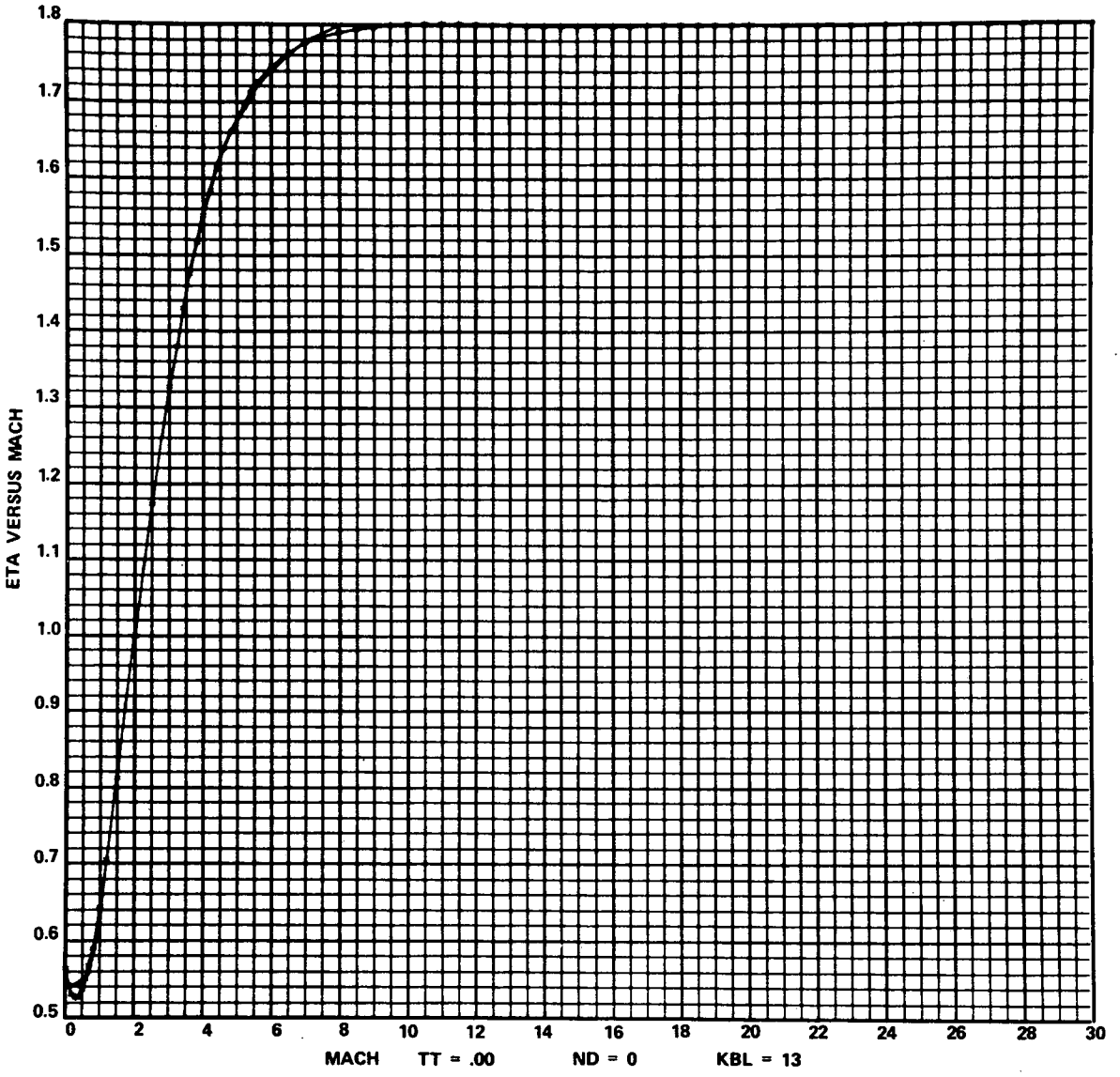

Figure 8. The 13-term polynomial approximation.

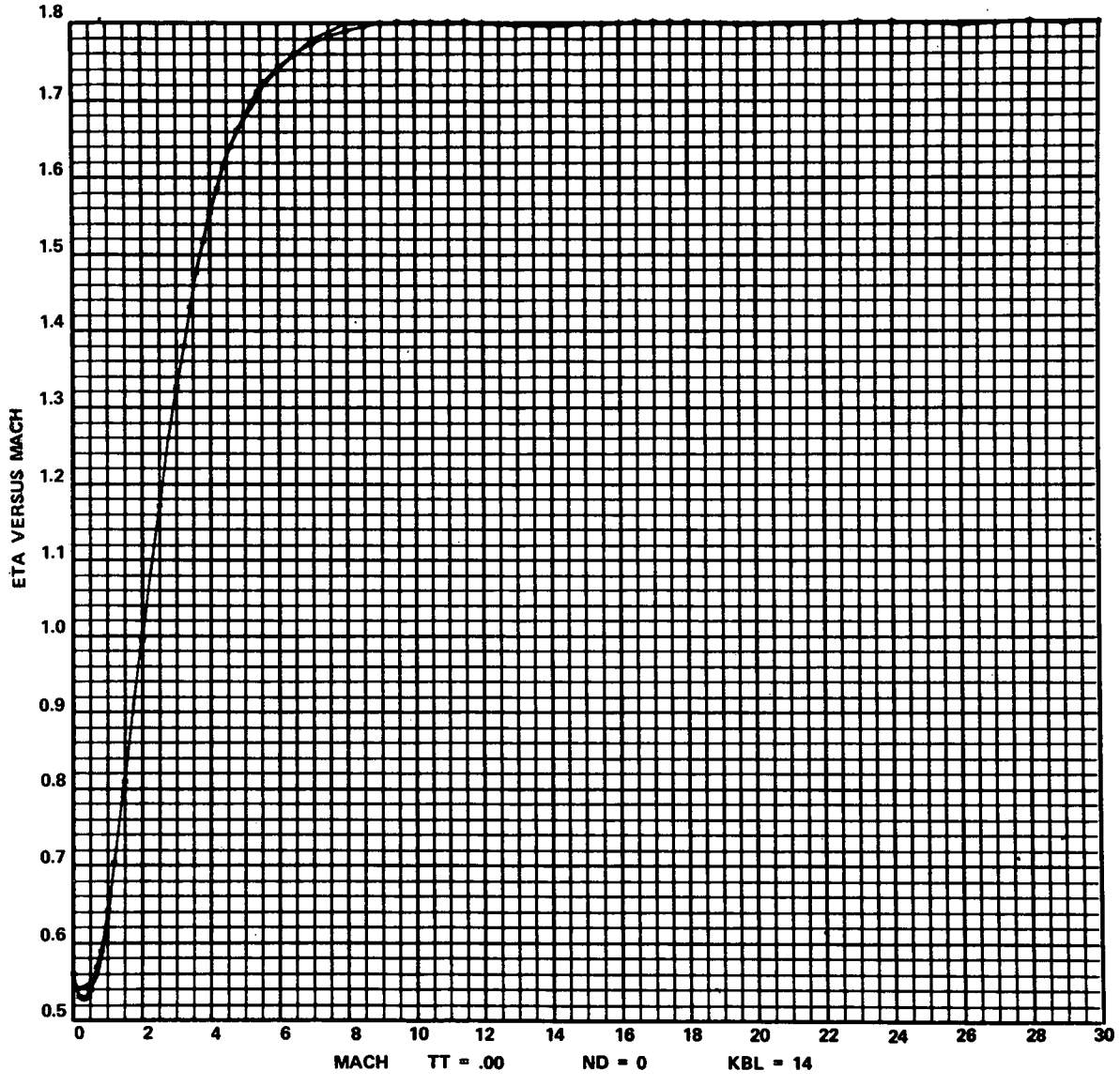

Figure 9. The 14-term polynomial approximation.

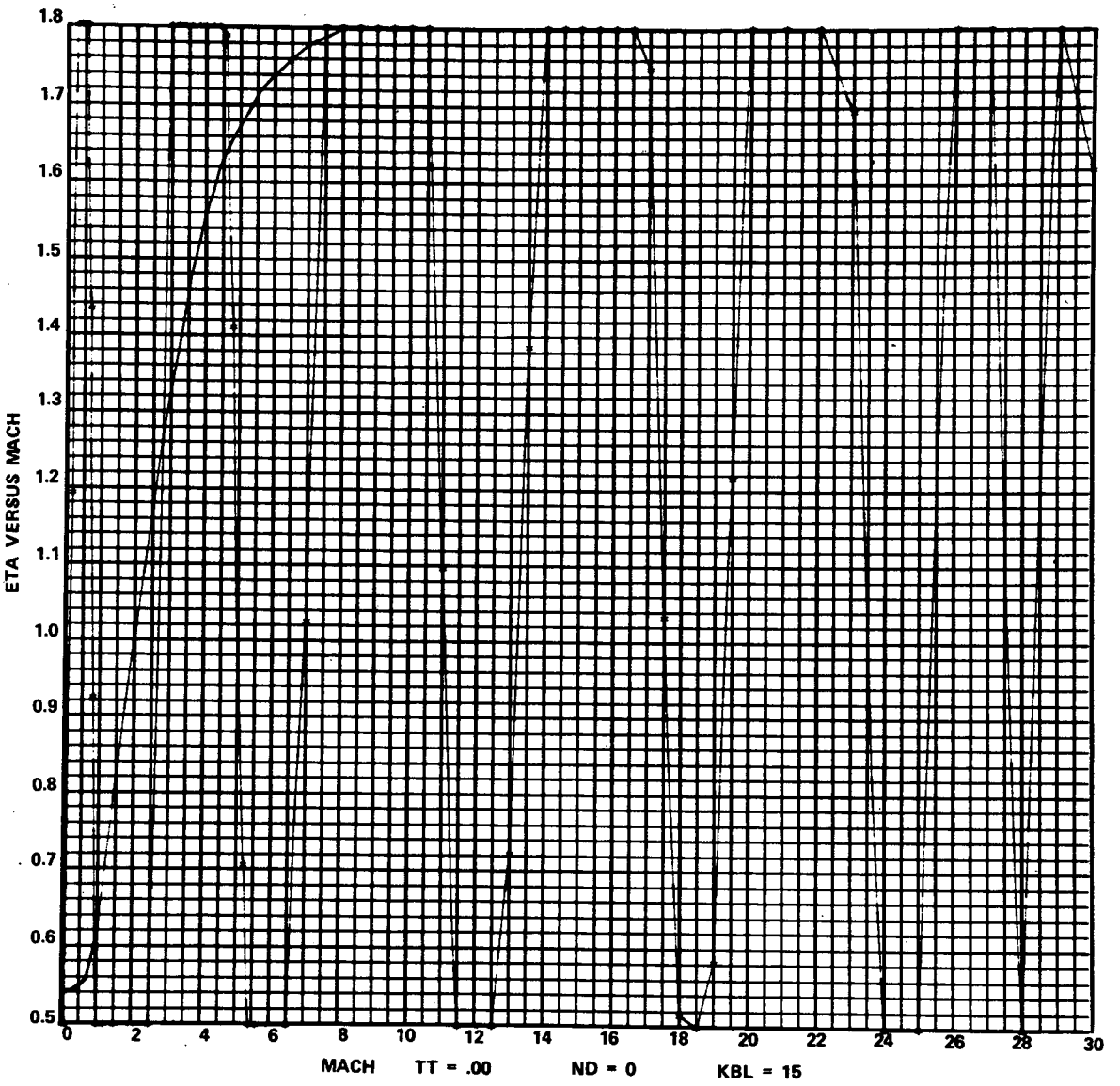

Figure 10. The 15-term polynomial approximation.

$G(22) = -x^2y$

$G(23) = -x^3y$

.
.
.

$G(38) = -x^{18}y$

$G(39) = -x^{19}y$

An explanation of how a part of the last 19 of the above functions became the denominator of a rational function approximation is given in the discussion to follow.

The computer program listed in the Appendix determines rational function approximations ranging from one-term through "NT" terms (where NT = 15) from the preceding list of 39 possible terms. A sample printout from this program is included here as Table 2. Note that the symbols used in Table 2 are the same as those in Table 1. As may be seen from Table 2 the following functions were chosen (in the order shown below) for a 10-term rational function approximation:

AFN(1) is G(1) $\equiv 1$

AFN(2) is G(21) $\equiv -xy$

AFN(3) is G(22) $\equiv -x^2y$

AFN(4) is G(4) $\equiv x^3$

AFN(5) is G(23) $\equiv -x^3y$

AFN(6) is G(5) $\equiv x^4$

AFN(7) is G(24) $\equiv -x^4y$

AFN(8) is G(6) $\equiv x^5$

AFN(9) is G(25) $\equiv -x^5y$

AFN(10) is G(2) $\equiv x$

TABLE 2. RATIONAL FUNCTION APPROXIMATIONS FOR

```
THE NUMBER OF DATA POINTS USED IN THIS FIT IS    66
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS IN THE NUMERATOR IS    20
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS IN THE DENOMINATOR IS    19
THE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS TO BE SELECTED IS    15
THE CONSTANT ADDED TO THE DEPENDENT VARIABLE IS     .0000
INITIATION OF PLOTTING IS APPROXIMATING FUNCTION NUMBER     6

APPROXIMATING FUNCTION NUMBER  1 IS G( 1)

CA(1) =    .15099318181818+01
DDD   =    .8532348444850922-01      RMS  =    .3595525090166463-01      HM  =    .15047301030681 82+03

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

APPROXIMATING FUNCTION NUMBER  2 IS G(21)

CA( 1) =    .11344437488164 87+01
CA( 2) =   -.2008379623291594-01
DDD    =    .4507321700106255-01      RMS  =    .2613288216632696-01      HM  =    .15709456317878 64+03
```

TABLE 2. (Continued)

```
APPROXIMATING FUNCTION NUMBER  3 IS G(22)

CA( 1) =   .8485581186488874+00
CA( 2) =  -.7047881407237316-01
CA( 3) =   .1969870072033916-02
DDD    =   .1931649121332159-01      RMS   =   .1710772075095778-01      HM  =   .1613317902192028+03

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

APPROXIMATING FUNCTION NUMBER  4 IS G( 4)

CA( 1) =   .6515371714504308+00
CA( 2) =  -.1495591462516265+00
CA( 3) =   .9746742782537227-02
CA( 4) =   .3366114568077821-03
DDD    =   .5993214650803351-02      RMS   =   .9529233053500662-02      HM  =   .1635235962811564+03

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

APPROXIMATING FUNCTION NUMBER  5 IS G(23)

CA( 1) =   .5443102094453536+00
```

TABLE 2. (Continued)

```
CA( 2) =  -.1261529856522850+00
CA( 3) =   .7004761330708393-02
CA( 4) =   .4432793075846939-01
CA( 5) =   .2450565427789956-01
DDD    =   .7647729405983565-03      RMS  =   .3404037132133666-02      HM  =   .164383724807440B+03

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

APPROXIMATING FUNCTION NUMBER  6 IS G( 5)

CA( 1) =   .5321089761816416+00
CA( 2) =  -.1684359405789742+00
CA( 3) =   .1428422672697273-01
CA( 4) =   .3130824991826786-01
CA( 5) =   .1688166082128660-01
CA( 6) =  -.1183568139867210-04
DDD    =   .3350810471837856-03      RMS  =   .2253216714697166-02      HM  =   .164454413221986S+03

  Y  =  .5400+00  X1  =  .0000    CY  =  .53210898+00  DIFF=  .78910238-02  PDIF=  .14613007-01  DENOM =  .10000000+01
  Y  =  .5410+00  X1  =  .1000+00 CY  =  .54116908+00  DIFF= -.16907786-03  PDIF= -.31252839-03  DENOM =  .98331613+00
  Y  =  .5420+00  X1  =  .2000+00 CY  =  .55051586+00  DIFF= -.85158578-02  PDIF= -.15711915-01  DENOM =  .96701923+00
  Y  =  .5430+00  X1  =  .3000+00 CY  =  .56029044+00  DIFF= -.17290436-01  PDIF= -.31842423-01  DENOM =  .95121060+00
  Y  =  .5460+00  X1  =  .4000+00 CY  =  .57063807+00  DIFF= -.24638073-01  PDIF= -.45124676-01  DENOM =  .93599153+00
  Y  =  .5490+00  X1  =  .5000+00 CY  =  .58170713+00  DIFF= -.32707130-01  PDIF= -.59575828-01  DENOM =  .92146329+00
  Y  =  .5530+00  X1  =  .6000+00 CY  =  .59364755+00  DIFF= -.40647548-01  PDIF= -.73503704-01  DENOM =  .90772720+00
```

TABLE 2. (Continued)

Y	=	.5565+00	X1	=	.7000+00	CY	=	.60660884+00	DIFF=	-.50108842-01	PDIF=	-.90042843-01	DENOM	=	.89488452+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.62073755+00	DIFF=	-.40737550-01	PDIF=	-.70237154-01	DENOM	=	.88303656+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.65304953+00	DIFF=	-.33049535-01	PDIF=	-.53305701-01	DENOM	=	.86272995+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.69156780+00	DIFF=	.84321954-02	PDIF=	.12045993-01	DENOM	=	.84761767+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.76239567+00	DIFF=	.57604329-01	PDIF=	.70249181-01	DENOM	=	.83646120+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.91473033+00	DIFF=	.85269667-01	PDIF=	.85269667-01	DENOM	=	.85531831+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.10953639+01	DIFF=	.74636150-01	PDIF=	.63791581-01	DENOM	=	.93196252+00
Y	=	.1330+01	X1	=	.3000+01	CY	=	.12756282+01	DIFF=	.54371829-01	PDIF=	.40881074-01	DENOM	=	.10790551+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13415241+01	DIFF=	.38475902-01	PDIF=	.27881088-01	DENOM	=	.11604537+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14021676+01	DIFF=	.27832398-01	PDIF=	.19463215-01	DENOM	=	.12559603+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14570116+01	DIFF=	.22988394-01	PDIF=	.15532699-01	DENOM	=	.13663850+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15058827+01	DIFF=	.14117312-01	PDIF=	.92877051-02	DENOM	=	.14925382+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15488994+01	DIFF=	.11100584-01	PDIF=	.71157590-02	DENOM	=	.16352302+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15863851+01	DIFF=	.36148680-02	PDIF=	.22735019-02	DENOM	=	.17952713+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16187891+01	DIFF=	.12108840-02	PDIF=	.74745927-03	DENOM	=	.19734719+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16466230+01	DIFF=	-.66229837-02	PDIF=	-.40384047-02	DENOM	=	.21706422+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16704139+01	DIFF=	-.10413917-01	PDIF=	-.62734441-02	DENOM	=	.23875927+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.17078770+01	DIFF=	-.17876981-01	PDIF=	-.10578095-01	DENOM	=	.28840752+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17224565+01	DIFF=	-.17456524-01	PDIF=	-.10238431-01	DENOM	=	.31652278+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17347944+01	DIFF=	-.14794380-01	PDIF=	-.86013840-02	DENOM	=	.34694018+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17540373+01	DIFF=	-.14037348-01	PDIF=	-.80674414-02	DENOM	=	.41500553+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17705271+01	DIFF=	-.10527093-01	PDIF=	-.59813027-02	DENOM	=	.51448011+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17813204+01	DIFF=	-.13204274-02	PDIF=	-.74181314-03	DENOM	=	.63112852+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17883746+01	DIFF=	.16254120-02	PDIF=	.90805139-03	DENOM	=	.76621689+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17929697+01	DIFF=	.70303157-02	PDIF=	.39057309-02	DENOM	=	.92101133+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17959428+01	DIFF=	.40572247-02	PDIF=	.22540137-02	DENOM	=	.10967780+02
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17978433+01	DIFF=	.21566617-02	PDIF=	.11981454-02	DENOM	=	.12947830+02
Y	=	.1800+01	X1	=	.9500+01	CY	=	.17990341+01	DIFF=	.96589330-03	PDIF=	.53660739-03	DENOM	=	.15162924+02

TABLE 2. (Continued)

Y = .1800+01	XI = .1000+02	CY = .17997560+01	DIFF= .24403413-03	PDIF= .13557452-03	DENOM = .17625724+02
Y = .1800+01	XI = .1050+02	CY = .18001697+01	DIFF= -.16974531-03	PDIF= -.94302949-04	DENOM = .20348891+02
Y = .1800+01	XI = .1100+02	CY = .18003833+01	DIFF= -.38326920-03	PDIF= -.21292733-03	DENOM = .23345087+02
Y = .1800+01	XI = .1150+02	CY = .18004690+01	DIFF= -.46899581-03	PDIF= -.26055323-03	DENOM = .26626972+02
Y = .1800+01	XI = .1200+02	CY = .18004756+01	DIFF= -.47561748-03	PDIF= -.26423193-03	DENOM = .30207207+02
Y = .1800+01	XI = .1250+02	CY = .18004358+01	DIFF= -.43575592-03	PDIF= -.24208662-03	DENOM = .34098455+02
Y = .1800+01	XI = .1300+02	CY = .18003711+01	DIFF= -.37111075-03	PDIF= -.20617264-03	DENOM = .38313376+02
Y = .1800+01	XI = .1350+02	CY = .18002959+01	DIFF= -.29593191-03	PDIF= -.16440661-03	DENOM = .42864631+02
Y = .1800+01	XI = .1400+02	CY = .18002194+01	DIFF= -.21937875-03	PDIF= -.12187708-03	DENOM = .47764883+02
Y = .1800+01	XI = .1450+02	CY = .18001471+01	DIFF= -.14713305-03	PDIF= -.81740581-04	DENOM = .53026791+02
Y = .1800+01	XI = .1500+02	CY = .18000825+01	DIFF= -.82507884-04	PDIF= -.45837713-04	DENOM = .58663017+02
Y = .1800+01	XI = .1550+02	CY = .18000272+01	DIFF= -.27213229-04	PDIF= -.15118461-04	DENOM = .64686223+02
Y = .1800+01	XI = .1600+02	CY = .17999819+01	DIFF= .18113935-04	PDIF= .10063297-04	DENOM = .71109070+02
Y = .1800+01	XI = .1650+02	CY = .17999465+01	DIFF= .53541975-04	PDIF= .29745541-04	DENOM = .77944218+02
Y = .1800+01	XI = .1700+02	CY = .17999204+01	DIFF= .79589735-04	PDIF= .44216520-04	DENOM = .85204330+02
Y = .1800+01	XI = .1750+02	CY = .17999029+01	DIFF= .97050273-04	PDIF= .53916818-04	DENOM = .92902066+02
Y = .1800+01	XI = .1800+02	CY = .17998931+01	DIFF= .10686958-03	PDIF= .59371991-04	DENOM = .10105009+03
Y = .1800+01	XI = .1850+02	CY = .17998899+01	DIFF= .11006391-03	PDIF= .61146618-04	DENOM = .10966106+03
Y = .1800+01	XI = .1900+02	CY = .17998923+01	DIFF= .10766413-03	PDIF= .59813407-04	DENOM = .11874763+03
Y = .1800+01	XI = .1950+02	CY = .17998993+01	DIFF= .10067917-03	PDIF= .55932874-04	DENOM = .12832248+03
Y = .1800+01	XI = .2000+02	CY = .17999099+01	DIFF= .90072742-04	PDIF= .50040412-04	DENOM = .13839826+03
Y = .1800+01	XI = .2100+02	CY = .17999385+01	DIFF= .61546942-04	PDIF= .34192746-04	DENOM = .16010325+03
Y = .1800+01	XI = .2200+02	CY = .17999715+01	DIFF= .28507324-04	PDIF= .15837402-04	DENOM = .18396390+03
Y = .1800+01	XI = .2300+02	CY = .18000037+01	DIFF= -.37275122-05	PDIF= -.20708401-05	DENOM = .21008150+03
Y = .1800+01	XI = .2400+02	CY = .18000309+01	DIFF= -.30871526-04	PDIF= -.17150848-04	DENOM = .23855733+03
Y = .1800+01	XI = .2500+02	CY = .18000495+01	DIFF= -.49547029-04	PDIF= -.27526127-04	DENOM = .26949269+03
Y = .1800+01	XI = .2600+02	CY = .18000571+01	DIFF= -.57147523-04	PDIF= -.31748624-04	DENOM = .30298887+03
Y = .1800+01	XI = .2700+02	CY = .18000517+01	DIFF= -.51706930-04	PDIF= -.28726072-04	DENOM = .33914716+03

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .18000318+01  DIFF= -.31783143-04  PDIF= -.17657302-04  DENOM =  .37806885+03
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17999964+01  DIFF=  .36418512-05  PDIF=  .20232507-05  DENOM =  .41985522+03
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .17999448+01  DIFF=  .55245730-04  PDIF=  .30692072-04  DENOM =  .46460757+03

 DDD =   .32713683-01  RMS =   .22263465-01  YDY =   .16450954+03  ERR1 =   .19885584-03  ERROR =   .17357901-02

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

APPROXIMATING FUNCTION NUMBER  7 IS G(24)

CA( 1) =   .51191653328504l3+00
CA( 2) =  -.17913657746450l0+00
CA( 3) =   .1567835995221985-01
CA( 4) =   .5515258702348359-01
CA( 5) =   .3006612235842510-01
CA( 6) =  -.5937732611199177-02
CA( 7) =  -.3291248343594522-02
DDD    =   .1239019717521519-03      RMS  =   .1370146927269237-02      MM  =   .1644891541939627+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .51191653+00  DIFF=  .28083467-01  PDIF=  .52006420-01  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .52121067+00  DIFF=  .19789335-01  PDIF=  .36579177-01  DENOM =  .98227286+00
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .53091153+00  DIFF=  .11088468-01  PDIF=  .20458428-01  DENOM =  .96503508+00
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .54125651+00  DIFF=  .17434867-02  PDIF=  .32108410-02  DENOM =  .94845521+00
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .55247955+00  DIFF= -.64795462-02  PDIF= -.11867301-01  DENOM =  .93269388+00
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .56480806+00  DIFF= -.15808058-01  PDIF= -.28794276-01  DENOM =  .91790386+00
 Y  =  .5530+00  X1  =  .6000+00  CY  =  .57845898+00  DIFF= -.25458978-01  PDIF= -.46037936-01  DENOM =  .90423000+00
```

TABLE 2. (Continued)

Y	=	.5565+00	X1	=	.7000+00	CY	=	.59363392+00	DIFF=	-.37133924-01	PDIF=	-.66727627-01	DENOM	=	.89180924+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.61051372+00	DIFF=	-.30513718-01	PDIF=	-.52609858-01	DENOM	=	.88077065+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.64997169+00	DIFF=	-.29971692-01	PDIF=	-.48341438-01	DENOM	=	.86331666+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.69764054+00	DIFF=	.23594571-02	PDIF=	.33706530-02	DENOM	=	.85274247+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.78460224+00	DIFF=	.35397761-01	PDIF=	.43168001-01	DENOM	=	.85138266+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.96169962+00	DIFF=	.38300377-01	PDIF=	.38300377-01	DENOM	=	.89230929+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11516753+01	DIFF=	.18324653-01	PDIF=	.15662096-01	DENOM	=	.99136708+00
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13230861+01	DIFF=	.69138517-02	PDIF=	.51983847-02	DENOM	=	.11488897+01
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13822186+01	DIFF=	-.22185631-02	PDIF=	-.16076544-02	DENOM	=	.12274037+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14353467+01	DIFF=	-.53467259-02	PDIF=	-.37389691-02	DENOM	=	.13140750+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14825404+01	DIFF=	-.25403625-02	PDIF=	-.17164611-02	DENOM	=	.14082615+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15240918+01	DIFF=	-.40917633-02	PDIF=	-.26919495-02	DENOM	=	.15091947+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15604296+01	DIFF=	-.42959421-03	PDIF=	-.27538090-03	DENOM	=	.16159797+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15920510+01	DIFF=	-.20510193-02	PDIF=	-.12899493-02	DENOM	=	.17275951+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16194728+01	DIFF=	.52724816-03	PDIF=	.32546183-03	DENOM	=	.18428932+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16431986+01	DIFF=	-.31985902-02	PDIF=	-.19503599-02	DENOM	=	.19606000+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16636999+01	DIFF=	-.36998770-02	PDIF=	-.22288416-02	DENOM	=	.20793149+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16966972+01	DIFF=	-.66972328-02	PDIF=	-.39628596-02	DENOM	=	.23135356+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17099117+01	DIFF=	-.49116732-02	PDIF=	-.28807468-02	DENOM	=	.24256085+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17213411+01	DIFF=	-.13411435-02	PDIF=	-.77973459-03	DENOM	=	.25318238+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17398207+01	DIFF=	.17932983-03	PDIF=	.10306312-03	DENOM	=	.27184261+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17566803+01	DIFF=	.33196968-02	PDIF=	.18861914-02	DENOM	=	.28798478+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17686600+01	DIFF=	.11340030-01	PDIF=	.63708032-02	DENOM	=	.29246763+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17772833+01	DIFF=	.12716672-01	PDIF=	.71042858-02	DENOM	=	.28088133+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17836041+01	DIFF=	.16395870-01	PDIF=	.91088166-02	DENOM	=	.24832238+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17884257+01	DIFF=	.11574300-01	PDIF=	.64301666-02	DENOM	=	.18939359+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17928877+01	DIFF=	.71123170-02	PDIF=	.39512872-02	DENOM	=	.98204078+00
Y	=	.1800+01	X1	=	.9500+01	CY	=	.17857235+01	DIFF=	.14276479-01	PDIF=	.79313773-02	DENOM	=	-.31630730+00

TABLE 2. (Continued)

Y = .1800+01 X1 = .1000+02 CY = .17937287+01 DIFF= .62713390-02 PDIF= .34840772-02 DENOM = -.20698909+01

Y = .1800+01 X1 = .1050+02 CY = .17956829+01 DIFF= .43175507-02 PDIF= .23986393-02 DENOM = -.43524293+01

Y = .1800+01 X1 = .1100+02 CY = .17969198+01 DIFF= .30802272-02 PDIF= .17112373-02 DENOM = -.72425789+01

Y = .1800+01 X1 = .1150+02 CY = .17977945+01 DIFF= .22054936-02 PDIF= .12252742-02 DENOM = -.10823933+02

Y = .1800+01 X1 = .1200+02 CY = .17984325+01 DIFF= .15674558-02 PDIF= .87080875-03 DENOM = -.15185021+02

Y = .1800+01 X1 = .1250+02 CY = .17989031+01 DIFF= .10968930-02 PDIF= .60938501-03 DENOM = -.20419311+02

Y = .1800+01 X1 = .1300+02 CY = .17992511+01 DIFF= .74889737-03 PDIF= .41605409-03 DENOM = -.26625206+02

Y = .1800+01 X1 = .1350+02 CY = .17995079+01 DIFF= .49213760-03 PDIF= .27340978-03 DENOM = -.33906046+02

Y = .1800+01 X1 = .1400+02 CY = .17996961+01 DIFF= .30393132-03 PDIF= .16885074-03 DENOM = -.42370110+02

Y = .1800+01 X1 = .1450+02 CY = .17998325+01 DIFF= .16750103-03 PDIF= .93056129-04 DENOM = -.52130612+02

Y = .1800+01 X1 = .1500+02 CY = .17999297+01 DIFF= .70263641-04 PDIF= .39035356-04 DENOM = -.63305702+02

Y = .1800+01 X1 = .1550+02 CY = .17999973+01 DIFF= .26903284-05 PDIF= .14946269-05 DENOM = -.76018470+02

Y = .1800+01 X1 = .1600+02 CY = .18000425+01 DIFF= -.42485762-04 PDIF= -.23603201-04 DENOM = -.90396939+02

Y = .1800+01 X1 = .1650+02 CY = .18000708+01 DIFF= -.70835450-04 PDIF= -.39353028-04 DENOM = -.10657407+03

Y = .1800+01 X1 = .1700+02 CY = .18000866+01 DIFF= -.86645642-04 PDIF= -.48136468-04 DENOM = -.12468777+03

Y = .1800+01 X1 = .1750+02 CY = .18000932+01 DIFF= -.93223816-04 PDIF= -.51791009-04 DENOM = -.14488086+03

Y = .1800+01 X1 = .1800+02 CY = .18000931+01 DIFF= -.93125564-04 PDIF= -.51736425-04 DENOM = -.16730113+03

Y = .1800+01 X1 = .1850+02 CY = .18000883+01 DIFF= -.88326223-04 PDIF= -.49070124-04 DENOM = -.19210128+03

Y = .1800+01 X1 = .1900+02 CY = .18000804+01 DIFF= -.80351332-04 PDIF= -.44639629-04 DENOM = -.21943895+03

Y = .1800+01 X1 = .1950+02 CY = .18000704+01 DIFF= -.70376492-04 PDIF= -.39098051-04 DENOM = -.24947673+03

Y = .1800+01 X1 = .2000+02 CY = .18000593+01 DIFF= -.59304223-04 PDIF= -.32946791-04 DENOM = -.28238214+03

Y = .1800+01 X1 = .2100+02 CY = .18000365+01 DIFF= -.36455765-04 PDIF= -.20253203-04 DENOM = -.35749062+03

Y = .1800+01 X1 = .2200+02 CY = .18000155+01 DIFF= -.15517914-04 PDIF= -.86210636-05 DENOM = -.44620328+03

Y = .1800+01 X1 = .2300+02 CY = .17999985+01 DIFF= .14939526-05 PDIF= .82997368-06 DENOM = -.55003801+03

Y = .1800+01 X1 = .2400+02 CY = .17999864+01 DIFF= .13606210-04 PDIF= .75590058-05 DENOM = -.67059168+03

Y = .1800+01 X1 = .2500+02 CY = .17999795+01 DIFF= .20479311-04 PDIF= .11377395-04 DENOM = -.80954016+03

Y = .1800+01 X1 = .2600+02 CY = .17999778+01 DIFF= .22152171-04 PDIF= .12306762-04 DENOM = -.96863832+03

Y = .1800+01 X1 = .2700+02 CY = .17999811+01 DIFF= .18881363-04 PDIF= .10489646-04 DENOM = -.11497200+04

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17999890+01  DIFF=  .11040030-04  PDIF=  .61333498-05  DENOM = -.13546980+04
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .18000009+01  DIFF= -.94526182-06  PDIF= -.52514545-06  DENOM = -.18855642+04
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18000166+01  DIFF= -.16633419-04  PDIF= -.92407883-05  DENOM = -.18443894+04

 DDD =   .97553254-02  RMS =   .12157630-01  YDY =   .16450954+03  ERR1 =   .59299452-04  ERROR =   .94788003-03

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APPROXIMATING FUNCTION NUMBER  8 IS G( 6)

CA( 1) =   .5003702185504913+00
CA( 2) =  -.2274779139090803+00
CA( 3) =   .2708523580903123-01
CA( 4) =   .4359567443633542-01
CA( 5) =   .2268724773486636-01
CA( 6) =  -.5632343757550845-02
CA( 7) =  -.3087632317094126-02
CA( 8) =   .7756807272993283-06
DDD    =   .6218910342015334-04      RMS   =   .9707003362158664-03      MM  =   .1644993065493744+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .50037022+00  DIFF=  .3962978I-01  PDIF=  .73388484-01  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .51190792+00  DIFF=  .29092082-01  PDIF=  .53774643-01  DENOM =  .97754544+00
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .52388432+00  DIFF=  .18115682-01  PDIF=  .33423768-01  DENOM =  .95576438+00
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .53649061+00  DIFF=  .65093894-02  PDIF=  .11987826-01  DENOM =  .93478184+00
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .54991548+00  DIFF= -.39154761-02  PDIF= -.71712017-02  DENOM =  .91471541+00
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .56434256+00  DIFF= -.15342560-01  PDIF= -.27946374-01  DENOM =  .89567528+00
```

TABLE 2. (Continued)

Y	XI	CY	DIFF	PDIF	DENOM
Y = .5530+00	XI = .6000+00	CY = .57994730+00	DIFF= -.26947301-01	PDIF= -.48729296-01	DENOM = .87776422+00
Y = .5565+00	XI = .7000+00	CY = .59689316+00	DIFF= -.40393164-01	PDIF= -.72584301-01	DENOM = .86107761+00
Y = .5800+00	XI = .8000+00	CY = .61532737+00	DIFF= -.35327374-01	PDIF= -.60909265-01	DENOM = .84570340+00
Y = .6200+00	XI = .1000+01	CY = .65714083+00	DIFF= -.37140828-01	PDIF= -.59904561-01	DENOM = .81920694+00
Y = .7000+00	XI = .1200+01	CY = .70606517+00	DIFF= -.60651697-02	PDIF= -.86645282-02	DENOM = .79883029+00
Y = .8200+00	XI = .1500+01	CY = .79291267+00	DIFF= .27087327-01	PDIF= .33033326-01	DENOM = .78066323+00
Y = .1000+01	XI = .2000+01	CY = .96634159+00	DIFF= .33658415-01	PDIF= .33658415-01	DENOM = .78548098+00
Y = .1170+01	XI = .2500+01	CY = .11523723+01	DIFF= .17627734-01	PDIF= .15066440-01	DENOM = .83446555+00
Y = .1330+01	XI = .3000+01	CY = .13221846+01	DIFF= .78153603-02	PDIF= .58762108-02	DENOM = .92379085+00
Y = .1380+01	XI = .3200+01	CY = .13812925+01	DIFF= -.12925095-02	PDIF= -.93660105-03	DENOM = .96907751+00
Y = .1430+01	XI = .3400+01	CY = .14346111+01	DIFF= -.46110530-02	PDIF= -.32245126-02	DENOM = .10187686+01
Y = .1480+01	XI = .3600+01	CY = .14821142+01	DIFF= -.21141825-02	PDIF= -.14285017-02	DENOM = .10719967+01
Y = .1520+01	XI = .3800+01	CY = .15240139+01	DIFF= -.40139118-02	PDIF= -.26407314-02	DENOM = .11277761+01
Y = .1560+01	XI = .4000+01	CY = .15606788+01	DIFF= -.67881982-03	PDIF= -.43514091-03	DENOM = .11850021+01
Y = .1590+01	XI = .4200+01	CY = .15925657+01	DIFF= -.25656911-02	PDIF= -.16136422-02	DENOM = .12424518+01
Y = .1620+01	XI = .4400+01	CY = .16201674+01	DIFF= -.16738401-03	PDIF= -.10332346-03	DENOM = .12987836+01
Y = .1640+01	XI = .4600+01	CY = .16439762+01	DIFF= -.39762426-02	PDIF= -.24245382-02	DENOM = .13525373+01
Y = .1660+01	XI = .4800+01	CY = .16644605+01	DIFF= -.44605240-02	PDIF= -.26870627-02	DENOM = .14021343+01
Y = .1690+01	XI = .5200+01	CY = .16971332+01	DIFF= -.71332092-02	PDIF= -.42208339-02	DENOM = .14819500+01
Y = .1705+01	XI = .5400+01	CY = .17100478+01	DIFF= -.50478205-02	PDIF= -.29605986-02	DENOM = .15084185+01
Y = .1720+01	XI = .5600+01	CY = .17210891+01	DIFF= -.10891065-02	PDIF= -.63320145-03	DENOM = .15232296+01
Y = .1740+01	XI = .6000+01	CY = .17385153+01	DIFF= .14846696-02	PDIF= .85325840-03	DENOM = .15090750+01
Y = .1760+01	XI = .6500+01	CY = .17533751+01	DIFF= .66249246-02	PDIF= .37641617-02	DENOM = .13846135+01
Y = .1780+01	XI = .7000+01	CY = .17617392+01	DIFF= .18260761-01	PDIF= .10258854-01	DENOM = .11031519+01
Y = .1790+01	XI = .7500+01	CY = .17597676+01	DIFF= .30232388-01	PDIF= .16889602-01	DENOM = .61918117+00
Y = .1800+01	XI = .8000+01	CY = .19014665+01	DIFF= -.10146654+00	PDIF= -.56370301-01	DENOM = -.11743935+00
Y = .1800+01	XI = .8500+01	CY = .18021854+01	DIFF= -.21854324-02	PDIF= -.12141291-02	DENOM = -.11614816+01
Y = .1800+01	XI = .9000+01	CY = .17985068+01	DIFF= .14932443-02	PDIF= .82958017-03	DENOM = -.25723492+01

TABLE 2. (Continued)

Y = .1800+01	XI = .9500+01	CY = .17982378+01	DIFF= .17622348-02	PDIF= .97901935-03	DENOM = -.44140768+01
Y = .1800+01	XI = .1000+02	CY = .17985536+01	DIFF= .14464046-02	PDIF= .80355811-03	DENOM = -.67553310+01
Y = .1800+01	XI = .1050+02	CY = .17989391+01	DIFF= .10608930-02	PDIF= .58938501-03	DENOM = -.96694095+01
Y = .1800+01	XI = .1100+02	CY = .17992726+01	DIFF= .72742114-03	PDIF= .40412286-03	DENOM = -.13234242+02
Y = .1800+01	XI = .1150+02	CY = .17995316+01	DIFF= .46841980-03	PDIF= .26023322-03	DENOM = -.17532388+02
Y = .1800+01	XI = .1200+02	CY = .17997217+01	DIFF= .27825865-03	PDIF= .15458814-03	DENOM = -.22651041+02
Y = .1800+01	XI = .1250+02	CY = .17998556+01	DIFF= .14436008-03	PDIF= .80200045-04	DENOM = -.28682023+02
Y = .1800+01	XI = .1300+02	CY = .17999461+01	DIFF= .53921581-04	PDIF= .29956434-04	DENOM = -.35721791+02
Y = .1800+01	XI = .1350+02	CY = .18000041+01	DIFF= -.40766282-05	PDIF= -.22647934-05	DENOM = -.43871431+02
Y = .1800+01	XI = .1400+02	CY = .18000385+01	DIFF= -.38496281-04	PDIF= -.21386823-04	DENOM = -.53236660+02
Y = .1800+01	XI = .1450+02	CY = .18000562+01	DIFF= -.56216156-04	PDIF= -.31231198-04	DENOM = -.63927828+02
Y = .1800+01	XI = .1500+02	CY = .18000625+01	DIFF= -.62459361-04	PDIF= -.34699645-04	DENOM = -.76059916+02
Y = .1800+01	XI = .1550+02	CY = .18000611+01	DIFF= -.61127119-04	PDIF= -.33959511-04	DENOM = -.89752535+02
Y = .1800+01	XI = .1600+02	CY = .18000551+01	DIFF= -.55090601-04	PDIF= -.30605889-04	DENOM = -.10512993+03
Y = .1800+01	XI = .1650+02	CY = .18000464+01	DIFF= -.46430093-04	PDIF= -.25794496-04	DENOM = -.12232098+03
Y = .1800+01	XI = .1700+02	CY = .18000366+01	DIFF= -.36624697-04	PDIF= -.20347054-04	DENOM = -.14145918+03
Y = .1800+01	XI = .1750+02	CY = .18000267+01	DIFF= -.26700081-04	PDIF= -.14833379-04	DENOM = -.16268268+03
Y = .1800+01	XI = .1800+02	CY = .18000173+01	DIFF= -.17342327-04	PDIF= -.96346258-05	DENOM = -.18613425+03
Y = .1800+01	XI = .1850+02	CY = .18000090+01	DIFF= -.89850511-05	PDIF= -.49916950-05	DENOM = -.21196128+03
Y = .1800+01	XI = .1900+02	CY = .18000019+01	DIFF= -.18757884-05	PDIF= -.10421047-05	DENOM = -.24031581+03
Y = .1800+01	XI = .1950+02	CY = .17999961+01	DIFF= .38736254-05	PDIF= .21520141-05	DENOM = -.27135450+03
Y = .1800+01	XI = .2000+02	CY = .17999918+01	DIFF= .82489150-05	PDIF= .45827306-05	DENOM = -.30523865+03
Y = .1800+01	XI = .2100+02	CY = .17999869+01	DIFF= .13142337-04	PDIF= .73012983-05	DENOM = -.38221167+03
Y = .1800+01	XI = .2200+02	CY = .17999863+01	DIFF= .13713545-04	PDIF= .76186361-05	DENOM = -.47261784+03
Y = .1800+01	XI = .2300+02	CY = .17999888+01	DIFF= .11200019-04	PDIF= .62222325-05	DENOM = -.57791427+03
Y = .1800+01	XI = .2400+02	CY = .17999931+01	DIFF= .69107741-05	PDIF= .38393190-05	DENOM = -.69963216+03
Y = .1800+01	XI = .2500+02	CY = .17999979+01	DIFF= .20924452-05	PDIF= .11624696-05	DENOM = -.83937680+03
Y = .1800+01	XI = .2600+02	CY = .18000021+01	DIFF= -.21343386-05	PDIF= -.11857437-05	DENOM = -.99882761+03

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .18000048+01  DIFF= -.47990215-05  PDIF= -.26661230-05  DENOM = -.11797381+04
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .18000051+01  DIFF= -.50835779-05  PDIF= -.28242099-05  DENOM = -.13839358+04
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .18000023+01  DIFF= -.23137814-05  PDIF= -.12854341-05  DENOM = -.16133226+04
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .17999959+01  DIFF=  .40547147-05  PDIF=  .22526193-05  DENOM = -.18698741+04

 DDD =   .22065635-01  RMS =   .18284633-01  YDY =   .16450954+03  ERR1 =   .13412982-03  ERROR =   .14255771-02

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APPROXIMATING FUNCTION NUMBER  9 IS G(25)

CA( 1) =   .4973829212268530+00
CA( 2) =  -.2224425234569729+00
CA( 3) =   .2594007306898696-01
CA( 4) =   .6105316413647642-01
CA( 5) =   .3247622687810869-01
CA( 6) =  -.1298631772767823-01
CA( 7) =  -.7176194008713237-02
CA( 8) =   .8072139258111398-03
CA( 9) =   .4480576875312904-03
DDD    =   .5405698918533111-04      RMS   =   .9050112102547879-03      HH  =   .164500644359724O+03

  Y  =  .5400+00  X1  =  .0000     CY  =  .49738292+00  DIFF=  .42617079-01  PDIF=  .78920516-01  DENOM =  .10000000+01
  Y  =  .5410+00  X1  =  .1000+00  CY  =  .50860820+00  DIFF=  .32391795-01  PDIF=  .59873928-01  DENOM =  .97804691+00
  Y  =  .5420+00  X1  =  .2000+00  CY  =  .52033036+00  DIFF=  .21669637-01  PDIF=  .39980880-01  DENOM =  .95679757+00
  Y  =  .5430+00  X1  =  .3000+00  CY  =  .53280284+00  DIFF=  .10197156-01  PDIF=  .18779292-01  DENOM =  .93642167+00
```

TABLE 2. (Continued

Y	=	.5460+00	X1	=	.4000+00	CY	=	.54626652+00	DIFF=	-.26651516-03	PDIF=	-.48812301-03	DENOM =	.91707276+00
Y	=	.5490+00	X1	=	.5000+00	CY	=	.56094609+00	DIFF=	-.11946094-01	PDIF=	-.21759735-01	DENOM =	.89888877+00
Y	=	.5530+00	X1	=	.6000+00	CY	=	.57704584+00	DIFF=	-.24045835-01	PDIF=	-.43482523-01	DENOM =	.88199258+00
Y	=	.5565+00	X1	=	.7000+00	CY	=	.59474468+00	DIFF=	-.38244675-01	PDIF=	-.68723585-01	DENOM =	.86649252+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.61419115+00	DIFF=	-.34191146-01	PDIF=	-.58950252-01	DENOM =	.85248291+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.65873965+00	DIFF=	-.38739649-01	PDIF=	-.62483304-01	DENOM =	.82924564+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.71109752+00	DIFF=	-.11097524-01	PDIF=	-.15853605-01	DENOM =	.81277595+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.80339241+00	DIFF=	.16607588-01	PDIF=	.20253156-01	DENOM =	.80138160+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.98246671+00	DIFF=	.17533292-01	PDIF=	.17533292-01	DENOM =	.81820380+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11664899+01	DIFF=	.35100703-02	PDIF=	.30000601-02	DENOM =	.87689575+00
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13291602+01	DIFF=	.83978761-03	PDIF=	.63141926-03	DENOM =	.97059752+00
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13851520+01	DIFF=	-.51519629-02	PDIF=	-.37333065-02	DENOM =	.10158560+01
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14356215+01	DIFF=	-.56214767-02	PDIF=	-.39311026-02	DENOM =	.10646046+01
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14807103+01	DIFF=	-.71034442-03	PDIF=	-.47996244-03	DENOM =	.11161994+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15207219+01	DIFF=	-.72188493-03	PDIF=	-.47492430-03	DENOM =	.11700138+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15560548+01	DIFF=	.39451912-02	PDIF=	.25289687-02	DENOM =	.12254550+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15871524+01	DIFF=	.28476178-02	PDIF=	.17909546-02	DENOM =	.12819817+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16144663+01	DIFF=	.55336666-02	PDIF=	.34158436-02	DENOM =	.13391210+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16384331+01	DIFF=	.15669001-02	PDIF=	.95542689-03	DENOM =	.13964860+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16594596+01	DIFF=	.54043919-03	PDIF=	.32556578-03	DENOM =	.14537925+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16941312+01	DIFF=	-.41312179-02	PDIF=	-.24445076-02	DENOM =	.15677117+01
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17083968+01	DIFF=	-.33967815-02	PDIF=	-.19922472-02	DENOM =	.16244257+01
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17209648+01	DIFF=	-.96477819-03	PDIF=	-.56091755-03	DENOM =	.16813186+01
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17418463+01	DIFF=	-.18462749-02	PDIF=	-.10610775-02	DENOM =	.17978016+01
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17616391+01	DIFF=	-.16391186-02	PDIF=	-.93131739-03	DENOM =	.19576920+01
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17760968+01	DIFF=	.39031636-02	PDIF=	.21927886-02	DENOM =	.21537755+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17863922+01	DIFF=	.36078374-02	PDIF=	.20155516-02	DENOM =	.24184110+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17933287+01	DIFF=	.66713469-02	PDIF=	.37063039-02	DENOM =	.27967163+01

TABLE 2. (Continued)

Y	=	.1800+01	X1	=	.8500+01	CY	=	.17975902+01	DIFF=	.24097995-02	PDIF=	.13387775-02	DENOM	=	.33482481+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17998689+01	DIFF=	.13105657-03	PDIF=	.72809203-04	DENOM	=	.41486821+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18008421+01	DIFF=	-.84214233-03	PDIF=	-.46785685-03	DENOM	=	.52914937+01
Y	=	.1800+01	X1	=	.1000+02	CY	=	.18010762+01	DIFF=	-.10762035-02	PDIF=	-.59789086-03	DENOM	=	.68896376+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18009653+01	DIFF=	-.96527969-03	PDIF=	-.53626649-03	DENOM	=	.90772286+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18007392+01	DIFF=	-.73916895-03	PDIF=	-.41064942-03	DENOM	=	.12011221+02
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18005100+01	DIFF=	-.51001326-03	PDIF=	-.28334070-03	DENOM	=	.15873090+02
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18003210+01	DIFF=	-.32104869-03	PDIF=	-.17836038-03	DENOM	=	.20870512+02
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18001813+01	DIFF=	-.18126912-03	PDIF=	-.10070507-03	DENOM	=	.27239041+02
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18000854+01	DIFF=	-.85446685-04	PDIF=	-.47470381-04	DENOM	=	.35243796+02
Y	=	.1800+01	X1	=	.1350+02	CY	=	.18000241+01	DIFF=	-.24112116-04	PDIF=	-.13395620-04	DENOM	=	.45181134+02
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17999879+01	DIFF=	.12124772-04	PDIF=	.67359845-05	DENOM	=	.57380334+02
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17999689+01	DIFF=	.31063678-04	PDIF=	.17257599-04	DENOM	=	.72205278+02
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17999614+01	DIFF=	.38648269-04	PDIF=	.21471260-04	DENOM	=	.90056129+02
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17999608+01	DIFF=	.39176460-04	PDIF=	.21764700-04	DENOM	=	.11137101+03
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17999644+01	DIFF=	.35639902-04	PDIF=	.19799945-04	DENOM	=	.13662769+03
Y	=	.1800+01	X1	=	.1650+02	CY	=	.17999699+01	DIFF=	.30052889-04	PDIF=	.16696049-04	DENOM	=	.16634526+03
Y	=	.1800+01	X1	=	.1700+02	CY	=	.17999763+01	DIFF=	.23724966-04	PDIF=	.13180537-04	DENOM	=	.20108581+03
Y	=	.1800+01	X1	=	.1750+02	CY	=	.17999825+01	DIFF=	.17470792-04	PDIF=	.97059958-05	DENOM	=	.24145611+03
Y	=	.1800+01	X1	=	.1800+02	CY	=	.17999882+01	DIFF=	.11765104-04	PDIF=	.65361690-05	DENOM	=	.28810930+03
Y	=	.1800+01	X1	=	.1850+02	CY	=	.17999931+01	DIFF=	.68541448-05	PDIF=	.38078582-05	DENOM	=	.34174657+03
Y	=	.1800+01	X1	=	.1900+02	CY	=	.17999972+01	DIFF=	.28343037-05	PDIF=	.15746132-05	DENOM	=	.40311881+03
Y	=	.1800+01	X1	=	.1950+02	CY	=	.18000003+01	DIFF=	-.29320843-06	PDIF=	-.16289357-06	DENOM	=	.47302834+03
Y	=	.1800+01	X1	=	.2000+02	CY	=	.18000026+01	DIFF=	-.25848640-05	PDIF=	-.14360356-05	DENOM	=	.55233055+03
Y	=	.1800+01	X1	=	.2100+02	CY	=	.18000050+01	DIFF=	-.50313417-05	PDIF=	-.27951899-05	DENOM	=	.74281008+03
Y	=	.1800+01	X1	=	.2200+02	CY	=	.18000053+01	DIFF=	-.53399990-05	PDIF=	-.29666661-05	DENOM	=	.98252606+03
Y	=	.1800+01	X1	=	.2300+02	CY	=	.18000043+01	DIFF=	-.43310557-05	PDIF=	-.24061420-05	DENOM	=	.12804040+04
Y	=	.1800+01	X1	=	.2400+02	CY	=	.18000027+01	DIFF=	-.26956656-05	PDIF=	-.14975920-05	DENOM	=	.16463802+04

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .18000010+01  DIFF= -.96993498-06  PDIF= -.53885276-06  DENOM =  .20914551+04
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .17999995+01  DIFF=  .45434899-06  PDIF=  .25241611-06  DENOM =  .26277476+04
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .17999987+01  DIFF=  .13063994-05  PDIF=  .72577744-06  DENOM =  .32685483+04
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17999986+01  DIFF=  .14112367-05  PDIF=  .78402040-06  DENOM =  .40283737+04
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17999993+01  DIFF=  .66694231-06  PDIF=  .37052351-06  DENOM =  .49230198+04
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18000010+01  DIFF= -.97428410-06  PDIF= -.54126894-06  DENOM =  .59696156+04

 DDD =   .92460227-02  RMS =   .11836015-01  YDY =   .16450954+03  ERR1 =   .56203567-04  ERROR =   .92280507-03

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

APPROXIMATING FUNCTION NUMBER 10 IS G( 2)

CA( 1) =   .5282438979619410+00
CA( 2) =  -.2799609739501707+00
CA( 3) =   .2634628431580909-01
CA( 4) =   .1002415359532532+00
CA( 5) =   .5419616510030361-01
CA( 6) =  -.2636216918517045-01
CA( 7) =  -.1460512719260082-01
CA( 8) =   .1985396668354631-02
CA( 9) =   .1102575240062402-02
CA(10) =  -.1053707464137308+00
DDD    =   .2684949309728416-04      RMS   =   .6378169811740687-03      MM  =   .164505120252315 2+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .52824390+00  DIFF=  .11756102-01  PDIF=  .21770559-01  DENOM =  .10000000+01
```

TABLE 2. (Continued)

Y	=	.5410+00	X1	=	.1000+00	CY	=	.53254524+00	DIFF=	.84547589-02	PDIF=	.15628020-01	DENOM	=	.97232011+00				
Y	=	.5420+00	X1	=	.2000+00	CY	=	.53722376+00	DIFF=	.47762390-02	PDIF=	.88122491-02	DENOM	=	.94547221+00				
Y	=	.5430+00	X1	=	.3000+00	CY	=	.54269208+00	DIFF=	.30791724-03	PDIF=	.56706673-03	DENOM	=	.91973055+00				
Y	=	.5460+00	X1	=	.4000+00	CY	=	.54935352+00	DIFF=	-.33535209-02	PDIF=	-.61419797-02	DENOM	=	.89533697+00				
Y	=	.5490+00	X1	=	.5000+00	CY	=	.55759527+00	DIFF=	-.85952733-02	PDIF=	-.15656235-01	DENOM	=	.87250224+00				
Y	=	.5530+00	X1	=	.6000+00	CY	=	.56777929+00	DIFF=	-.14779292-01	PDIF=	-.26725664-01	DENOM	=	.85140736+00				
Y	=	.5565+00	X1	=	.7000+00	CY	=	.58023132+00	DIFF=	-.23731323-01	PDIF=	-.42643888-01	DENOM	=	.83220490+00				
Y	=	.5800+00	X1	=	.8000+00	CY	=	.59522884+00	DIFF=	-.15228844-01	PDIF=	-.26256627-01	DENOM	=	.81502031+00				
Y	=	.6200+00	X1	=	.1000+01	CY	=	.63365680+00	DIFF=	-.13656804-01	PDIF=	-.22027103-01	DENOM	=	.78707892+00				
Y	=	.7000+00	X1	=	.1200+01	CY	=	.68388963+00	DIFF=	.16110369-01	PDIF=	.23014813-01	DENOM	=	.76809482+00				
Y	=	.8200+00	X1	=	.1500+01	CY	=	.77987789+00	DIFF=	.40122115-01	PDIF=	.48929408-01	DENOM	=	.75668396+00				
Y	=	.1000+01	X1	=	.2000+01	CY	=	.97507125+00	DIFF=	.24928752-01	PDIF=	.24928752-01	DENOM	=	.78063288+00				
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11725712+01	DIFF=	-.25712437-02	PDIF=	-.21976442-02	DENOM	=	.84873750+00				
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13388137+01	DIFF=	-.88137222-02	PDIF=	-.66268588-02	DENOM	=	.94544058+00				
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13939755+01	DIFF=	-.13975481-01	PDIF=	-.10127160-01	DENOM	=	.98831505+00				
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14428415+01	DIFF=	-.12841476-01	PDIF=	-.89800529-02	DENOM	=	.10320458+01				
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14858851+01	DIFF=	-.58850773-02	PDIF=	-.39764036-02	DENOM	=	.10757492+01				
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15236880+01	DIFF=	-.36879723-02	PDIF=	-.24262976-02	DENOM	=	.11187003+01				
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15568665+01	DIFF=	.31334750-02	PDIF=	.20086378-02	DENOM	=	.11603757+01				
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15860247+01	DIFF=	.39752910-02	PDIF=	.25001830-02	DENOM	=	.12004954+01				
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16117266+01	DIFF=	.82734396-02	PDIF=	.51070615-02	DENOM	=	.12390655+01				
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16344817+01	DIFF=	.55182865-02	PDIF=	.33648088-02	DENOM	=	.12764202+01				
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16547389+01	DIFF=	.52610821-02	PDIF=	.31693265-02	DENOM	=	.13132644+01				
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16892389+01	DIFF=	.76108078-03	PDIF=	.45034364-03	DENOM	=	.13903482+01				
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17040636+01	DIFF=	.93643152-03	PDIF=	.54922670-03	DENOM	=	.14342318+01				
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17175553+01	DIFF=	.24447105-02	PDIF=	.14213433-02	DENOM	=	.14849775+01				
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17410352+01	DIFF=	-.10351740-02	PDIF=	-.59492757-03	DENOM	=	.16204523+01				
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17642893+01	DIFF=	-.42892782-02	PDIF=	-.24370899-02	DENOM	=	.18990183+01				

TABLE 2. (Continued)

Y	=	.1780+01	X1	=	.7000+01	CY	=	.17807992+01	DIFF=	-.79917071-03	PDIF=	-.44897231+03	DENOM =	.23845974+01
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17910411+01	DIFF=	-.10411397-02	PDIF=	-.58164230-03	DENOM =	.31993704+01
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17965091+01	DIFF=	.34909238-02	PDIF=	.19394021-02	DENOM =	.45014954+01
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17990326+01	DIFF=	.96737112-03	PDIF=	.53742840-03	DENOM =	.64892430+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.18000264+01	DIFF=	-.26358426-04	PDIF=	-.14643570-04	DENOM =	.94051305+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18003250+01	DIFF=	-.32503375-03	PDIF=	-.18057430-03	DENOM =	.13540056+02
Y	=	.1800+01	X1	=	.1000+02	CY	=	.18003463+01	DIFF=	-.34634554-03	PDIF=	-.19241419-03	DENOM =	.19237436+02
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18002773+01	DIFF=	-.27732490-03	PDIF=	-.15406939-03	DENOM =	.26897334+02
Y	=	.1800+01	X1	=	.1100+02	CY	=	.18001937+01	DIFF=	-.19372535-03	PDIF=	-.10762520-03	DENOM =	.36980603+02
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18001220+01	DIFF=	-.12199387-03	PDIF=	-.67774370-04	DENOM =	.50013013+02
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18000683+01	DIFF=	-.68305689-04	PDIF=	-.37947605-04	DENOM =	.66589391+02
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18000314+01	DIFF=	-.31350309-04	PDIF=	-.17416838-04	DENOM =	.87377752+02
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18000077+01	DIFF=	-.76625716-05	PDIF=	-.42569842-05	DENOM =	.11312343+03
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17999937+01	DIFF=	.63202164-05	PDIF=	.35112314-05	DENOM =	.14465324+03
Y	=	.1800+01	X1	=	.1400+02	CY	=	.17999864+01	DIFF=	.13583824-04	PDIF=	.75465686-05	DENOM =	.18287955+03
Y	=	.1800+01	X1	=	.1450+02	CY	=	.17999836+01	DIFF=	.16414733-04	PDIF=	.91192960-05	DENOM =	.22880450+03
Y	=	.1800+01	X1	=	.1500+02	CY	=	.17999835+01	DIFF=	.16475122-04	PDIF=	.91528456-05	DENOM =	.28352407+03
Y	=	.1800+01	X1	=	.1550+02	CY	=	.17999851+01	DIFF=	.14929653-04	PDIF=	.82942517-05	DENOM =	.34823222+03
Y	=	.1800+01	X1	=	.1600+02	CY	=	.17999874+01	DIFF=	.12568823-04	PDIF=	.69826797-05	DENOM =	.42422508+03
Y	=	.1800+01	X1	=	.1650+02	CY	=	.17999901+01	DIFF=	.99114832-05	PDIF=	.55063795-05	DENOM =	.51290503+03
Y	=	.1800+01	X1	=	.1700+02	CY	=	.17999927+01	DIFF=	.72841197-05	PDIF=	.40467332-05	DENOM =	.61578484+03
Y	=	.1800+01	X1	=	.1750+02	CY	=	.17999951+01	DIFF=	.48797908-05	PDIF=	.27109949-05	DENOM =	.73449183+03
Y	=	.1800+01	X1	=	.1800+02	CY	=	.17999972+01	DIFF=	.28008523-05	PDIF=	.15560291-05	DENOM =	.87077199+03
Y	=	.1800+01	X1	=	.1850+02	CY	=	.17999989+01	DIFF=	.10894039-05	PDIF=	.60522438-06	DENOM =	.10264991+04
Y	=	.1800+01	X1	=	.1900+02	CY	=	.18000003+01	DIFF=	-.25131560-06	PDIF=	-.13961978-06	DENOM =	.12036539+04
Y	=	.1800+01	X1	=	.1950+02	CY	=	.18000012+01	DIFF=	-.12420804-05	PDIF=	-.69004464-06	DENOM =	.14043782+04
Y	=	.1800+01	X1	=	.2000+02	CY	=	.18000019+01	DIFF=	-.19175104-05	PDIF=	-.10652835-05	DENOM =	.16309290+04
Y	=	.1800+01	X1	=	.2100+02	CY	=	.18000025+01	DIFF=	-.24912732-05	PDIF=	-.13840407-05	DENOM =	.21712591+04

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .2200+02  CY  =  .18000023+01  DIFF= -.23187194-05  PDIF= -.12881774-05  DENOM =  .28456016+04
 Y  =  .1800+01  X1  =  .2300+02  CY  =  .18000017+01  DIFF= -.17164449-05  PDIF= -.95358048-06  DENOM =  .36773419+04
 Y  =  .1800+01  X1  =  .2400+02  CY  =  .18000009+01  DIFF= -.94353797-06  PDIF= -.52418776-06  DENOM =  .46924256+04
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .18000002+01  DIFF= -.19799889-06  PDIF= -.10999938-06  DENOM =  .59194910+04
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .17999996+01  DIFF=  .37689010-06  PDIF=  .20938339-06  DENOM =  .73900013+04
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .17999993+01  DIFF=  .68306159-06  PDIF=  .37947866-06  DENOM =  .91383768+04
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17999993+01  DIFF=  .65806841-06  PDIF=  .36559356-06  DENOM =  .11202127+05
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17999997+01  DIFF=  .26660624-06  PDIF=  .14811458-06  DENOM =  .13621985+05
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18000005+01  DIFF= -.50649950-06  PDIF= -.28138861-06  DENOM =  .16442035+05

 DDD =   .46955786-02  RMS =   .84347573-02  YDY =   .16450954+03  ERR1 =   .28542896-04  ERROR =   .65762308-03

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APPROXIMATING FUNCTION NUMBER 11 IS G( 3)

CA( 1) =   .5492450791895854+00
CA( 2) =  -.3973422856934987+00
CA( 3) =   .2028256534253376+00
CA( 4) =  -.6393242213846917-01
CA( 5) =  -.3702760151885429-01
CA( 6) =   .7020194467811012-02
CA( 7) =   .3941300619267594-02
CA( 8) =  -.3409867605129533-03
CA( 9) =  -.1898689995202793-03
CA(10) =  -.3188160982165256+00
CA(11) =   .3174957694753918+00
```

TABLE 2. (Continued)

DDD = .1435701152698032-04 RMS = .4664016270142291-03 HM = .164507175384677 4+03

Y	=	.5400+00	X1	=	.0000	CY	=	.54924508+00	DIFF=	-.92450792-02	PDIF=	-.17120517-01	DENOM	=	.10000000+01
Y	=	.5410+00	X1	=	.1000+00	CY	=	.54088978+00	DIFF=	.11021598-03	PDIF=	.20372640-03	DENOM	=	.96225739+00
Y	=	.5420+00	X1	=	.2000+00	CY	=	.53608972+00	DIFF=	.59102799-02	PDIF=	.10904576-01	DENOM	=	.92835459+00
Y	=	.5430+00	X1	=	.3000+00	CY	=	.53503356+00	DIFF=	.79664384-02	PDIF=	.14671157-01	DENOM	=	.89808334+00
Y	=	.5460+00	X1	=	.4000+00	CY	=	.53785428+00	DIFF=	.81457243-02	PDIF=	.14918909-01	DENOM	=	.87124438+00
Y	=	.5490+00	X1	=	.5000+00	CY	=	.54462224+00	DIFF=	.43777608-02	PDIF=	.79740634-02	DENOM	=	.84764722+00
Y	=	.5530+00	X1	=	.6000+00	CY	=	.55534069+00	DIFF=	-.23406861-02	PDIF=	-.42327055-02	DENOM	=	.82710993+00
Y	=	.5565+00	X1	=	.7000+00	CY	=	.56994389+00	DIFF=	-.13443893-01	PDIF=	-.24157939-01	DENOM	=	.80945890+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.58829831+00	DIFF=	-.82983082-02	PDIF=	-.14307428-01	DENOM	=	.79452860+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.63541435+00	DIFF=	-.15414352-01	PDIF=	-.24861858-01	DENOM	=	.77220720+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.69448035+00	DIFF=	.55196504-02	PDIF=	.78852149-02	DENOM	=	.75897473+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.79927726+00	DIFF=	.20722745-01	PDIF=	.25271640-01	DENOM	=	.75388715+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.99249518+00	DIFF=	.75048196-02	PDIF=	.75048196-02	DENOM	=	.77738223+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11773089+01	DIFF=	-.73088531-02	PDIF=	-.62468830-02	DENOM	=	.83116351+00
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13342575+01	DIFF=	-.42574893-02	PDIF=	-.32011197-02	DENOM	=	.90676597+00
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13878924+01	DIFF=	-.78924483-02	PDIF=	-.57191655-02	DENOM	=	.94168479+00
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14363920+01	DIFF=	-.63919888-02	PDIF=	-.44699223-02	DENOM	=	.97879034+00
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14800051+01	DIFF=	-.50951580-05	PDIF=	-.34426744-05	DENOM	=	.10178091+01
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15190507+01	DIFF=	.94927231-03	PDIF=	.62452126-03	DENOM	=	.10584950+01
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15538827+01	DIFF=	.61173321-02	PDIF=	.39213667-02	DENOM	=	.11006219+01
Y	=	.1590+01	X1	=	.4200+01	CY	=	.15848651+01	DIFF=	.51349271-02	PDIF=	.32295139-02	DENOM	=	.11439768+01
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16123563+01	DIFF=	.76437006-02	PDIF=	.47183337-02	DENOM	=	.11883519+01
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16366988+01	DIFF=	.33011690-02	PDIF=	.20129079-02	DENOM	=	.12335379+01
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16582135+01	DIFF=	.17864609-02	PDIF=	.10761812-02	DENOM	=	.12793162+01
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16939203+01	DIFF=	-.39202610-02	PDIF=	-.23196811-02	DENOM	=	.13716869+01

TABLE 2. (Continued)

Y = .1705+01	XI = .5400+01	CY = .17086301+01	DIFF= -.36301169-02	PDIF= -.21291008-02	DENOM = .14177314+01
Y = .1720+01	XI = .5600+01	CY = .17215494+01	DIFF= -.15494229-02	PDIF= -.90082724-03	DENOM = .14632580+01
Y = .1740+01	XI = .6000+01	CY = .17427997+01	DIFF= -.27996558-02	PDIF= -.16089976-02	DENOM = .15512121+01
Y = .1760+01	XI = .6500+01	CY = .17624588+01	DIFF= -.24587691-02	PDIF= -.13970279-02	DENOM = .16503897+01
Y = .1780+01	XI = .7000+01	CY = .17763822+01	DIFF= .36178039-02	PDIF= .20324741-02	DENOM = .17285282+01
Y = .1790+01	XI = .7500+01	CY = .17861643+01	DIFF= .38356960-02	PDIF= .21428469-02	DENOM = .17726976+01
Y = .1800+01	XI = .8000+01	CY = .17930161+01	DIFF= .69839018-02	PDIF= .38799454-02	DENOM = .17659115+01
Y = .1800+01	XI = .8500+01	CY = .17978779+01	DIFF= .21221170-02	PDIF= .11789539-02	DENOM = .16864154+01
Y = .1800+01	XI = .9000+01	CY = .18015502+01	DIFF= -.15501779-02	PDIF= -.86120995-03	DENOM = .15069747+01
Y = .1800+01	XI = .9500+01	CY = .18049826+01	DIFF= -.49825527-02	PDIF= -.27680848-02	DENOM = .11941623+01
Y = .1800+01	XI = .1000+02	CY = .18109413+01	DIFF= -.10941271-01	PDIF= -.60784837-02	DENOM = .70764721+00
Y = .1800+01	XI = .1050+02	CY = -.13912844+02	DIFF= .15712844+02	PDIF= .87293575+01	DENOM = -.51789722-03
Y = .1800+01	XI = .1100+02	CY = .17923920+01	DIFF= .76079914-02	PDIF= .42266619-02	DENOM = -.98660857+00
Y = .1800+01	XI = .1150+02	CY = .17973363+01	DIFF= .26636587-02	PDIF= .14798104-02	DENOM = -.23159406+01
Y = .1800+01	XI = .1200+02	CY = .17989173+01	DIFF= .10827283-02	PDIF= .60151572-03	DENOM = -.40635820+01
Y = .1800+01	XI = .1250+02	CY = .17996155+01	DIFF= .38454128-03	PDIF= .21363405-03	DENOM = -.63150651+01
Y = .1800+01	XI = .1300+02	CY = .17999517+01	DIFF= .48349300-04	PDIF= .26860722-04	DENOM = -.91670983+01
Y = .1800+01	XI = .1350+02	CY = .18001104+01	DIFF= -.11044052-03	PDIF= -.61355845-04	DENOM = -.12728278+02
Y = .1800+01	XI = .1400+02	CY = .18001755+01	DIFF= -.17545585-03	PDIF= -.97475474-04	DENOM = -.17119803+02
Y = .1800+01	XI = .1450+02	CY = .18001899+01	DIFF= -.18992500-03	PDIF= -.10551389-03	DENOM = -.22476180+02
Y = .1800+01	XI = .1500+02	CY = .18001779+01	DIFF= -.17785631-03	PDIF= -.98809061-04	DENOM = -.28945945+02
Y = .1800+01	XI = .1550+02	CY = .18001531+01	DIFF= -.15306124-03	PDIF= -.85034022-04	DENOM = -.36692367+02
Y = .1800+01	XI = .1600+02	CY = .18001236+01	DIFF= -.12355700-03	PDIF= -.68642777-04	DENOM = -.45894164+02
Y = .1800+01	XI = .1650+02	CY = .18000939+01	DIFF= -.93927603-04	PDIF= -.52182002-04	DENOM = -.56746215+02
Y = .1800+01	XI = .1700+02	CY = .18000667+01	DIFF= -.66675493-04	PDIF= -.37041941-04	DENOM = -.69460270+02
Y = .1800+01	XI = .1750+02	CY = .18000430+01	DIFF= -.43030442-04	PDIF= -.23905801-04	DENOM = -.84265666+02
Y = .1800+01	XI = .1800+02	CY = .18000234+01	DIFF= -.23448015-04	PDIF= -.13026675-04	DENOM = -.10141003+03
Y = .1800+01	XI = .1850+02	CY = .18000079+01	DIFF= -.79222423-05	PDIF= -.44012457-05	DENOM = -.12116001+03

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .1900+02  CY  =  .17999962+01  DIFF=  .38165296-05  PDIF=  .21202942-05  DENOM = -.14380196+03
 Y  =  .1800+01  X1  =  .1950+02  CY  =  .17999878+01  DIFF=  .12176383-04  PDIF=  .67646574-05  DENOM = -.16964268+03
 Y  =  .1800+01  X1  =  .2000+02  CY  =  .17999824+01  DIFF=  .17625154-04  PDIF=  .97917521-05  DENOM = -.17901010+03
 Y  =  .1800+01  X1  =  .2100+02  CY  =  .17999783+01  DIFF=  .21688007-04  PDIF=  .12048893-04  DENOM = -.26974678+03
 Y  =  .1800+01  X1  =  .2200+02  CY  =  .17999805+01  DIFF=  .19535945-04  PDIF=  .10853303-04  DENOM = -.35908545+03
 Y  =  .1800+01  X1  =  .2300+02  CY  =  .17999859+01  DIFF=  .14070229-04  PDIF=  .78167938-05  DENOM = -.47048343+03
 Y  =  .1800+01  X1  =  .2400+02  CY  =  .17999925+01  DIFF=  .74945330-05  PDIF=  .41636294-05  DENOM = -.60780470+03
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .17999986+01  DIFF=  .13906458-05  PDIF=  .77258099-06  DENOM = -.77534269+03
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .18000032+01  DIFF= -.31648204-05  PDIF= -.17582335-05  DENOM = -.97784304+03
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .18000055+01  DIFF= -.54847778-05  PDIF= -.30470988-05  DENOM = -.12205265+04
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .18000052+01  DIFF= -.51721134-05  PDIF= -.28733963-05  DENOM = -.15091115+04
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .18000020+01  DIFF= -.20395953-05  PDIF= -.11331085-05  DENOM = -.18498370+04
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .17999960+01  DIFF=  .39521051-05  PDIF=  .21956140-05  DENOM = -.22494856+04

 DDD =   .24689538+03  RMS =   .19341249+01  YDY =   .16450954+03  ERR1 =   .15007968+01  ERROR =   .15079571+00

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

APPROXIMATING FUNCTION NUMBER 12 IS G(26)

CA( 1) =   .54896878344041260+00
CA( 2) =  -.47144452749506670+00
CA( 3) =   .23131551439471790+00
CA( 4) =  -.85602067763003100+01
CA( 5) =  -.50908807577391260+01
CA( 6) =   .10358619384433470+01
CA( 7) =   .58982821825467380+02
```

TABLE 2. (Continued)

CA(8) = -.5460299265227552-03

CA(9) = -.3065045222346623-03

CA(10) = -.3593129095465893+00

CA(11) = .3402909164157973+00

CA(12) = .2792302773768653-07

DDD = .6468989510132611-05 RMS = .3130734619506528-03 HM = .1645084730395292+03

Y	=	.5400+00	X1	=	.0000	CY	=	.54896878+00	DIFF=	-.89687834-02	PDIF=	-.16608858-01	DENOM =	.10000000+01
Y	=	.5410+00	X1	=	.1000+00	CY	=	.54061972+00	DIFF=	.38028143-03	PDIF=	.70292316-03	DENOM =	.95511838+00
Y	=	.5420+00	X1	=	.2000+00	CY	=	.53582742+00	DIFF=	.61725840-02	PDIF=	.11388531-01	DENOM =	.91456578+00
Y	=	.5430+00	X1	=	.3000+00	CY	=	.53478548+00	DIFF=	.82145237-02	PDIF=	.15128036-01	DENOM =	.87805753+00
Y	=	.5460+00	X1	=	.4000+00	CY	=	.53763066+00	DIFF=	.83693375-02	PDIF=	.15328457-01	DENOM =	.84532237+00
Y	=	.5490+00	X1	=	.5000+00	CY	=	.54443575+00	DIFF=	.45642472-02	PDIF=	.83137472-02	DENOM =	.81610208+00
Y	=	.5530+00	X1	=	.6000+00	CY	=	.55520483+00	DIFF=	-.22048341-02	PDIF=	-.39870418-02	DENOM =	.79015115+00
Y	=	.5565+00	X1	=	.7000+00	CY	=	.56987147+00	DIFF=	-.13371466-01	PDIF=	-.24027792-01	DENOM =	.76723638+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.58829993+00	DIFF=	-.82999258-02	PDIF=	-.14310217-01	DENOM =	.74713651+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.63558153+00	DIFF=	-.15581526-01	PDIF=	-.25131493-01	DENOM =	.71455398+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.69480614+00	DIFF=	.51938608-02	PDIF=	.74198012-02	DENOM =	.69085857+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.79975203+00	DIFF=	.20247974-01	PDIF=	.24692651-01	DENOM =	.66900874+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.99285451+00	DIFF=	.71454942-02	PDIF=	.71454942-02	DENOM =	.65966870+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11772643+01	DIFF=	-.72642608-02	PDIF=	-.62087699-02	DENOM =	.67213691+00
Y	=	.1330+01	X1	=	.3000+01	CY	=	.13339034+01	DIFF=	-.39033659-02	PDIF=	-.29348616-02	DENOM =	.69626886+00
Y	=	.1380+01	X1	=	.3200+01	CY	=	.13874992+01	DIFF=	-.74991510-02	PDIF=	-.54341674-02	DENOM =	.70753242+00
Y	=	.1430+01	X1	=	.3400+01	CY	=	.14360138+01	DIFF=	-.60137602-02	PDIF=	-.42054267-02	DENOM =	.71916637+00
Y	=	.1480+01	X1	=	.3600+01	CY	=	.14796911+01	DIFF=	.30887602-03	PDIF=	.20870001-03	DENOM =	.73086157+00
Y	=	.1520+01	X1	=	.3800+01	CY	=	.15188405+01	DIFF=	.11595203-02	PDIF=	.76284233-03	DENOM =	.74233549+00
Y	=	.1560+01	X1	=	.4000+01	CY	=	.15538028+01	DIFF=	.61971775-02	PDIF=	.39725497-02	DENOM =	.75332042+00

TABLE 2. (Continued)

Y	=	.1590+01	X1	=	.4200+01	CY	=	.15849280+01	DIFF=	.50720337-02	PDIF=	.31899583-02	DENOM =	.76355176+00					
Y	=	.1620+01	X1	=	.4400+01	CY	=	.16125597+01	DIFF=	.74403268-02	PDIF=	.45927944-02	DENOM =	.77275629+00					
Y	=	.1640+01	X1	=	.4600+01	CY	=	.16370266+01	DIFF=	.29733607-02	PDIF=	.18130248-02	DENOM =	.78064037+00					
Y	=	.1660+01	X1	=	.4800+01	CY	=	.16586376+01	DIFF=	.13624451-02	PDIF=	.82075005-03	DENOM =	.78687825+00					
Y	=	.1690+01	X1	=	.5200+01	CY	=	.16944143+01	DIFF=	-.44143215-02	PDIF=	-.26120246-02	DENOM =	.79288129+00					
Y	=	.1705+01	X1	=	.5400+01	CY	=	.17090854+01	DIFF=	-.40853747-02	PDIF=	-.23961142-02	DENOM =	.79172863+00					
Y	=	.1720+01	X1	=	.5600+01	CY	=	.17219123+01	DIFF=	-.19123447-02	PDIF=	-.11118283-02	DENOM =	.78707065+00					
Y	=	.1740+01	X1	=	.6000+01	CY	=	.17428171+01	DIFF=	-.28171096-02	PDIF=	-.16190285-02	DENOM =	.76448624+00					
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17617647+01	DIFF=	-.17646757-02	PDIF=	-.10026566-02	DENOM =	.70242480+00					
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17746946+01	DIFF=	.53054071-02	PDIF=	.29805658-02	DENOM =	.58626665+00					
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17830704+01	DIFF=	.69296091-02	PDIF=	.38712900-02	DENOM =	.39251771+00					
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17842441+01	DIFF=	.15755932-01	PDIF=	.87532958-02	DENOM =	.90470711-01					
Y	=	.1800+01	X1	=	.8500+01	CY	=	.17956760+01	DIFF=	.43240209-02	PDIF=	.24022338-02	DENOM =	-.35893971+00					
Y	=	.1800+01	X1	=	.9000+01	CY	=	.17971156+01	DIFF=	.28844236-02	PDIF=	.16024576-02	DENOM =	-.10042815+01					
Y	=	.1800+01	X1	=	.9500+01	CY	=	.17983668+01	DIFF=	.16331840-02	PDIF=	.90732443-03	DENOM =	-.19047694+01					
Y	=	.1800+01	X1	=	.1000+02	CY	=	.17991695+01	DIFF=	.83047869-03	PDIF=	.46137705-03	DENOM =	-.31314088+01					
Y	=	.1800+01	X1	=	.1050+02	CY	=	.17996461+01	DIFF=	.35385999-03	PDIF=	.19658888-03	DENOM =	-.47681394+01					
Y	=	.1800+01	X1	=	.1100+02	CY	=	.17999107+01	DIFF=	.89315809-04	PDIF=	.49619894-04	DENOM =	-.69129785+01					
Y	=	.1800+01	X1	=	.1150+02	CY	=	.18000442+01	DIFF=	-.44154935-04	PDIF=	-.24530520-04	DENOM =	-.96791637+01					
Y	=	.1800+01	X1	=	.1200+02	CY	=	.18001002+01	DIFF=	-.10015124-03	PDIF=	-.55639580-04	DENOM =	-.13196296+02					
Y	=	.1800+01	X1	=	.1250+02	CY	=	.18001128+01	DIFF=	-.11282673-03	PDIF=	-.62681514-04	DENOM =	-.17611482+02					
Y	=	.1800+01	X1	=	.1300+02	CY	=	.18001033+01	DIFF=	-.10327787-03	PDIF=	-.57376596-04	DENOM =	-.23090474+02					
Y	=	.1800+01	X1	=	.1350+02	CY	=	.18000841+01	DIFF=	-.84097211-04	PDIF=	-.46720673-04	DENOM =	-.29818817+02					
Y	=	.1800+01	X1	=	.1400+02	CY	=	.18000625+01	DIFF=	-.62465760-04	PDIF=	-.34703200-04	DENOM =	-.38002983+02					
Y	=	.1800+01	X1	=	.1450+02	CY	=	.18000422+01	DIFF=	-.42197752-04	PDIF=	-.23443196-04	DENOM =	-.47871518+02					
Y	=	.1800+01	X1	=	.1500+02	CY	=	.18000251+01	DIFF=	-.25067298-04	PDIF=	-.13926277-04	DENOM =	-.59676178+02					
Y	=	.1800+01	X1	=	.1550+02	CY	=	.18000117+01	DIFF=	-.11655239-04	PDIF=	-.64751328-05	DENOM =	-.73693075+02					
Y	=	.1800+01	X1	=	.1600+02	CY	=	.18000019+01	DIFF=	-.18807837-05	PDIF=	-.10448798-05	DENOM =	-.90223811+02					

TABLE 2. (Continued)

```
 Y  =  .1800+01  X1  =  .1650+02  CY  =  .17999953+01  DIFF=  .46712703-05  PDIF=  .25951501-05  DENOM = -.10959662+03
 Y  =  .1800+01  X1  =  .1700+02  CY  =  .17999914+01  DIFF=  .85543119-05  PDIF=  .47523955-05  DENOM = -.13216752+03
 Y  =  .1800+01  X1  =  .1750+02  CY  =  .17999897+01  DIFF=  .10346608-04  PDIF=  .57481154-05  DENOM = -.15832141+03
 Y  =  .1800+01  X1  =  .1800+02  CY  =  .17999894+01  DIFF=  .10589717-04  PDIF=  .58831759-05  DENOM = -.18847328+03
 Y  =  .1800+01  X1  =  .1850+02  CY  =  .17999902+01  DIFF=  .97585649-05  PDIF=  .54214249-05  DENOM = -.22306928+03
 Y  =  .1800+01  X1  =  .1900+02  CY  =  .17999917+01  DIFF=  .82503964-05  PDIF=  .45835535-05  DENOM = -.26258790+03
 Y  =  .1800+01  X1  =  .1950+02  CY  =  .17999936+01  DIFF=  .63845327-05  PDIF=  .35469626-05  DENOM = -.30754109+03
 Y  =  .1800+01  X1  =  .2000+02  CY  =  .17999956+01  DIFF=  .44079298-05  PDIF=  .24488499-05  DENOM = -.35847539+03
 Y  =  .1800+01  X1  =  .2100+02  CY  =  .17999992+01  DIFF=  .79915525-06  PDIF=  .44397514-06  DENOM = -.48065342+03
 Y  =  .1800+01  X1  =  .2200+02  CY  =  .18000017+01  DIFF= -.17175069-05  PDIF= -.95417051-06  DENOM = -.63422967+03
 Y  =  .1800+01  X1  =  .2300+02  CY  =  .18000029+01  DIFF= -.28888934-05  PDIF= -.16049408-05  DENOM = -.82493822+03
 Y  =  .1800+01  X1  =  .2400+02  CY  =  .18000028+01  DIFF= -.28442552-05  PDIF= -.15801418-05  DENOM = -.10591759+04
 Y  =  .1800+01  X1  =  .2500+02  CY  =  .18000019+01  DIFF= -.19325968-05  PDIF= -.10736649-05  DENOM = -.13440386+04
 Y  =  .1800+01  X1  =  .2600+02  CY  =  .18000006+01  DIFF= -.61148610-06  PDIF= -.33971450-06  DENOM = -.16873577+04
 Y  =  .1800+01  X1  =  .2700+02  CY  =  .17999994+01  DIFF=  .62518622-06  PDIF=  .34732568-06  DENOM = -.20977360+04
 Y  =  .1800+01  X1  =  .2800+02  CY  =  .17999987+01  DIFF=  .12917929-05  PDIF=  .71766272-06  DENOM = -.25845845+04
 Y  =  .1800+01  X1  =  .2900+02  CY  =  .17999991+01  DIFF=  .93671043-06  PDIF=  .52039468-06  DENOM = -.31581582+04
 Y  =  .1800+01  X1  =  .3000+02  CY  =  .18000008+01  DIFF= -.84437722-06  PDIF= -.46909845-06  DENOM = -.38295926+04

 DDD =   .19582769-02  RMS =   .54470967-02  YDY =   .16450954+03  ERR1 =   .11903729-04  ERROR =   .42468757-03

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

APPROXIMATING FUNCTION NUMBER 13 IS G(27)

CA( 1) =   .5485096945387962+00
CA( 2) =  -.5764655405431457+00
```

TABLE 2. (Continued)

```
CA( 3) =   .27175539069154 41+00
CA( 4) =  -.10790948935596 57+00
CA( 5) =  -.67520725144225 71-01
CA( 6) =   .13793607448081 25-01
CA( 7) =   .81285565143965 90-02
CA( 8) =  -.69914129425168 97-03
CA( 9) =  -.40487212596459 65-03
CA(10) =  -.41220149416174 26+00
CA(11) =   .36215771000251 23+00
CA(12) =   .31129894378989 39-06
CA(13) =  -.24378267827142 52-08
DDD    =   .42860958873562 62-05      RMS  =   .25483494026158 42-03      HM  =   .16450883214634 90+03
```

Y	=	.5400+00	X1	=	.0000	CY	=	.54850969+00	DIFF=	-.85096945-02	PDIF=	-.15758694-01	DENOM =	.10000000+01
Y	=	.5410+00	X1	=	.1000+00	CY	=	.54053150+00	DIFF=	.46850017-03	PDIF=	.86598922-03	DENOM =	.94500429+00
Y	=	.5420+00	X1	=	.2000+00	CY	=	.53596377+00	DIFF=	.60362305-02	PDIF=	.11136957-01	DENOM =	.89504982+00
Y	=	.5430+00	X1	=	.3000+00	CY	=	.53502147+00	DIFF=	.79785251-02	PDIF=	.14693416-01	DENOM =	.84976012+00
Y	=	.5460+00	X1	=	.4000+00	CY	=	.53786636+00	DIFF=	.81336449-02	PDIF=	.14896786-01	DENOM =	.80877727+00
Y	=	.5490+00	X1	=	.5000+00	CY	=	.54459831+00	DIFF=	.44016887-02	PDIF=	.80176479-02	DENOM =	.77176137+00
Y	=	.5530+00	X1	=	.6000+00	CY	=	.55524904+00	DIFF=	-.22490375-02	PDIF=	-.40669757-02	DENOM =	.73839013+00
Y	=	.5565+00	X1	=	.7000+00	CY	=	.56977847+00	DIFF=	-.13278467-01	PDIF=	-.23860677-01	DENOM =	.70835831+00
Y	=	.5800+00	X1	=	.8000+00	CY	=	.58807441+00	DIFF=	-.80744139-02	PDIF=	-.13921403-01	DENOM =	.68137728+00
Y	=	.6200+00	X1	=	.1000+01	CY	=	.63517743+00	DIFF=	-.15177432-01	PDIF=	-.24479730-01	DENOM =	.63549312+00
Y	=	.7000+00	X1	=	.1200+01	CY	=	.69440601+00	DIFF=	.55939908-02	PDIF=	.79914155-02	DENOM =	.59874215+00
Y	=	.8200+00	X1	=	.1500+01	CY	=	.79969450+00	DIFF=	.20305500-01	PDIF=	.24762805-01	DENOM =	.55694869+00
Y	=	.1000+01	X1	=	.2000+01	CY	=	.99362393+00	DIFF=	.63760664-02	PDIF=	.63760664-02	DENOM =	.51104529+00
Y	=	.1170+01	X1	=	.2500+01	CY	=	.11781794+01	DIFF=	-.81793987-02	PDIF=	-.69909391-02	DENOM =	.48035397+00

TABLE 2. (Continued)

Y =	.1330+01	XI =	.3000+01	CY =	.13341457+01	DIFF=	-.41457253-02	PDIF=	-.31170867-02	DENOM =	.45359307+00
Y =	.1380+01	XI =	.3200+01	CY =	.13873876+01	DIFF=	-.73876484-02	PDIF=	-.53533684-02	DENOM =	.44238061+00
Y =	.1430+01	XI =	.3400+01	CY =	.14355791+01	DIFF=	-.55791254-02	PDIF=	-.39014863-02	DENOM =	.43043589+00
Y =	.1480+01	XI =	.3600+01	CY =	.14790096+01	DIFF=	.99041803-03	PDIF=	.66920137-03	DENOM =	.41756016+00
Y =	.1520+01	XI =	.3800+01	CY =	.15180230+01	DIFF=	.19770113-02	PDIF=	.13006653-02	DENOM =	.40360444+00
Y =	.1560+01	XI =	.4000+01	CY =	.15529824+01	DIFF=	.70176027-02	PDIF=	.44984633-02	DENOM =	.38845423+00
Y =	.1590+01	XI =	.4200+01	CY =	.15842464+01	DIFF=	.57536004-02	PDIF=	.36186166-02	DENOM =	.37201418+00
Y =	.1620+01	XI =	.4400+01	CY =	.16121546+01	DIFF=	.78454069-02	PDIF=	.48428437-02	DENOM =	.35419278+00
Y =	.1640+01	XI =	.4600+01	CY =	.16370195+01	DIFF=	.29804594-02	PDIF=	.18173533-02	DENOM =	.33488711+00
Y =	.1660+01	XI =	.4800+01	CY =	.16591232+01	DIFF=	.87682515-03	PDIF=	.52820792-03	DENOM =	.31396753+00
Y =	.1690+01	XI =	.5200+01	CY =	.16960175+01	DIFF=	-.60175240-02	PDIF=	-.35606651-02	DENOM =	.26654302+00
Y =	.1705+01	XI =	.5400+01	CY =	.17112165+01	DIFF=	-.62165282-02	PDIF=	-.36460576-02	DENOM =	.23950796+00
Y =	.1720+01	XI =	.5600+01	CY =	.17244679+01	DIFF=	-.44679447-02	PDIF=	-.25976423-02	DENOM =	.20976829+00
Y =	.1740+01	XI =	.6000+01	CY =	.17454661+01	DIFF=	-.54660740-02	PDIF=	-.31414218-02	DENOM =	.14008931+00
Y =	.1760+01	XI =	.6500+01	CY =	.17508006+01	DIFF=	.91993682-02	PDIF=	.52269137-02	DENOM =	.26330935-01
Y =	.1780+01	XI =	.7000+01	CY =	.17854718+01	DIFF=	-.54718069-02	PDIF=	-.30740488-02	DENOM =	-.13225864+00
Y =	.1790+01	XI =	.7500+01	CY =	.17915009+01	DIFF=	-.15009114-02	PDIF=	-.83849802-03	DENOM =	-.35895082+00
Y =	.1800+01	XI =	.8000+01	CY =	.17957839+01	DIFF=	.42160852-02	PDIF=	.23422695-02	DENOM =	-.68578028+00
Y =	.1800+01	XI =	.8500+01	CY =	.17982343+01	DIFF=	.17656724-02	PDIF=	.98092909-03	DENOM =	-.11550226+01
Y =	.1800+01	XI =	.9000+01	CY =	.17994932+01	DIFF=	.50682071-03	PDIF=	.28156706-03	DENOM =	-.18206698+01
Y =	.1800+01	XI =	.9500+01	CY =	.18000614+01	DIFF=	-.61352390-04	PDIF=	-.34084661-04	DENOM =	-.27499037+01
Y =	.1800+01	XI =	.1000+02	CY =	.18002623+01	DIFF=	-.26231000-03	PDIF=	-.14572778-03	DENOM =	-.40245683+01
Y =	.1800+01	XI =	.1050+02	CY =	.18002865+01	DIFF=	-.28650923-03	PDIF=	-.15917180-03	DENOM =	-.57426386+01
Y =	.1800+01	XI =	.1100+02	CY =	.18002382+01	DIFF=	-.23818714-03	PDIF=	-.13232619-03	DENOM =	-.80196899+01
Y =	.1800+01	XI =	.1150+02	CY =	.18001702+01	DIFF=	-.17015366-03	PDIF=	-.94529813-04	DENOM =	-.10990364+02
Y =	.1800+01	XI =	.1200+02	CY =	.18001064+01	DIFF=	-.10643728-03	PDIF=	-.59131822-04	DENOM =	-.14809834+02
Y =	.1800+01	XI =	.1250+02	CY =	.18000559+01	DIFF=	-.55913895-04	PDIF=	-.31063275-04	DENOM =	-.19655270+02
Y =	.1800+01	XI =	.1300+02	CY =	.18000201+01	DIFF=	-.20056780-04	PDIF=	-.11142656-04	DENOM =	-.25727297+02

TABLE 2. (Continued)

```
Y = .1800+01  X1 = .1350+02  CY = .17999971+01  DIFF= .28699668-05  PDIF= .15944260-05  DENOM = -.33251463+02
Y = .1800+01  X1 = .1400+02  CY = .17999843+01  DIFF= .15661755-04  PDIF= .87009750-05  DENOM = -.42479693+02
Y = .1800+01  X1 = .1450+02  CY = .17999788+01  DIFF= .21150629-04  PDIF= .11750349-04  DENOM = -.53691752+02
Y = .1800+01  X1 = .1500+02  CY = .17999782+01  DIFF= .21778810-04  PDIF= .12099339-04  DENOM = -.67196701+02
Y = .1800+01  X1 = .1550+02  CY = .17999805+01  DIFF= .19472628-04  PDIF= .10818127-04  DENOM = -.83334355+02
Y = .1800+01  X1 = .1600+02  CY = .17999843+01  DIFF= .15656779-04  PDIF= .86982108-05  DENOM = -.10247674+03
Y = .1800+01  X1 = .1650+02  CY = .17999887+01  DIFF= .11325387-04  PDIF= .62918819-05  DENOM = -.12502956+03
Y = .1800+01  X1 = .1700+02  CY = .17999929+01  DIFF= .71282725-05  PDIF= .39601514-05  DENOM = -.15143362+03
Y = .1800+01  X1 = .1750+02  CY = .17999965+01  DIFF= .34532456-05  PDIF= .19184698-05  DENOM = -.18216632+03
Y = .1800+01  X1 = .1800+02  CY = .17999995+01  DIFF= .49684075-06  PDIF= .27602264-06  DENOM = -.21774308+03
Y = .1800+01  X1 = .1850+02  CY = .18000017+01  DIFF= -.16783798-05  PDIF= -.93243322-06  DENOM = -.25871883+03
Y = .1800+01  X1 = .1900+02  CY = .18000031+01  DIFF= -.30991880-05  PDIF= -.17217711-05  DENOM = -.30568943+03
Y = .1800+01  X1 = .1950+02  CY = .18000038+01  DIFF= -.38479479-05  PDIF= -.21377488-05  DENOM = -.35929311+03
Y = .1800+01  X1 = .2000+02  CY = .18000040+01  DIFF= -.40377635-05  PDIF= -.22432020-05  DENOM = -.42021200+03
Y = .1800+01  X1 = .2100+02  CY = .18000032+01  DIFF= -.32450369-05  PDIF= -.18027983-05  DENOM = -.56695178+03
Y = .1800+01  X1 = .2200+02  CY = .18000017+01  DIFF= -.16873583-05  PDIF= -.93742125-06  DENOM = -.75229789+03
Y = .1800+01  X1 = .2300+02  CY = .18000001+01  DIFF= -.13693458-06  PDIF= -.76074768-07  DENOM = -.98343422+03
Y = .1800+01  X1 = .2400+02  CY = .17999991+01  DIFF= .91185165-06  PDIF= .50658425-06  DENOM = -.12683860+04
Y = .1800+01  X1 = .2500+02  CY = .17999988+01  DIFF= .12489824-05  PDIF= .69387909-06  DENOM = -.16160664+04
Y = .1800+01  X1 = .2600+02  CY = .17999991+01  DIFF= .91970384-06  PDIF= .51094658-06  DENOM = -.20363235+04
Y = .1800+01  X1 = .2700+02  CY = .17999998+01  DIFF= .18214365-06  PDIF= .10119092-06  DENOM = -.25399865+04
Y = .1800+01  X1 = .2800+02  CY = .18000005+01  DIFF= -.53694913-06  PDIF= -.29830507-06  DENOM = -.31389135+04
Y = .1800+01  X1 = .2900+02  CY = .18000007+01  DIFF= -.68299582-06  PDIF= -.37944212-06  DENOM = -.38460374+04
Y = .1800+01  X1 = .3000+02  CY = .17999996+01  DIFF= .39118621-06  PDIF= .21732567-06  DENOM = -.46754139+04
```



```
DDD = .18106065-02  RMS = .52376933-02  YDY = .16450954+03  ERR1 = .11006088-04  ERROR = .40836125-03
```

TABLE 2. (Continued)

```
APPROXIMATING FUNCTION NUMBER 14 IS G( 9)

CA( 1) =   .54711795548388870+00
CA( 2) =  -.77757793653960590+00
CA( 3) =   .35678834535126780+00
CA( 4) =  -.14237465413144380+00
CA( 5) =  -.98996695669502610-01
CA( 6) =   .20080322399893320-01
CA( 7) =   .12842700080109100-01
CA( 8) =  -.10018161148332940-02
CA( 9) =  -.64311720046774560-03
CA(10) =  -.50730435175604490+00
CA(11) =   .39536863500968930+00
CA(12) =   .26463695614389490-05
CA(13) =  -.44363715230536590-07
CA(14) =  -.56477992656473400-09
DDD    =   .26819477511631770-05      RMS   =   .20158266787430130-03      MM  =   .16450909604401650+03

 Y  =  .5400+00  X1  =  .0000     CY  =  .54711796+00  DIFF= -.71179555-02  PDIF= -.13181399-01  DENOM =  .10000000+01
 Y  =  .5410+00  X1  =  .1000+00  CY  =  .54034152+00  DIFF=  .65847955-03  PDIF=  .12171526-02  DENOM =  .92571237+00
 Y  =  .5420+00  X1  =  .2000+00  CY  =  .53656533+00  DIFF=  .54346656-02  PDIF=  .10027058-01  DENOM =  .85798432+00
 Y  =  .5430+00  X1  =  .3000+00  CY  =  .53603359+00  DIFF=  .69664070-02  PDIF=  .12829479-01  DENOM =  .79626712+00
 Y  =  .5460+00  X1  =  .4000+00  CY  =  .53895232+00  DIFF=  .70476764-02  PDIF=  .12907832-01  DENOM =  .74004137+00
 Y  =  .5490+00  X1  =  .5000+00  CY  =  .54547911+00  DIFF=  .35208855-02  PDIF=  .64132705-02  DENOM =  .68881614+00
 Y  =  .5530+00  X1  =  .6000+00  CY  =  .55571394+00  DIFF= -.27139367-02  PDIF= -.49076613-02  DENOM =  .64212828+00
```

TABLE 2. (Continued)

Y = .5565+00	X1 = .7000+00	CY = .56969180+00	DIFF= -.13191801-01	PDIF= -.23704943-01	DENOM = .59954162+00
Y = .5800+00	X1 = .8000+00	CY = .58737793+00	DIFF= -.73779250-02	PDIF= -.12720560-01	DENOM = .56064620+00
Y = .6200+00	X1 = .1000+01	CY = .63337941+00	DIFF= -.13379409-01	PDIF= -.21579691-01	DENOM = .49241590+00
Y = .7000+00	X1 = .1200+01	CY = .69205905+00	DIFF= .79409487-02	PDIF= .11344212-01	DENOM = .43465349+00
Y = .8200+00	X1 = .1500+01	CY = .79810059+00	DIFF= .21899411-01	PDIF= .26706599-01	DENOM = .36245491+00
Y = .1000+01	X1 = .2000+01	CY = .99668934+00	DIFF= .33106577-02	PDIF= .33106577-02	DENOM = .26509108+00
Y = .1170+01	X1 = .2500+01	CY = .11859517+01	DIFF= -.15951666-01	PDIF= -.13633903-01	DENOM = .17864151+00
Y = .1330+01	X1 = .3000+01	CY = .13419108+01	DIFF= -.11910842-01	PDIF= -.89555205-02	DENOM = .91263922-01
Y = .1380+01	X1 = .3200+01	CY = .13919123+01	DIFF= -.11912331-01	PDIF= -.86321239-02	DENOM = .54889005-01
Y = .1430+01	X1 = .3400+01	CY = .14234391+01	DIFF= .65609022-02	PDIF= .45880435-02	DENOM = .17610490-01
Y = .1480+01	X1 = .3600+01	CY = .15088981+01	DIFF= -.28898104-01	PDIF= -.19525746-01	DENOM = -.20468456-01
Y = .1520+01	X1 = .3800+01	CY = .15331052+01	DIFF= -.13105201-01	PDIF= -.86218427-02	DENOM = -.59156043-01
Y = .1560+01	X1 = .4000+01	CY = .15633541+01	DIFF= -.33540698-02	PDIF= -.21500448-02	DENOM = -.98194862-01
Y = .1590+01	X1 = .4200+01	CY = .15913312+01	DIFF= -.13311829-02	PDIF= -.83722196-03	DENOM = -.13728481+00
Y = .1620+01	X1 = .4400+01	CY = .16164474+01	DIFF= .35526206-02	PDIF= .21929757-02	DENOM = -.17610595+00
Y = .1640+01	X1 = .4600+01	CY = .16388281+01	DIFF= .11718572-02	PDIF= .71454705-03	DENOM = -.21434132+00
Y = .1660+01	X1 = .4800+01	CY = .16587357+01	DIFF= .12642747-02	PDIF= .76161129-03	DENOM = -.25169966+00
Y = .1690+01	X1 = .5200+01	CY = .16922406+01	DIFF= -.22406027-02	PDIF= -.13258004-02	DENOM = -.32288475+00
Y = .1705+01	X1 = .5400+01	CY = .17063441+01	DIFF= -.13440642-02	PDIF= -.78830745-03	DENOM = -.35646132+00
Y = .1720+01	X1 = .5600+01	CY = .17189725+01	DIFF= .10275377-02	PDIF= .59740564-03	DENOM = -.38870557+00
Y = .1740+01	X1 = .6000+01	CY = .17405000+01	DIFF= -.49997909-03	PDIF= -.28734430-03	DENOM = -.45006348+00
Y = .1760+01	X1 = .6500+01	CY = .17617364+01	DIFF= -.17363738-02	PDIF= -.98657604-03	DENOM = -.52608467+00
Y = .1780+01	X1 = .7000+01	CY = .17777863+01	DIFF= .22136878-02	PDIF= .12436448-02	DENOM = -.61502384+00
Y = .1790+01	X1 = .7500+01	CY = .17891465+01	DIFF= .85348334-03	PDIF= .47680634-03	DENOM = -.74130947+00
Y = .1800+01	X1 = .8000+01	CY = .17961587+01	DIFF= .38413264-02	PDIF= .21340702-02	DENOM = -.94175002+00
Y = .1800+01	X1 = .8500+01	CY = .17996280+01	DIFF= .37200873-03	PDIF= .20667152-03	DENOM = -.12676979+01
Y = .1800+01	X1 = .9000+01	CY = .18008187+01	DIFF= -.81869622-03	PDIF= -.45483123-03	DENOM = -.17872099+01
Y = .1800+01	X1 = .9500+01	CY = .18009127+01	DIFF= -.91271756-03	PDIF= -.50706531-03	DENOM = -.25872060+01

TABLE 2. (Continued

```
Y = .1800+01  X1 = .1000+02  CY = .18006496+01  DIFF= -.64955145-03  PDIF= -.36086192-03  DENOM = -.37756273+01
Y = .1800+01  X1 = .1050+02  CY = .18003617+01  DIFF= -.36168235-03  PDIF= -.20093464-03  DENOM = -.54835972+01
Y = .1800+01  X1 = .1100+02  CY = .18001514+01  DIFF= -.15137069-03  PDIF= -.84094829-04  DENOM = -.78675840+01
Y = .1800+01  X1 = .1150+02  CY = .18000255+01  DIFF= -.25503861-04  PDIF= -.14168812-04  DENOM = -.11111570+02
Y = .1800+01  X1 = .1200+02  CY = .17999629+01  DIFF=  .37053747-04  PDIF=  .20585415-04  DENOM = -.15429229+02
Y = .1800+01  X1 = .1250+02  CY = .17999405+01  DIFF=  .59483930-04  PDIF=  .33046628-04  DENOM = -.21066106+02
Y = .1800+01  X1 = .1300+02  CY = .17999404+01  DIFF=  .59596694-04  PDIF=  .33109274-04  DENOM = -.28301818+02
Y = .1800+01  X1 = .1350+02  CY = .17999508+01  DIFF=  .49204095-04  PDIF=  .27335608-04  DENOM = -.37452255+02
Y = .1800+01  X1 = .1400+02  CY = .17999646+01  DIFF=  .35407553-04  PDIF=  .19670863-04  DENOM = -.48871807+02
Y = .1800+01  X1 = .1450+02  CY = .17999779+01  DIFF=  .22074628-04  PDIF=  .12263682-04  DENOM = -.62955594+02
Y = .1800+01  X1 = .1500+02  CY = .17999890+01  DIFF=  .11021049-04  PDIF=  .61228051-05  DENOM = -.80141725+02
Y = .1800+01  X1 = .1550+02  CY = .17999972+01  DIFF=  .28424818-05  PDIF=  .15791566-05  DENOM = -.10091357+03
Y = .1800+01  X1 = .1600+02  CY = .18000025+01  DIFF= -.25385822-05  PDIF= -.14103235-05  DENOM = -.12580205+03
Y = .1800+01  X1 = .1650+02  CY = .18000055+01  DIFF= -.55297676-05  PDIF= -.30720931-05  DENOM = -.15538795+03
Y = .1800+01  X1 = .1700+02  CY = .18000067+01  DIFF= -.66627255-05  PDIF= -.37015142-05  DENOM = -.19030428+03
Y = .1800+01  X1 = .1750+02  CY = .18000065+01  DIFF= -.64756406-05  PDIF= -.35975781-05  DENOM = -.23123863+03
Y = .1800+01  X1 = .1800+02  CY = .18000055+01  DIFF= -.54514191-05  PDIF= -.30285662-05  DENOM = -.27893555+03
Y = .1800+01  X1 = .1850+02  CY = .18000040+01  DIFF= -.39899207-05  PDIF= -.22166226-05  DENOM = -.33419898+03
Y = .1800+01  X1 = .1900+02  CY = .18000024+01  DIFF= -.24003211-05  PDIF= -.13335117-05  DENOM = -.39789475+03
Y = .1800+01  X1 = .1950+02  CY = .18000009+01  DIFF= -.90481876-06  PDIF= -.50267709-06  DENOM = -.47095299+03
Y = .1800+01  X1 = .2000+02  CY = .17999996+01  DIFF=  .35176561-06  PDIF=  .19542534-06  DENOM = -.55437072+03
Y = .1800+01  X1 = .2100+02  CY = .17999981+01  DIFF=  .18821058-05  PDIF=  .10456143-05  DENOM = -.75662245+03
Y = .1800+01  X1 = .2200+02  CY = .17999979+01  DIFF=  .21097337-05  PDIF=  .11720743-05  DENOM = -.10140617+04
Y = .1800+01  X1 = .2300+02  CY = .17999986+01  DIFF=  .14252218-05  PDIF=  .79178991-06  DENOM = -.13373379+04
Y = .1800+01  X1 = .2400+02  CY = .17999996+01  DIFF=  .39468241-06  PDIF=  .21926801-06  DENOM = -.17384267+04
Y = .1800+01  X1 = .2500+02  CY = .18000005+01  DIFF= -.45398875-06  PDIF= -.25221597-06  DENOM = -.22307201+04
Y = .1800+01  X1 = .2600+02  CY = .18000008+01  DIFF= -.77469911-06  PDIF= -.43038840-06  DENOM = -.28291212+04
Y = .1800+01  X1 = .2700+02  CY = .18000005+01  DIFF= -.49269073-06  PDIF= -.27371707-06  DENOM = -.35501417+04
```

TABLE 2. (Continued)

```
 Y   =  .1800+01   X1  =  .2800+02   CY  =  .17999999+01   DIFF=  .14537522-06   PDIF=  .80764014-07   DENOM = -.44120032+04
 Y   =  .1800+01   X1  =  .2900+02   CY  =  .17999995+01   DIFF=  .54911385-06   PDIF=  .30506325-06   DENOM = -.54347424+04
 Y   =  .1800+01   X1  =  .3000+02   CY  =  .18000002+01   DIFF= -.21888173-06   PDIF= -.12160096-06   DENOM = -.66403206+04


 DDD =   .28101638-02   RMS =   .65252003-02   YDY =   .16450954+03   ERR1 =   .17082072-04   ERROR =   .50874284-03

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


APPROXIMATING FUNCTION NUMBER IS IS G(29)


CA( 1) =    .5445255000995302+00
CA( 2) =   -.1052399112596059+01
CA( 3) =    .4909405172795375+00
CA( 4) =   -.1785645464468284+00
CA( 5) =   -.1451425506040166+00
CA( 6) =    .2834101152861633-01
CA( 7) =    .2072221855162725-01
CA( 8) =   -.1499243763561397-02
CA( 9) =   -.1169792232077523-02
CA(10) =   -.6294659483748437+00
CA(11) =    .4330352988894974+00
CA(12) =    .1441855138917059-04
CA(13) =   -.3794072513344632-06
CA(14) =   -.1008606621568983-07
CA(15) =   -.3555378387654323-10
DDD    =    .1358171924786822-05      RMS   =   .1434516033258953-03      MM  =   .16450931381776S1+03
```

TABLE 2. (Continued)

Y	=	.5400+00	XI	=	.0000	CY	=	.54452550+00	DIFF=	-.45255001-02	PDIF=	-.83805557-02	DENOM	=	.10000000+01
Y	=	.5410+00	XI	=	.1000+00	CY	=	.53998805+00	DIFF=	.10119503-02	PDIF=	.18705181-02	DENOM	=	.89952641+00
Y	=	.5420+00	XI	=	.2000+00	CY	=	.53781465+00	DIFF=	.41853482-02	PDIF=	.77220446-02	DENOM	=	.80802944+00
Y	=	.5430+00	XI	=	.3000+00	CY	=	.53823321+00	DIFF=	.47667942-02	PDIF=	.87786266-02	DENOM	=	.72471108+00
Y	=	.5460+00	XI	=	.4000+00	CY	=	.54145474+00	DIFF=	.45452637-02	PDIF=	.83246589-02	DENOM	=	.64882028+00
Y	=	.5490+00	XI	=	.5000+00	CY	=	.54766564+00	DIFF=	.13343565-02	PDIF=	.24305219-02	DENOM	=	.57965156+00
Y	=	.5530+00	XI	=	.6000+00	CY	=	.55701996+00	DIFF=	-.40199606-02	PDIF=	-.72693682-02	DENOM	=	.51654363+00
Y	=	.5565+00	XI	=	.7000+00	CY	=	.56963216+00	DIFF=	-.13132162-01	PDIF=	-.23597776-01	DENOM	=	.45887804+00
Y	=	.5800+00	XI	=	.8000+00	CY	=	.58557118+00	DIFF=	-.55711766-02	PDIF=	-.96054768-02	DENOM	=	.40607786+00
Y	=	.6200+00	XI	=	.1000+01	CY	=	.62745630+00	DIFF=	-.74563014-02	PDIF=	-.12026293-01	DENOM	=	.31296532+00
Y	=	.7000+00	XI	=	.1200+01	CY	=	.68224383+00	DIFF=	.17756171-01	PDIF=	.25365959-01	DENOM	=	.23336955+00
Y	=	.8200+00	XI	=	.1500+01	CY	=	.78653550+00	DIFF=	.33464503-01	PDIF=	.40810370-01	DENOM	=	.13234226+00
Y	=	.1000+01	XI	=	.2000+01	CY	=	.73866506+00	DIFF=	.26133494+00	PDIF=	.26133494+00	DENOM	=	-.71802105-02
Y	=	.1170+01	XI	=	.2500+01	CY	=	.11525897+01	DIFF=	.17410344-01	PDIF=	.14880635-01	DENOM	=	-.13195932+00
Y	=	.1330+01	XI	=	.3000+01	CY	=	.13268034+01	DIFF=	.31965676-02	PDIF=	.24034343-02	DENOM	=	-.25366070+00
Y	=	.1380+01	XI	=	.3200+01	CY	=	.13847008+01	DIFF=	-.47008282-02	PDIF=	-.34063972-02	DENOM	=	-.30193548+00
Y	=	.1430+01	XI	=	.3400+01	CY	=	.14362771+01	DIFF=	-.62771239-02	PDIF=	-.43895971-02	DENOM	=	-.34960390+00
Y	=	.1480+01	XI	=	.3600+01	CY	=	.14819253+01	DIFF=	-.19252626-02	PDIF=	-.13008531-02	DENOM	=	-.39620094+00
Y	=	.1520+01	XI	=	.3800+01	CY	=	.15221222+01	DIFF=	-.21222096-02	PDIF=	-.13961905-02	DENOM	=	-.44115359+00
Y	=	.1560+01	XI	=	.4000+01	CY	=	.15573881+01	DIFF=	.26119354-02	PDIF=	.16743176-02	DENOM	=	-.48381785+00
Y	=	.1590+01	XI	=	.4200+01	CY	=	.15882513+01	DIFF=	.17486594-02	PDIF=	.10997858-02	DENOM	=	-.52351566+00
Y	=	.1620+01	XI	=	.4400+01	CY	=	.16152243+01	DIFF=	.47756623-02	PDIF=	.29479397-02	DENOM	=	-.55957152+00
Y	=	.1640+01	XI	=	.4600+01	CY	=	.16387878+01	DIFF=	.12121822-02	PDIF=	.73913549-03	DENOM	=	-.59134898+00
Y	=	.1660+01	XI	=	.4800+01	CY	=	.16593829+01	DIFF=	.61707775-03	PDIF=	.37173359-03	DENOM	=	-.61828704+00
Y	=	.1690+01	XI	=	.5200+01	CY	=	.16932201+01	DIFF=	-.32201190-02	PDIF=	-.19053959-02	DENOM	=	-.65599538+00
Y	=	.1705+01	XI	=	.5400+01	CY	=	.17071353+01	DIFF=	-.21352677-02	PDIF=	-.12523564-02	DENOM	=	-.66634652+00
Y	=	.1720+01	XI	=	.5600+01	CY	=	.17194339+01	DIFF=	.56606775-03	PDIF=	.32910916-03	DENOM	=	-.67109211+00

TABLE 2. (Continued)

Y	=	.1740+01	X1	=	.6000+01	CY	=	.17401416+01	DIFF=	-.14158787-03	PDIF=	-.81372337-04	DENOM =	-.66549225+00
Y	=	.1760+01	X1	=	.6500+01	CY	=	.17607194+01	DIFF=	-.71938586-03	PDIF=	-.40874197-03	DENOM =	-.63996400+00
Y	=	.1780+01	X1	=	.7000+01	CY	=	.17772737+01	DIFF=	.27263433-02	PDIF=	.15316535-02	DENOM =	-.61881936+00
Y	=	.1790+01	X1	=	.7500+01	CY	=	.17901216+01	DIFF=	-.12164051-03	PDIF=	-.67955593-04	DENOM =	-.64585087+00
Y	=	.1800+01	X1	=	.8000+01	CY	=	.17979787+01	DIFF=	.20212721-02	PDIF=	.11229289-02	DENOM =	-.78624027+00
Y	=	.1800+01	X1	=	.8500+01	CY	=	.18008217+01	DIFF=	-.82168415-03	PDIF=	-.45649119-03	DENOM =	-.11302137+01
Y	=	.1800+01	X1	=	.9000+01	CY	=	.18010085+01	DIFF=	-.10084802-02	PDIF=	-.56026680-03	DENOM =	-.17967731+01
Y	=	.1800+01	X1	=	.9500+01	CY	=	.18005612+01	DIFF=	-.56117487-03	PDIF=	-.31176382-03	DENOM =	-.29375219+01
Y	=	.1800+01	X1	=	.1000+02	CY	=	.18001969+01	DIFF=	-.19492650-03	PDIF=	-.10940361-03	DENOM =	-.47406026+01
Y	=	.1800+01	X1	=	.1050+02	CY	=	.18000068+01	DIFF=	-.67904918-05	PDIF=	-.37724955-05	DENOM =	-.74347667+01
Y	=	.1800+01	X1	=	.1100+02	CY	=	.17999350+01	DIFF=	.64977123-04	PDIF=	.36098402-04	DENOM =	-.11293594+02
Y	=	.1800+01	X1	=	.1150+02	CY	=	.17999242+01	DIFF=	.75795646-04	PDIF=	.42108692-04	DENOM =	-.16639883+02
Y	=	.1800+01	X1	=	.1200+02	CY	=	.17999385+01	DIFF=	.61511918-04	PDIF=	.34173288-04	DENOM =	-.23850233+02
Y	=	.1800+01	X1	=	.1250+02	CY	=	.17999592+01	DIFF=	.40781533-04	PDIF=	.22656407-04	DENOM =	-.33359832+02
Y	=	.1800+01	X1	=	.1300+02	CY	=	.17999780+01	DIFF=	.21957263-04	PDIF=	.12198479-04	DENOM =	-.45667487+02
Y	=	.1800+01	X1	=	.1350+02	CY	=	.17999921+01	DIFF=	.79252264-05	PDIF=	.44029035-05	DENOM =	-.61340898+02
Y	=	.1800+01	X1	=	.1400+02	CY	=	.18000011+01	DIFF=	-.10555849-05	PDIF=	-.58643604-06	DENOM =	-.81022219+02
Y	=	.1800+01	X1	=	.1450+02	CY	=	.18000058+01	DIFF=	-.58174596-05	PDIF=	-.32319220-05	DENOM =	-.10543391+03
Y	=	.1800+01	X1	=	.1500+02	CY	=	.18000075+01	DIFF=	-.75043906-05	PDIF=	-.41691059-05	DENOM =	-.13538492+03
Y	=	.1800+01	X1	=	.1550+02	CY	=	.18000072+01	DIFF=	-.72076088-05	PDIF=	-.40042271-05	DENOM =	-.17177722+03
Y	=	.1800+01	X1	=	.1600+02	CY	=	.18000058+01	DIFF=	-.58200959-05	PDIF=	-.32333866-05	DENOM =	-.21561269+03
Y	=	.1800+01	X1	=	.1650+02	CY	=	.18000040+01	DIFF=	-.40014548-05	PDIF=	-.22230305-05	DENOM =	-.26800044+03
Y	=	.1800+01	X1	=	.1700+02	CY	=	.18000022+01	DIFF=	-.21944198-05	PDIF=	-.12191221-05	DENOM =	-.33016454+03
Y	=	.1800+01	X1	=	.1750+02	CY	=	.18000007+01	DIFF=	-.66203535-06	PDIF=	-.36779742-06	DENOM =	-.40345216+03
Y	=	.1800+01	X1	=	.1800+02	CY	=	.17999995+01	DIFF=	.47025089-06	PDIF=	.26125049-06	DENOM =	-.48934231+03
Y	=	.1800+01	X1	=	.1850+02	CY	=	.17999988+01	DIFF=	.11751032-05	PDIF=	.65283513-06	DENOM =	-.58945493+03
Y	=	.1800+01	X1	=	.1900+02	CY	=	.17999985+01	DIFF=	.14895616-05	PDIF=	.82753421-06	DENOM =	-.70556068+03
Y	=	.1800+01	X1	=	.1950+02	CY	=	.17999985+01	DIFF=	.14879295-05	PDIF=	.82662749-06	DENOM =	-.83959117+03

TABLE 2. (Concluded)

```
Y = .1800+01  X1 = .2000+02  CY = .17999987+01  DIFF= .12610528-05  PDIF= .70058487-06  DENOM = -.99364988+03
Y = .1800+01  X1 = .2100+02  CY = .17999995+01  DIFF= .49211222-06  PDIF= .27339568-06  DENOM = -.13711951+04
Y = .1800+01  X1 = .2200+02  CY = .18000002+01  DIFF= -.21924172-06  PDIF= -.12180095-06  DENOM = -.18589166+04
Y = .1800+01  X1 = .2300+02  CY = .18000006+01  DIFF= -.55126658-06  PDIF= -.30625921-06  DENOM = -.24810949+04
Y = .1800+01  X1 = .2400+02  CY = .18000005+01  DIFF= -.46780134-06  PDIF= -.25988963-06  DENOM = -.32660461+04
Y = .1800+01  X1 = .2500+02  CY = .18000001+01  DIFF= -.13988631-06  PDIF= -.77714616-07  DENOM = -.42466510+04
Y = .1800+01  X1 = .2600+02  CY = .17999998+01  DIFF= .17343419-06  PDIF= .96352326-07  DENOM = -.54609453+04
Y = .1800+01  X1 = .2700+02  CY = .17999997+01  DIFF= .25547184-06  PDIF= .14192880-06  DENOM = -.69527738+04
Y = .1800+01  X1 = .2800+02  CY = .17999999+01  DIFF= .55615452-07  PDIF= .30897473-07  DENOM = -.87725169+04
Y = .1800+01  X1 = .2900+02  CY = .18000002+01  DIFF= -.20353613-06  PDIF= -.11307563-06  DENOM = -.10977893+05
Y = .1800+01  X1 = .3000+02  CY = .17999999+01  DIFF= .59508370-07  PDIF= .33060206-07  DENOM = -.13634846+05

DDD = .70537503-01  RMS = .32691743-01  YDY = .16450954+03  ERR1 = .42877455-03  ERROR = .25488398-02
```

Hence, the approximation may be expressed as a function of the independent variable in the following manner:

$$y \equiv F(x) = \sum_{k=1}^{10} CA(J) \cdot AFN(J) \quad ,$$

where the coefficients are listed in Table 2. Thus,

$$y = CA(1) + CA(2) \cdot (-xy) + CA(3) \cdot (-x^2y) + CA(4) \cdot x^3$$

$$+ CA(5) \cdot (-x^3y) + CA(6) \cdot x^4 + CA(7) \cdot (-x^4y) + CA(8) \cdot x^5$$

$$+ CA(9) \cdot (-x^5y) + CA(10) \cdot x \quad .$$

Therefore, the rational function approximation to the curve may be written as

$$F(x) \equiv y = \frac{CA(1) + CA(10)x + CA(4)x^3 + CA(6)x^4 + CA(8)x^5}{1 + CA(2)x + CA(3)x^2 + CA(5)x^3 + CA(7)x^4 + CA(9)x^5}$$

Again, as with the polynomial approximations, the plots resulting from the functions given in Table 2 are included here as Figures 11 through 20. Note that the computed values are plotted as asterisks and the nominal values as dots. As may be seen by inspection of Figure 15, the nominal curve and the curve as determined by the approximation almost coincide. Also note from Table 2 that the error for this 10-term approximation, 0.66×10^{-3}, and that the algebraic sign of the denominator (DENOM) in the rational function is always positive so that there are no zeros in the region of interest. Thus, this 10-term approximating function is considered the most acceptable of the rational function approximations.

As before, on some of the graphs of the rational function approximations there are "spikes." Some of these are due to numerical precision problems, as is the case with the polynomial approximations, but not all of them. For

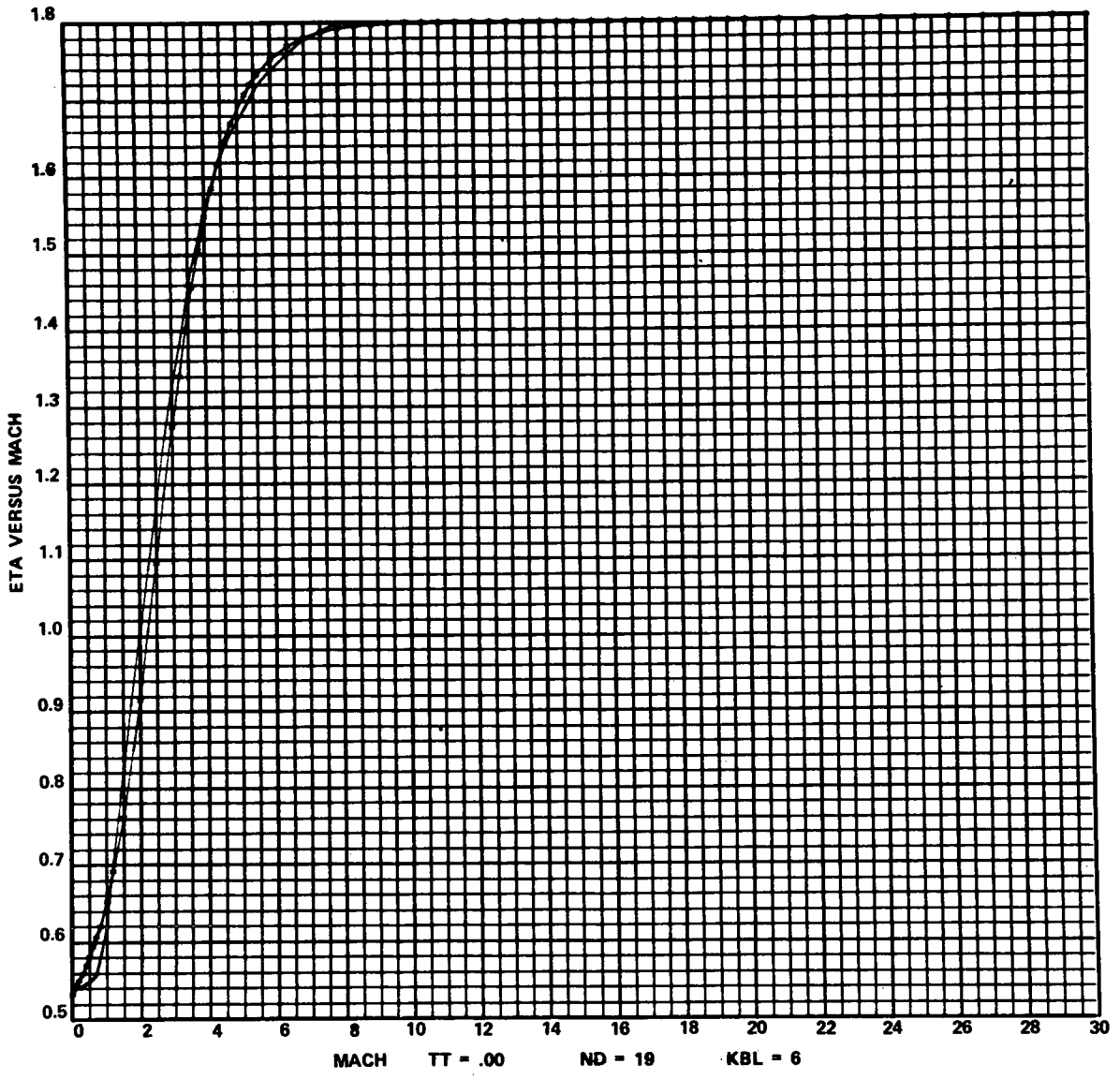

Figure 11. The six-term rational function approximation.

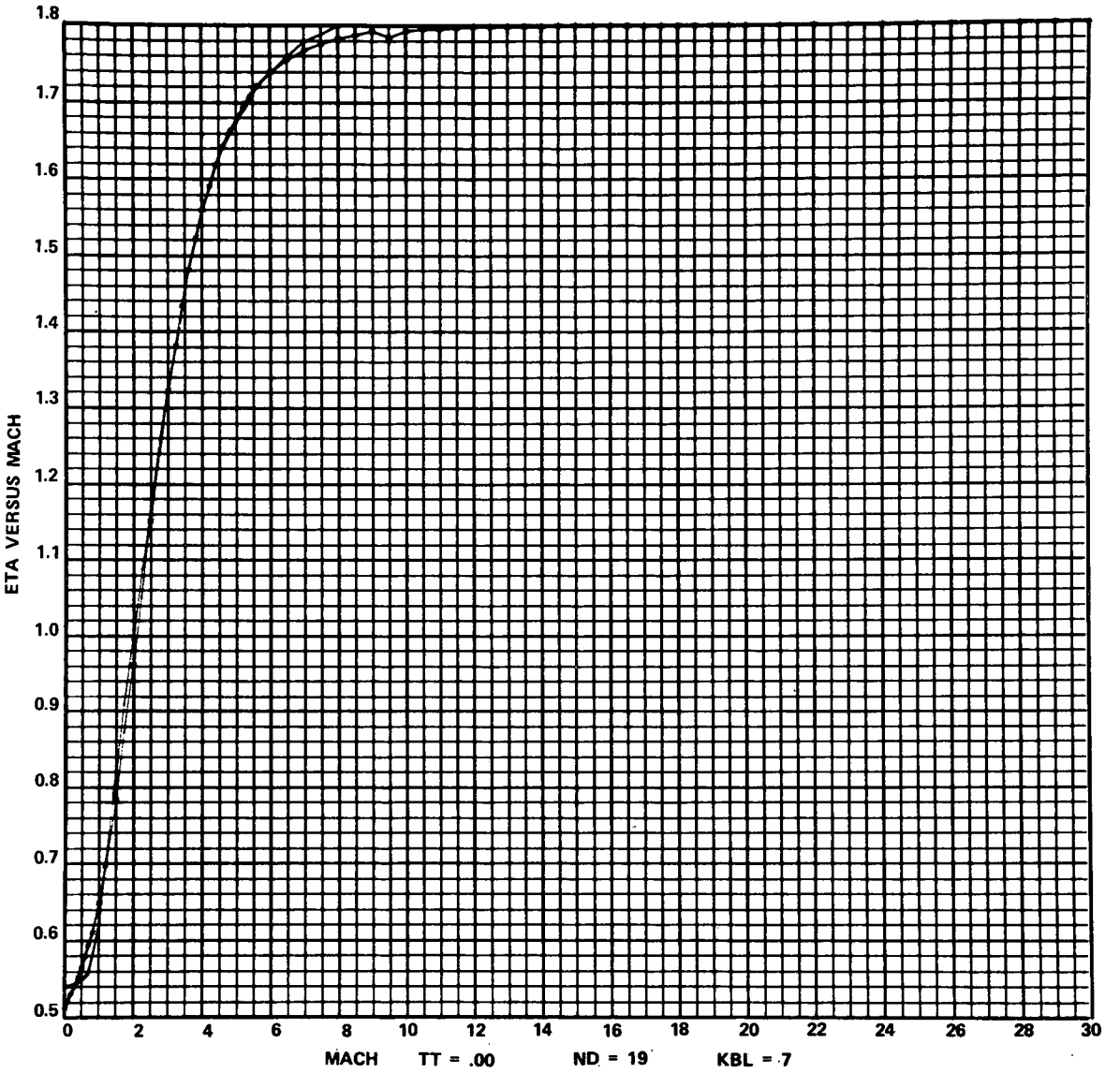

Figure 12. The seven-term rational function approximation.

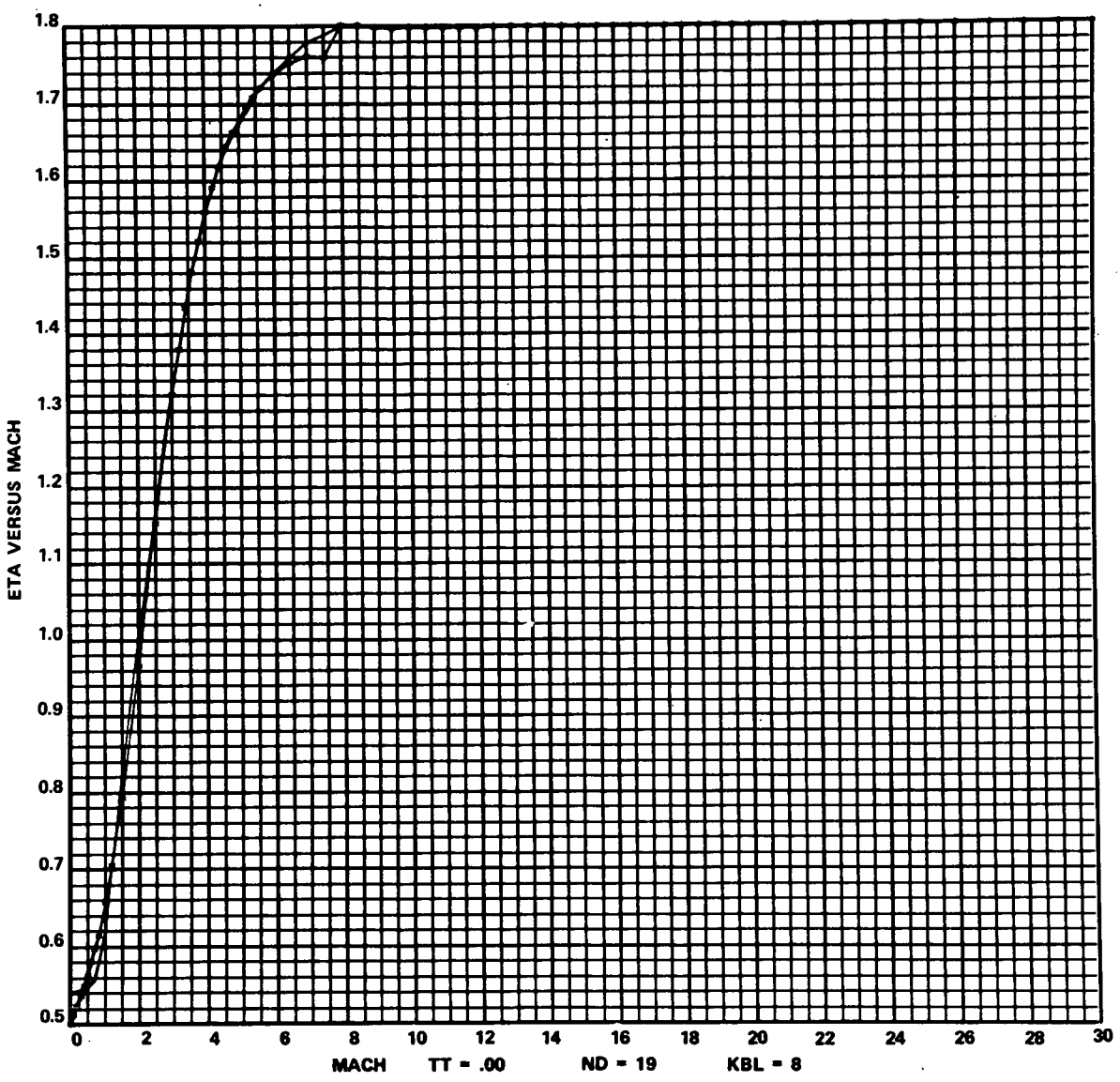

Figure 13. The eight-term rational function approximation.

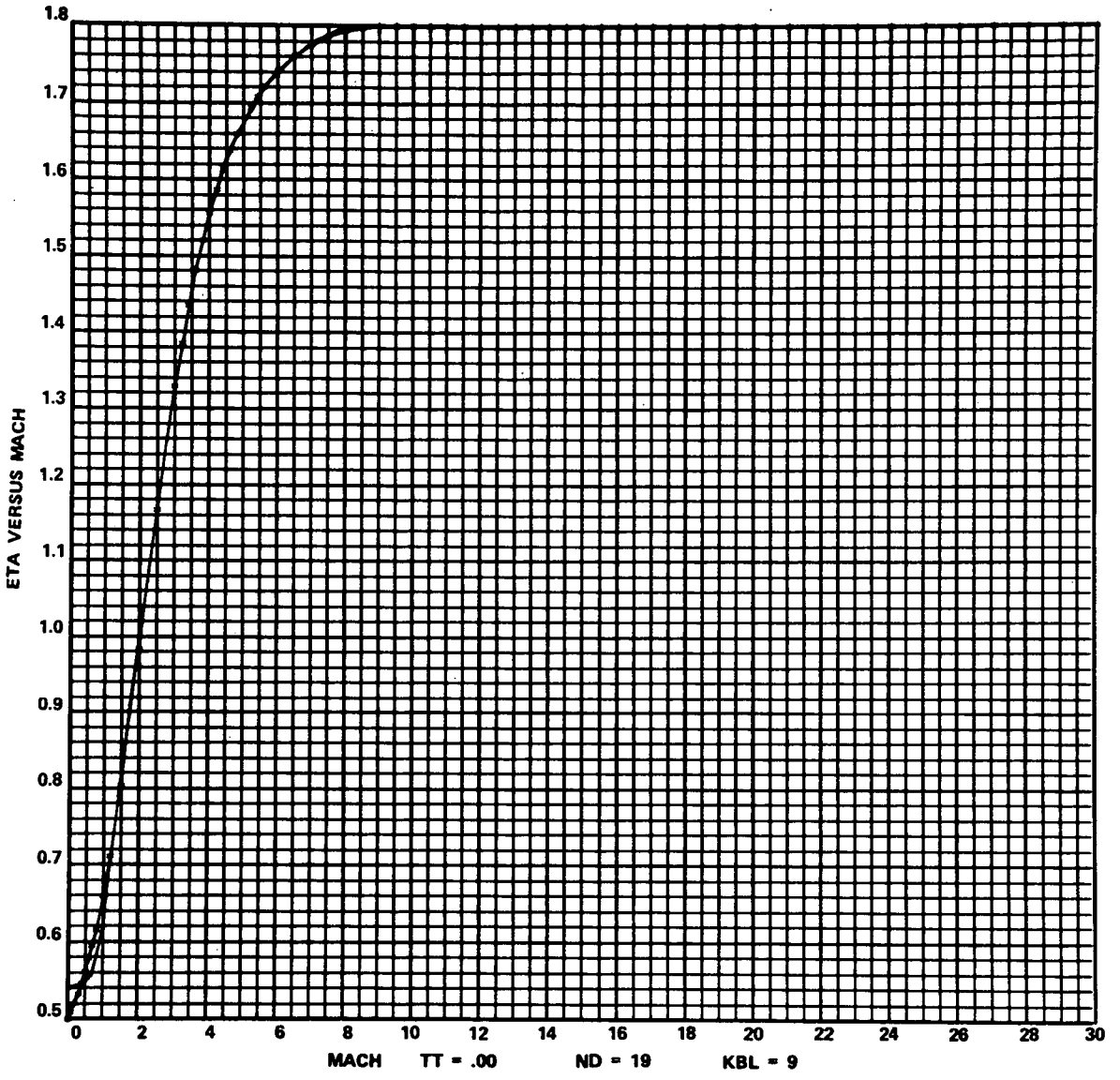

Figure 14. The nine-term rational function approximation.

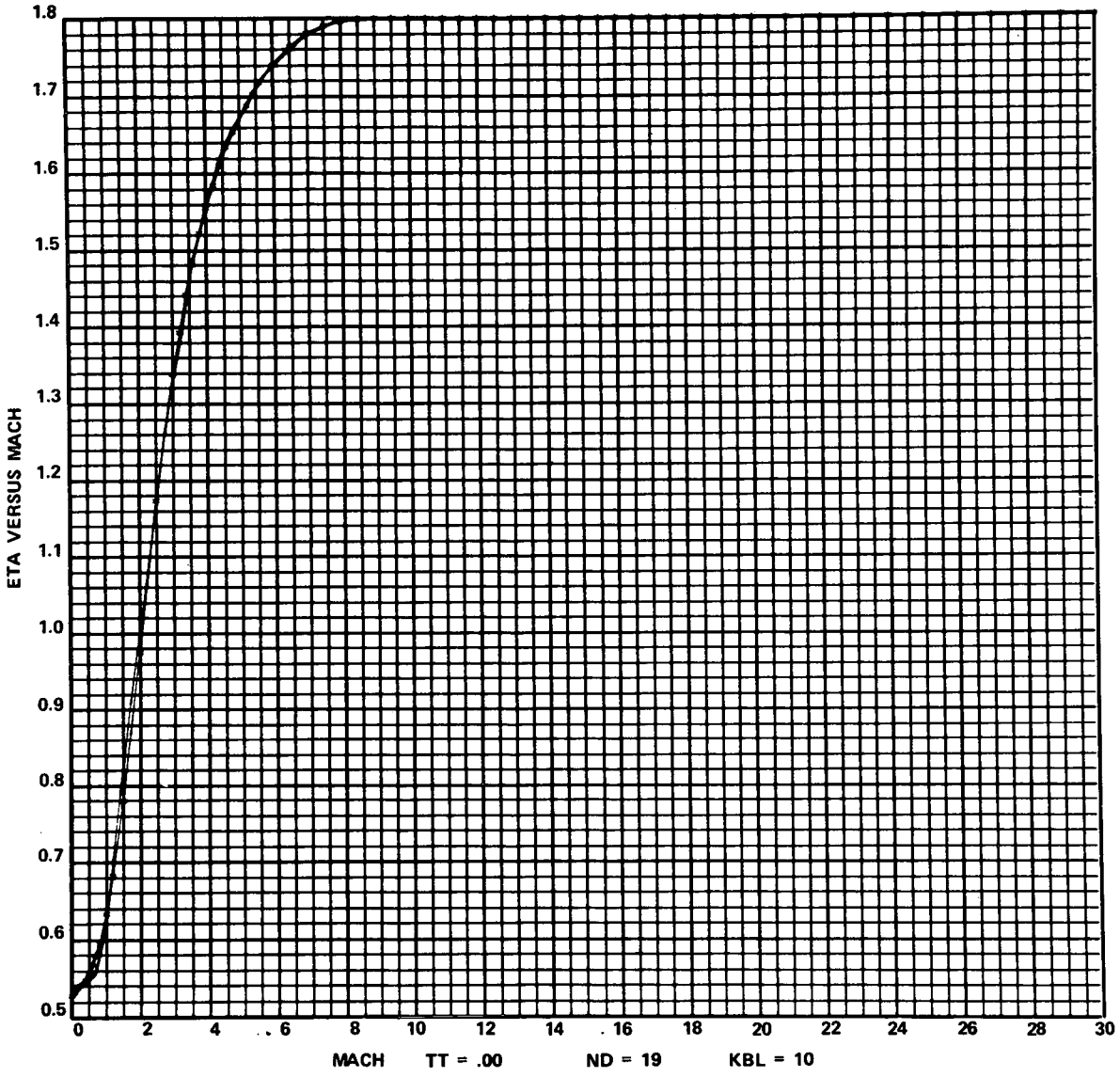

Figure 15. The 10-term rational function approximation.

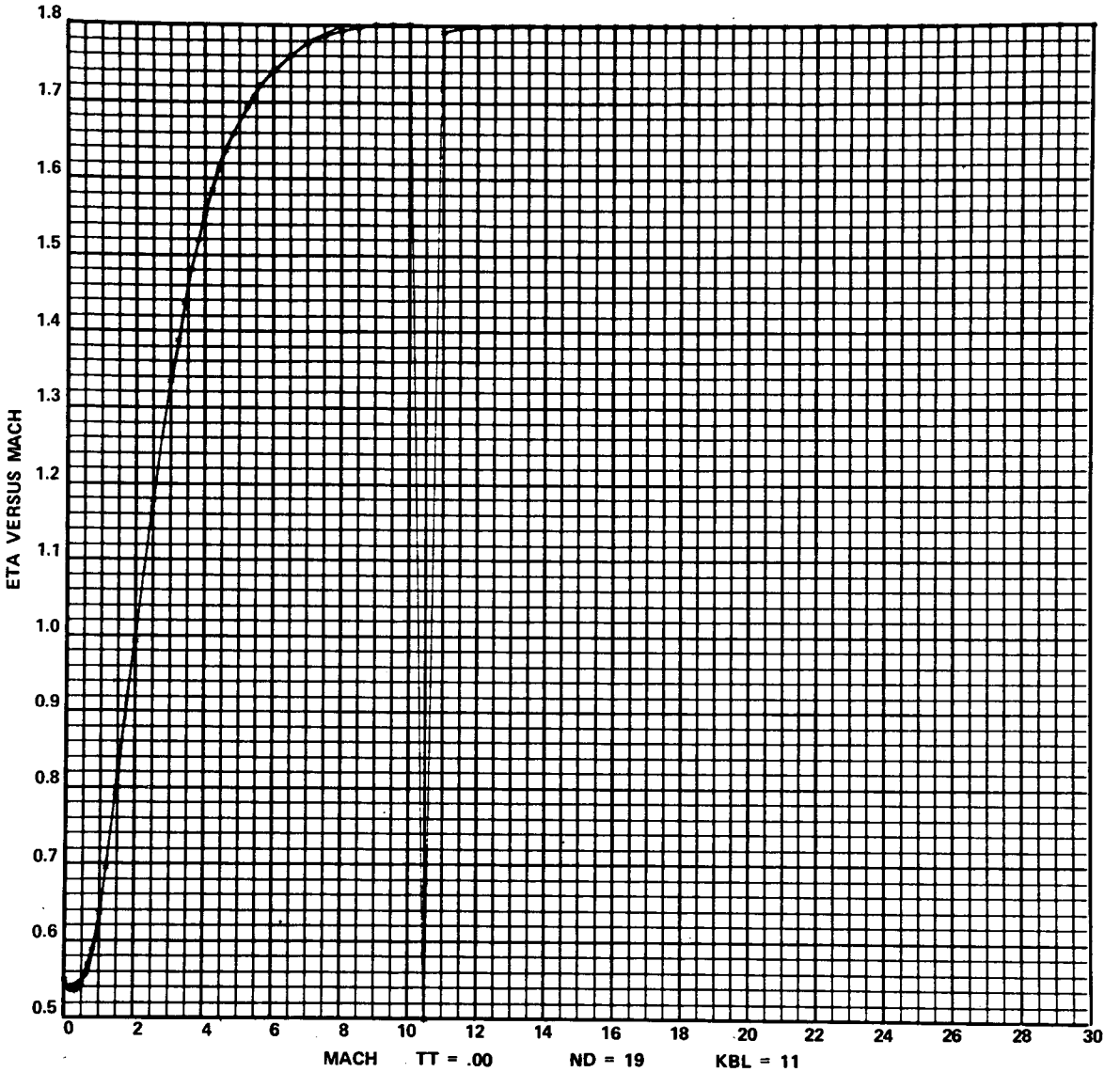

Figure 16. The 11-term rational function approximation.

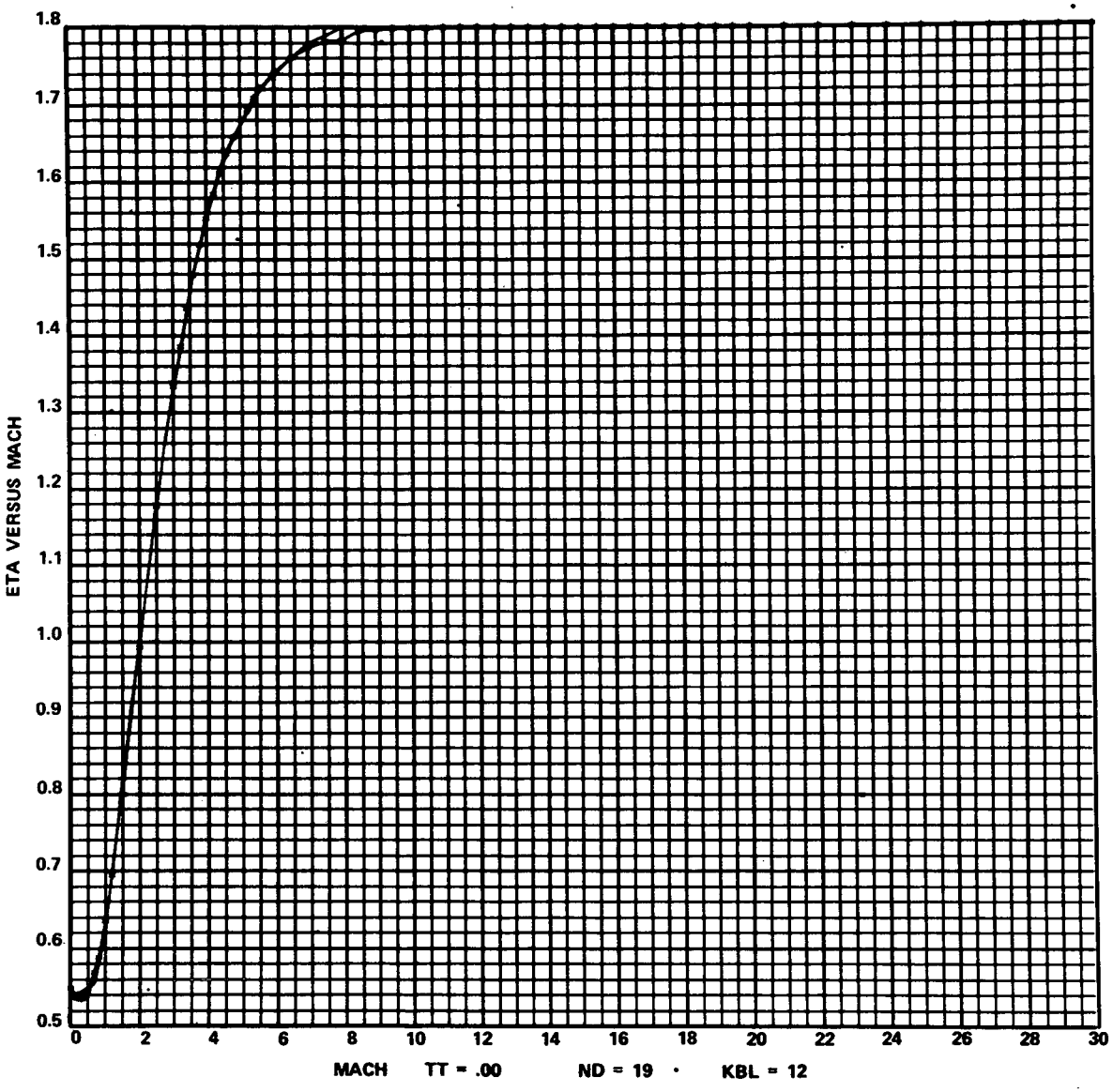

Figure 17. The 12-term rational function approximation.

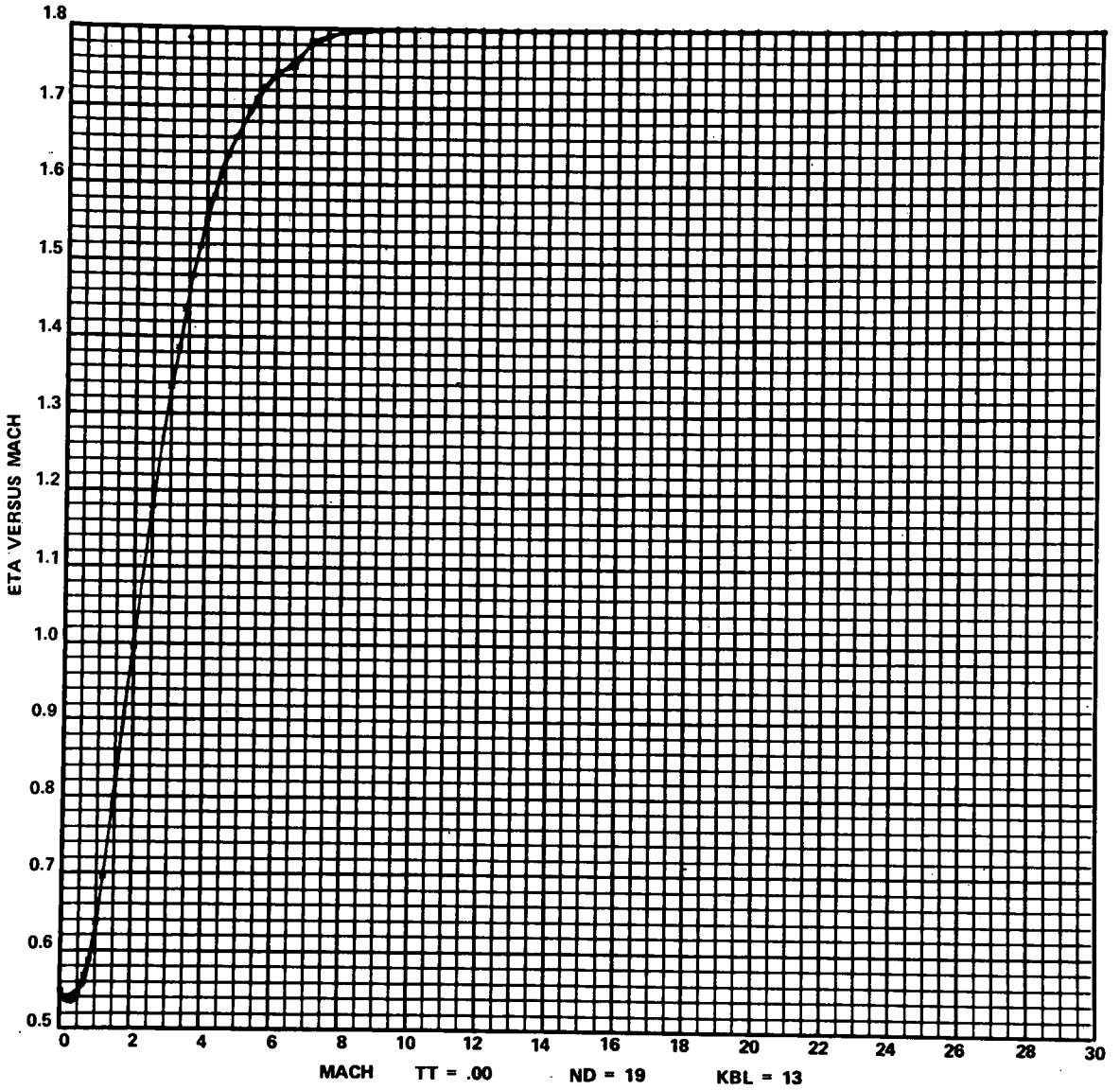

Figure 18. The 13-term rational function approximation.

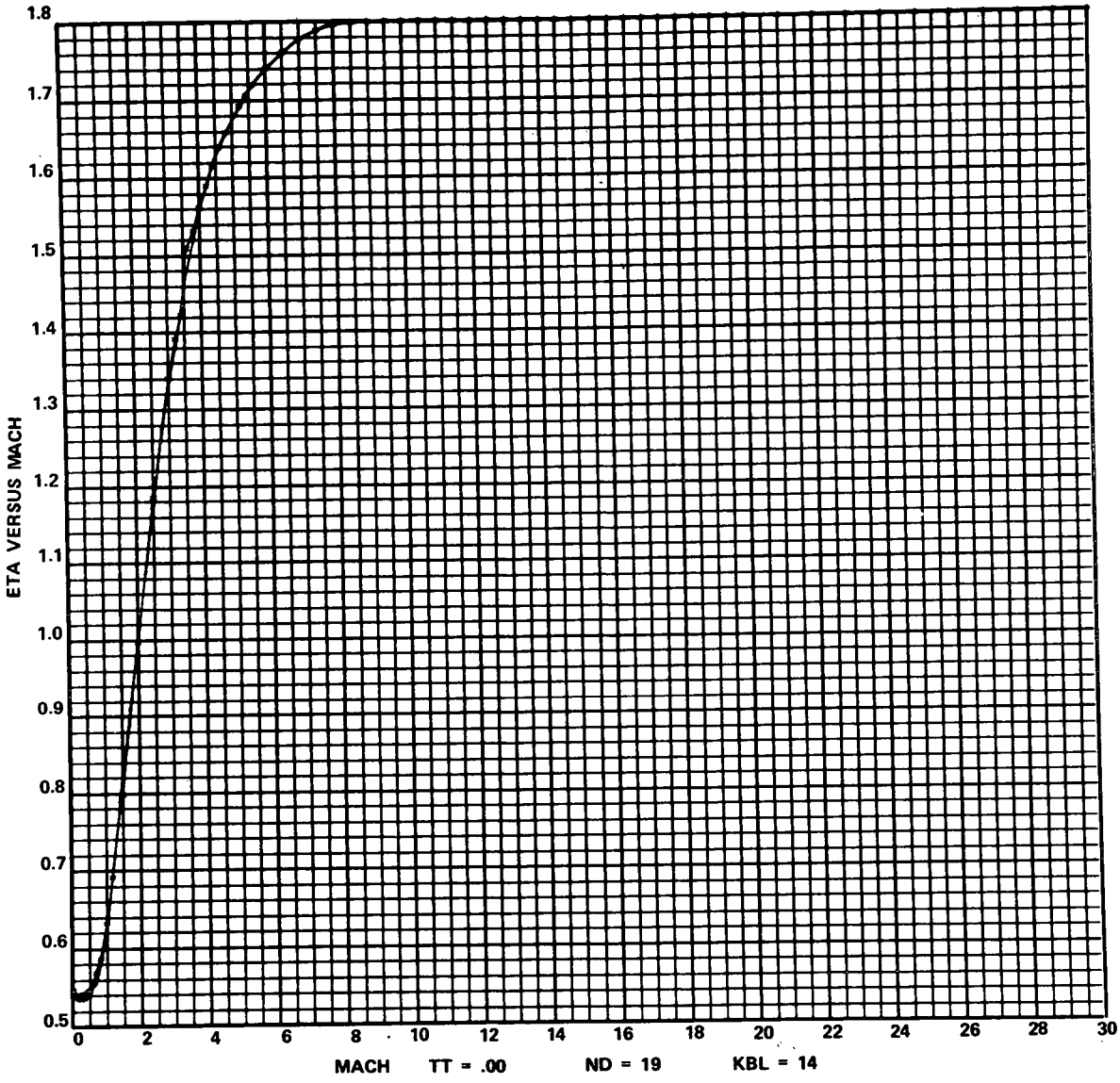

Figure 19. The 14-term rational function approximation.

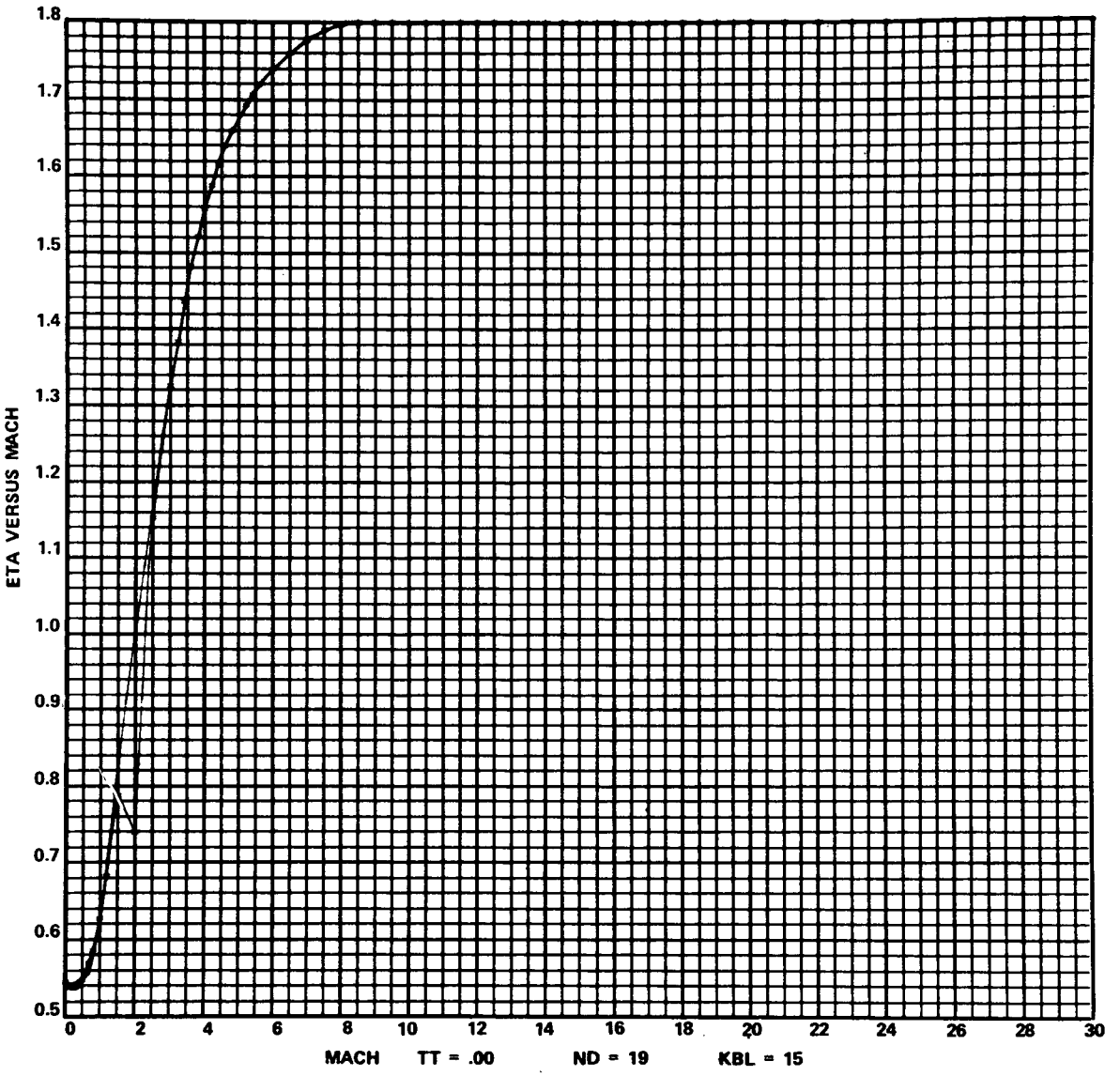

Figure 20. The 15-term rational function approximation.

example, see Figure 16 at x1 = 10.5. From Table 2 it may be seen that the algebraic sign of the denominator changes from positive at x1 = 10.0 to negative at x1 = 10.5. Hence, there exists a zero of the denominator for this particular rational function approximation between x1 = 10.0 and x1 = 10.5. As another example, from Table 2, an error of 0.408×10^{-3} occurs for a 13-term rational function approximation [i.e., at AFN (13)] which is less than the error of the 10-term rational function approximation. But, from Table 2, it may be seen that the algebraic sign of the denominator is positive at x1 = 6.5 and negative at x1 = 7.0, indicating that a zero of the denominator exists between 6.5 and 7.0 for this approximation. Thus neither of these approximating functions can be used with any safety, although for the 13-term function both the error-term and the plot seem to be acceptable. Many other tabular functions have been approximated with the program. The sample printout and Figures 1 through 20, should serve to familiarize the reader with the operation of the program.

CONCLUSION

The program, as designed, allows the user greater flexibility as compared to the standard "least-squares" approximation techniques. By use of the recursion relations to compute the coefficients of an approximation, quantities once computed need not be recomputed when the approximation is changed. Thus, many approximations to a function are easily and rapidly available. Also by use of the so called "picker" or "best $\bar{g}_i$ choice," it is not necessary for the user to have a good idea as to the type of approximation that is desirable to approximate a function. The program chooses the best 1, 2, . . . , N-term approximations to a function. Additional flexibility is available since the function used as terms in the approximations may be arbitrarily chosen. As shown by previous examples, polynomial and rational function approximations are available for the same function during one run of the program. This was possible by setting ND = 0 and ND = 19 respectively in the data pack. In addition, the program is designed to accommodate multiple cases.

The main restrictions are that the functions used as terms, to be chosen for the approximations, be defined over a region including the data points and that computer capacity not be exceeded by making the possible number of terms to be selected too large.

APPENDIX

COMPUTER PROGRAM FOR DETERMINING COEFFICIENTS OF APPROXIMATING FUNCTIONS FOR TABULATED NUMERICAL DATA

Definition of Symbols

Symbol	Definition
CA	Coefficients of the approximation
GDG	Dot product of the $\bar{g}_i$ vectors
XDG	Dot product of $\bar{y}$ and the $\bar{g}_i$ vectors
G	Arbitrary functions used in the approximation
X	Independent variables
Y	Dependent variable
NC	Case Number
IPOINT	Number of data points
NN	Maximum number of functions to be used in the numerator of the approximation
ND	Maximum number of functions to be used in the denominator of the approximation
NT	Maximum number of terms to be selected for the approximation
TT	Constant added to the dependent variable
NP	Initiation of plotting

```
@FOR,IS MAIN
HVJ 009-10/29-07116 (,0)

   MAIN PROGRAM

   STORAGE USED: CODE(1) 001611; DATA(0) 060730; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003    TRACSF
    0004    IDENT
    0005    NNCODS
    0006    QUIK3V
    0007    ENDJOB
    0010    NINTRS
    0011    NRDUS
    0012    NIO2S
    0013    NIO1S
    0014    NPRTS
    0015    NRDCS
    0016    DSQRT
    0017    NSTOPS

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000007 10L      0001    000413 120L     0001    000051 127G     0001    000554 150L     0001    000135 160G
    0001    000136 163G     0001    000162 173G     0001    000650 180L     0001    000216 205G     0001    000242 216G
    0001    000256 229G     0001    000301 237G     0001    000369 244G     0001    001227 270L     0001    000462 304G
    0001    001343 310L     0001    001415 340L     0001    001427 350L     0001    000620 355G     0001    001553 370L
    0001    001603 375L     0000    060335 380F     0000    060336 390F     0000    060343 400F     0001    000701 400G
    0001    000752 405G     0000    060344 410F     0001    000760 410G     0000    060346 420F     0001    001004 422G
    0000    060400 430F     0001    001030 430G     0000    060412 440F     0001    001060 441G     0000    060424 450F
    0001    001100 450G     0001    001124 455G     0000    060431 460F     0001    001154 465G     0000    060444 470F
    0000    060447 480F     0000    060471 490F     0000    060514 500F     0001    001213 503G     0000    060525 510F
    0001    001246 516G     0000    060634 520F     0000    060635 530F     0001    001303 534G     0000    060636 540F
    0001    001357 564G     0001    001400 574G     0001    000247 70L      0000 D  000000 A        0000 D  060317 ANUM
    0000 D  000702 B        0000 D  007760 BMB      0000 D  007722 BMF      0000 D  001604 CA       0000 D  060323 CY
    0000 D  060301 DDD      0000 D  060305 DDDM     0000 D  060321 DENOM    0000 D  060325 DIFF     0000 D  060333 ERROR
    0000 D  060331 ERRI     0000 D  010035 G        0000 D  001642 GDG      0000 D  060303 H        0000 D  060277 HM
    0000 I  060270 I        0000 I  060316 II       0000 I  010016 IM       0000 I  060256 IPOINT   0000 I  060271 J
    0000 I  060275 JMI      0000 I  060274 K        0000 I  060276 KBL      0000 I  060313 KBLMI    0000 I  060314 KBMJ
    0000 I  060315 KMJPK    0000 I  060312 L        0000 I  060225 LABELX   0000 I  060241 LABELY   0000 R  057075 LPLOTX
    0000 R  057405 LPLOTY   0000 R  057715 LPLOTZ   0000 I  060311 M        0000 I  060267 N        0000 I  060255 NC
    0000 I  060263 ND       0000 I  060262 NN       0000 I  060266 NP       0000 I  060261 NT       0000 D  060327 PDIF
    0000 D  060257 POINT    0000 D  060307 RMS      0000 D  060264 TT       0000 D  046415 X        0000 D  056255 Y
    0000 D  007604 YDG      0000 D  060272 YDY

00100      1•   C     MULTIVARIABLE FUNCTION APPROXIMATION WITH LINEAR COMBINATIONS OF
00100      2•   C     ARBITRARY FUNCTIONS
00101      3•         DIMENSION A(15,15), B(15,15), CA(15), GDG(39,39), YDG(39), BMF(15)  A   1
```

```
00101     4*        1, BMB(15), IM(15), G(39,200), X(200,10), Y(200)                                  A   2
00103     5*         IMPLICIT REAL*8(A-H,O-Z)                                                         A   3
00104     6*         REAL LPLOTX,LPLOTY,LPLOTZ                                                        A   4
00105     7*         DIMENSION LABELX(12), LABELY(12), LPLOTX(200), LPLOTY(200), LPLOTZ               A   5
00105     8*        1(200)                                                                            A   6
00106     9*         DATA /LABELX/6H  MACH,6H       ,6H TT = ,2*6H       ,6H ND = ,2*6H            A   7
00106    10*        1     ,6HKBL = ,3*6H      /                                                      A   8
00110    11*         DATA /LABELY/12*6H      /                                                        A   9
00112    12*         CALL IDENT (9)                                                                   A  10
00113    13*         NC=1                                                                             A  11
00114    14*       10 READ(5,390,END=375,ERR=375)IPOINT,POINT,NT,NN,ND,TT,NP                          A  12
00125    15*          READ (5,400) LABELY                                                             A  13
00133    16*          ENCODE(520,LABELX(4))TT                                                         A  14
00136    17*          ENCODE(530,LABELX(7))ND                                                         A  15
00141    18*          N=NN+ND                                                                         A  16
00142    19*          PRINT 380                                                                       A  17
00144    20*          PRINT 500, NC                                                                   A  18
00147    21*          PRINT 510, IPOINT,NN,ND,NT,TT,NP                                                A  19
00157    22*          DO 30 I=1,N                                                                     A  20
00162    23*          DO 20 J=1,N                                                                     A  21
00165    24*       20 GDG(I,J)=0.0                                                                    A  22
00167    25*       30 YDG(I)=0.0                                                                      A  23
00171    26*          YDY=0.0                                                                         A  24
00172    27*          DO 100 K=1,IPOINT                                                               A  25
00175    28*          READ 410, Y(K),X(K,1)                                                           A  26
00201    29*          Y(K)=Y(K)+TT                                                                    A  27
00201    30*   C      THESE ARE THE ARBITRARY FUNCTIONS CHOSEN                                        A  28
00202    31*          G(1,K)=1.                                                                       A  29
00203    32*          G(2,K)=X(K,1)                                                                   A  30
00204    33*          DO 40 J=3,NN                                                                    A  31
00207    34*          JM1=J-1                                                                         A  32
00210    35*       40 G(J,K)=G(2,K)*G(JM1,K)                                                          A  33
00212    36*          IF (ND) 50,70,50                                                                A  34
00215    37*       50 DO 60 J=1,ND                                                                    A  35
00220    38*       60 G(J+NN,K)=-G(J+1,K)*Y(K)                                                        A  36
00222    39*       70 CONTINUE                                                                        A  37
00222    40*   C      PART #1   COMPUTE DOT PRODUCTS                                                  A  38
00223    41*          DO 90 J=1,N                                                                     A  39
00226    42*          DO 80 I=1,J                                                                     A  40
00231    43*          GDG(I,J)=G(I,K)*G(J,K)+GDG(I,J)                                                 A  41
00232    44*       80 GDG(J,I)=GDG(I,J)                                                               A  42
00234    45*       90 YDG(J)=Y(K)*G(J,K)+YDG(J)                                                       A  43
00236    46*          YDY=Y(K)*Y(K)+YDY                                                               A  44
00237    47*      100 Y(K)=Y(K)-TT                                                                    A  45
00237    48*   C      PART  2   MAXIMUM   H(1)                                                        A  46
00241    49*          KBL=1                                                                           A  47
00242    50*          HM=0.                                                                           A  48
00243    51*          DO 120 I=KBL,N                                                                  A  49
00246    52*          B(1,1)=GDG(I,I)                                                                 A  50
00247    53*          A(1,1)=YDG(I)/B(1,1)                                                            A  51
00250    54*          DDD=A(1,1)*YDG(I)                                                               A  52
00251    55*          H=DDD                                                                           A  53
00252    56*          IF (ABS(H)-ABS(HM)) 120,120,110                                                 A  54
00255    57*       110 BMF(1)=B(1,1)                                                                  A  55
00256    58*          CA(1)=A(1,1)                                                                    A  56
00257    59*          IM(1)=I                                                                         A  57
```

```
00260    60*          DDDM=DDD                                                  A  58
00261    61*          HM=H                                                      A  59
00262    62*       120 CONTINUE                                                 A  60
00264    63*          B(1,1)=BMF(1)                                             A  61
00265    64*          A(1,1)=CA(1)                                              A  62
00266    65*          DDD=1.-DDDM/YDY                                           A  63
00267    66*          DDD=ABS(DDD)                                              A  64
00270    67*          RMS=SQRT(DDD/POINT)                                       A  65
00271    68*          PRINT 420, KBL,IM(1),CA(1),DDD,RMS,HM                     A  66
00271    69*    C     PART  3       MAXIMUM     H(2)                            A  67
00301    70*          KBL=2                                                     A  68
00302    71*          HM=0.                                                     A  69
00303    72*          DO 150 I=1,N                                              A  70
00306    73*          IF (I-IM(1)) 130,150,130                                  A  71
00311    74*       130 CONTINUE                                                 A  72
00312    75*          M=IM(1)                                                   A  73
00313    76*          B(2,1)=GDG(I,M)                                           A  74
00314    77*          B(1,2)=B(2,1)/B(1,1)                                      A  75
00315    78*          B(2,2)=GDG(I,I)-B(2,1)*B(1,2)                             A  76
00316    79*          A(2,2)=YDG(I)-B(2,1)*A(1,1)                               A  77
00317    80*          A(2,2)=A(2,2)/B(2,2)                                      A  78
00320    81*          A(2,1)=A(1,1)-A(2,2)*B(1,2)                               A  79
00321    82*          DDD=A(2,1)*YDG(M)+A(2,2)*YDG(I)                           A  80
00322    83*          H=DDD                                                     A  81
00323    84*          IF (ABS(H)-ABS(HM)) 150,150,140                           A  82
00326    85*       140 BMB(1)=B(2,1)                                            A  83
00327    86*          BMF(1)=B(1,2)                                             A  84
00330    87*          BMF(2)=B(2,2)                                             A  85
00331    88*          IM(2)=I                                                   A  86
00332    89*          CA(2)=A(2,2)                                              A  87
00333    90*          CA(1)=A(2,1)                                              A  88
00334    91*          HM=H                                                      A  89
00335    92*          DDDM=DDD                                                  A  90
00336    93*       150 CONTINUE                                                 A  91
00340    94*          B(2,1)=BMB(1)                                             A  92
00341    95*          B(1,2)=BMF(1)                                             A  93
00342    96*          B(2,2)=BMF(2)                                             A  94
00343    97*          A(2,2)=CA(2)                                              A  95
00344    98*          A(2,1)=CA(1)                                              A  96
00345    99*          DDD=1.-DDDM/YDY                                           A  97
00346   100*          DDD=ABS(DDD)                                              A  98
00347   101*          RMS=SQRT(DDD/POINT)                                       A  99
00350   102*          PRINT 430, KBL,IM(2)                                      A 100
00354   103*          DO 160 I=1,2                                              A 101
00357   104*       160 PRINT 450, I,CA(I)                                       A 102
00364   105*          PRINT 460, DDD,RMS,HM                                     A 103
00371   106*          IF (NP-KBL) 180,180,170                                   A 104
00374   107*       170 PRINT 470                                                A 105
00374   108*    C     PART  *****  4A  *****                                    A 106
00376   109*       180 L=IM(1)                                                  A 107
00377   110*          DO 370 KBL=3,NT                                           A 108
00402   111*          HM=0.                                                     A 109
00403   112*          KBLM1=KBL-1                                               A 110
00404   113*          DO 270 I=1,N                                              A 111
00407   114*          DO 190 J=1,KBLM1                                          A 112
00412   115*          IF (I-IM(J)) 190,270,190                                  A 113
```

```
00415      190 CONTINUE
00417          B(KBL,1)=GDG(I,L)
00420          B(1,KBL)=B(KBL,1)/B(1,1)
00421          DO 210 J=2,KBLM1
00424          JM1=J-1
00425          M=IM(J)
00426          B(KBL,J)=GDG(I,M)
00427          DO 200 K=1,JM1
00432      200 B(KBL,J)=B(KBL,J)-B(K,J)*B(KBL,K)
00434      210 B(J,KBL)=B(KBL,J)/B(J,J)
00436          B(KBL,KBL)=GDG(I,I)
00437          A(KBL,KBL)=YDG(I)
00440          DO 220 K=1,KBLM1
00443          B(KBL,KBL)=B(KBL,KBL)-B(K,KBL)*B(KBL,K)
00444      220 A(KBL,KBL)=A(KBL,KBL)-A(K,K)*B(KBL,K)
00446          A(KBL,KBL)=A(KBL,KBL)/B(KBL,KBL)
00447          DO 230 J=1,KBLM1
00452          KBMJ=KBL-J
00453          A(KBL,KBMJ)=A(KBMJ,KBMJ)
00454          DO 230 K=1,J
00457          KMJPK=KBMJ+K
00460      230 A(KBL,KBMJ)=A(KBL,KBMJ)-A(KBL,KMJPK)*B(KBMJ,KMJPK)
00463          DDD=0.
00464          DO 240 J=1,KBLM1
00467          M=IM(J)
00470      240 DDD=DDD+A(KBL,J)*YDG(M)
00472          DDD=DDD+A(KBL,KBL)*YDG(I)
00473          H=DDD
00474          IF (ABS(H)-ABS(HM)) 270,270,250
00477      250 IM(KBL)=I
00500          HM=H
00501          DDDM=DDD
00502          DO 260 J=1,KBLM1
00505          BMB(J)=B(KBL,J)
00506          BMF(J)=B(J,KBL)
00507      260 CA(J)=A(KBL,J)
00511          BMF(KBL)=B(KBL,KBL)
00512          CA(KBL)=A(KBL,KBL)
00513      270 CONTINUE
00515          DO 280 J=1,KBLM1
00520          B(KBL,J)=BMB(J)
00521          B(J,KBL)=BMF(J)
00522      280 A(KBL,J)=CA(J)
00524          B(KBL,KBL)=BMF(KBL)
00525          A(KBL,KBL)=CA(KBL)
00526          DDD=1.-DDDM/YDY
00527          PRINT 440, KBL,IM(KBL)
00533          DO 290 II=1,KBL
00536      290 PRINT 450, II,CA(II)
00543          DDD=ABS(DDD)
00544          RMS=SQRT(DDD/POINT)
00545          PRINT 460, DDD,RMS,HM
00552          IF (NP-KBL) 310,310,300
00555      300 PRINT 470
00557      310 IF (KBL-NP) 370,320,320
00562      320 DDD=0.
```

```
00563           DO 360 J=1,IPOINT
00566           ENCODE(540,LABELX(10))KBL
00571           ANUM=0.
00572           DENOM=1.
00573           DO 350 I=1,KBL
00576           M=IM(I)
00577           IF (M-NN) 330,330,340
00602       330 ANUM=ANUM+CA(I)*G(M,J)
00603           GO TO 350
00604       340 DENOM=DENOM+CA(I)*G(M-NN+1,J)
00605       350 CONTINUE
00607           CY=ANUM/DENOM
00610           CY=CY-TT
00611           DIFF=Y(J)-CY
00612           PDIF=DIFF/Y(J)
00613           DDD=DDD+DIFF*DIFF
00614           PRINT 480, Y(J),X(J,1),CY,DIFF,PDIF,DENOM
00624           LPLOTY(J)=Y(J)
00625           LPLOTX(J)=X(J,1)
00626           LPLOTZ(J)=CY
00627       360 CONTINUE
00631           CALL QUIK3V (-1,35,LABELX,LABELY,-IPOINT,LPLOTX,LPLOTY)
00632           CALL QUIK3V (0,40,LABELX,LABELY,-IPOINT,LPLOTX,LPLOTZ)
00633           DDD=ABS(DDD)
00634           RMS=SQRT(DDD/POINT)
00635           ERR1=DDD/YDY
00636           ERROR=SQRT(ERR1/POINT)
00637           PRINT 490, DDD,RMS,YDY,ERR1,ERROR
00646       370 CONTINUE
00650           NC=NC+1
00651           GO TO 10
00652       375 CALL ENDJOB
00653           STOP
00653     C
00654       380 FORMAT (1H1)
00655       390 FORMAT (I4,D14.8,I4,I4,I4,D14.8,I2)
00656       400 FORMAT (12A6)
00657       410 FORMAT (2D15.8)
00660       420 FORMAT (1H0,30HAPPROXIMATING FUNCTION NUMBER I2,6H IS G(I2,1H),///
00660          1,1H0,7HCA(I) =E23.16,/,1H0,7HDDD    =E23.16,6X,6HRMS  =E23.16,6X,5H
00660          2HM  =E23.16,///,65(2H**),/////)
00661       430 FORMAT (1H0,30HAPPROXIMATING FUNCTION NUMBER I2,6H IS G(I2,1H),///
00661          1)
00662       440 FORMAT (1H0,30HAPPROXIMATING FUNCTION NUMBER I2,6H IS G(I2,1H),///
00662          1)
00663       450 FORMAT (1H0,3HCA(,I2,3H) =,E23.16)
00664       460 FORMAT (1H0,8HDDD     =E23.16,6X,7HRMS   =E23.16,6X,5HHM  =E23.16,/
00664          1///)
00665       470 FORMAT (65(2H**),/////)
00666       480 FORMAT (1H0,2X,5HY    =E10.4,2X,5HX1  =E10.4,2X,5HCY   =E14.8,2X,5HD
00666          1IFF=E14.8,2X,5HPDIF=E14.8,2X,7HDENOM =E14.8)
00667       490 FORMAT (1H0,///,2X,5HDDD =E15.8,2X,5HRMS =E15.8,2X,5HYDY =E15.8,2X
00667          1,6HERR1 =E15.8,2X,7HERROR =E15.8,///,65(2H**),///)
00670       500 FORMAT (25(2H**),7X,13HCASE NUMBER (I2,1H),7X,25(2H**),/////)
00671       510 FORMAT (1H0,46HTHE NUMBER OF DATA POINTS USED IN THIS FIT IS I4,//
00671          1,1X,66HTHE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS IN THE NUMERA
```

```
00671    228*          2TOR IS I4,//,1X,68HTHE MAXIMUM NUMBER OF APPROXIMATING FUNCTIONS I   A 226
00671    229*          3N THE DENOMINATOR IS I4,//,1X,64HTHE MAXIMUM NUMBER OF APPROXIMATI   A 227
00671    230*          4NG FUNCTIONS TO BE SELECTED IS I4,//,1X,48HTHE CONSTANT ADDED TO T   A 228
00671    231*          5HE DEPENDENT VARIABLE IS F8.4,//,1X,56HINITIATION OF PLOTTING IS A   A 229
00671    232*          6PPROXIMATING FUNCTION NUMBER I4,//)                                  A 230
00672    233*      520 FORMAT(F6.2)                                                          A 231
00673    234*      530 FORMAT(I4)                                                            A 232
00674    235*      540 FORMAT(I2)                                                            A 233
00675    236*          END                                                                   A 234

       END OF COMPILATION:          NO  DIAGNOSTICS.


PROGRAM CONTINGENCY AT  024753
MAXIMUM TIME
ERROR  EXIT.  EXECUTION TIME:        140048 MILLISECONDS.
 ERR# 023773 00

     X                  000002 000010  000002 053470  000002 053440  000000 001761  000000 001676  000000 000016  000000 040147
         000001 000005  000001 003572  000001 000032  000000 004665  041265 751175  000000 000010  005752 121056  000000 002003

     A   041265 751175  000000 000010  005752 121056  000000 002003  001265 751175  502232 371776  033306 361734  122034 534226
         200052 344417  015335 243625  177365 473517  471304 604524  177777 722277  116513 102100  000000 000002  400052 576745
         000000 000000  000000 000000

     R                  000000 000000  233033 720177  000000 000002  000000 000142  606060 606060  050505 050505  000000 000000
         000000 000000  000000 000000  000000 000061  777777 774771  000000 000000  000000 000304  000000 000305  000000 000001
RUNSTREAM ANALYSIS TERMINATED


    RUNID:  RARPLT   ACCOUNT: 312020          PROJECT: AVARITRIN412

      5542   - MAX TIME

    TIME: 00:03:00.134    IN: 2109   OUT: 0        PAGES:   103

    INITIATION  TIME:   21:11:10-NOV 26,1971

    TERMINATION TIME:   21:19:30-NOV 26,1971
```

REFERENCES

1. Ingram, Hugo L.: An Orthonormalization Procedure for Multivariable Function Approximations. NASA TM X-53295, Apr. 1, 1965, pp. 133-138.

2. Gantmacher, F. R.: The Theory of Matrices. Vol. I. Chelsea Publishing Co., New York, N. Y., 1960.

3. Finkbeiner, Daniel T: Matrices and Linear Transformations. Vol. II. W. H. Freeman and Co., San Francisco, Calif., 1966.

4. Schwartz, Manuel; Green, Simon, and Rutledge, W. A.: Vector Analysis. Harper and Brothers, New York, N. Y., 1960.

5. Lee, Barry F.: Extended Precision Curve Fit of Aerodynamic Data. Computer Sciences Corporation, Huntsville, Ala., Job Number 310810, Oct., 1971.

THE SELECTION OF APPROXIMATING FUNCTIONS FOR TABULATED NUMERICAL DATA

By H. L. Ingram and W. R. Hooker

The information is this report has been reviewed for security classification. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

This document has also been reviewed and approved for technical accuracy.

E. D. GEISSLER
Director, Aero-Astrodynamics Laboratory

MSFC—RSA, Ala

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