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### **SIMILAR SOLUTIONS OF THE ATTACHED AND SEPARATED COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT**

JAMES W. CHRISTIAN, CAPT, USAF  
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HYPERSONIC RESEARCH LABORATORY

Project No. 7064



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## FOREWORD

This report was prepared by the Hypersonic Research Laboratory of the Aerospace Research Laboratories, Office of Aerospace Research, United States Air Force, under Project 7064, entitled "High Velocity Fluid Mechanics."

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## ABSTRACT

The development of governing equations and tabulation of similar solutions to the two-dimensional, laminar, compressible boundary layer with heat transfer are presented. Similar velocity and temperature profiles and global quantities such as displacement thickness, momentum thickness, form factor, etc., are presented for 116 pressure gradient-heat transfer combinations. Surface temperatures for these cases range from absolute zero ( $S(0) = -1$ ) to twice the free stream stagnation temperature ( $S(0) = +1$ ), while the streamwise pressure gradient varies from values corresponding to maximum reversed flow ( $\beta = -0.36$ ) to those of extremely accelerated flows ( $\beta = 20$ ). Results are presented at regular intervals of the parameters  $S(0)$  and  $\beta$ , allowing for straight-forward comparisons between cases. Five decimal place accuracy is maintained for all results.

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## NOMENCLATURE

a	speed of sound
c	constants, Eq (25)
$c_p$	specific heat
C	similarity coefficient, Eq (23)
$C_f$	coefficient of friction, Eq (45)
f	defined by $df/d\eta \equiv u/u_e$ , dimensionless velocity ratio
g	defined by $\psi = f(\eta)g(\xi)$ ; also Eq (104)
h	enthalpy
H	form factor, Eq (30)
m	pressure gradient parameter; Mach number power law exponent, Eq (23)
M	Mach number
n	pressure power law exponent, Eq (25)
N	y-stretching function, Eq (33)
p	static pressure
P	x-stretching function, compressible flow; Eq (70)
Pr	Prandtl number
Q	y-stretching function, compressible flow; Eq (69)
S	enthalpy distribution, Eq (12)
St	Stanton number, Eq (46)
T	temperature
u	longitudinal velocity component
U	transformed u, Eq (10)
v	transverse velocity component
V	transformed v, Eq (11)
x	longitudinal coordinate
X	transformed x, Eq (8)
y	transverse coordinate
Y	transformed y, Eq (9)
$\alpha$	boundary layer equation coefficient, Eq (76)

$\beta$	pressure gradient parameter, Eq (76)
$\gamma$	ratio of specific heats
$\delta^*$	displacement thickness, Eq (26)
$\Delta$	difference symbol
$\zeta$	static-to-stagnation pressure ratio, Eq (95)
$\eta$	similarity plane transverse coordinate, Eq (18)
$\theta$	enthalpy difference, Eq (50); also Eq (66)
$\lambda$	viscosity proportionality constant, Eq (5)
$\mu$	absolute viscosity
$\nu$	kinematic viscosity
$\xi$	similarity plane longitudinal coordinate, Eq (17)
$\rho$	density
$\tau$	shear stress
$\phi$	stagnation-to-static temperature ratio, Eq (32); also Eq (76)
$\psi$	stream function, Eq (53)

subscripts

e	external flow
o	stagnation condition
r	reference
s	stagnation condition
tr	transformed plane
w	wall condition

## I. INTRODUCTION

This report presents the development of governing equations and tabulation of solutions to the two-dimensional, laminar, compressible boundary layer with heat transfer. The assumptions and conditions of the problem are as follows: (a) Prandtl number is assumed to be unity, (b) wall temperature is arbitrary but constant, (c) the Chapman-Rubesin linear viscosity law is assumed throughout the boundary layer, (d) Stewartson's transformation is applied to the basic equations of motion and energy to yield nonlinear ordinary differential equations, and (e) the formulation of these transformed equations requires the restrictive "similarity condition"  $M_e = CX^m$ .

Since the similar solutions are a restricted set of boundary layer solutions based upon a condition of streamwise Mach number development infrequently found in real flows, some justification for this comprehensive presentation of solutions should be made. Cohen and Reshotko (Ref 4) stated four useful applications of similar solutions: (1) The solutions may be used as a basis for predicting trends and effects in real flows as Mach number, pressure gradient, and wall temperature are varied; (2) they may be used as a standard of comparison against which approximate methods for nonsimilar flows (such as the Karman-Pohlhausen (Ref 1) or Multiple Moment Integral (Ref 3) methods) can be measured; (3) the understanding of flow trends gained from similar solutions can aid in the development of new simple approximate techniques for solving similar and nonsimilar flows; and (4) similar solutions to segments of a real flow may be matched to form an approximate solution to the total flow. (This is the concept of local similarity derived from the assumption that flow is insensitive to its previous history). In addition, there are a few solutions which can be used to exactly describe corresponding real flows in the similarity plane, leading to exact physical plane solutions. These solutions are described further in the discussion section of this paper.

The contents of this report can be grouped into three types of information: (1) the working results necessary to the solution of numerical problems; (2) the methods of solution, of interest to those seeking solutions not presented; and (3) the analysis and derivations -- useful in the further study of the problem.

The working results consist of tabulated velocity- and temperature-related profiles, (Tab. III); the summary of global integral quantities, (Tab. IV); and the summarized transformation relations ( $F(\eta) \rightarrow G(x, y)$ ), (Tab. II). The sections related to methods of solution include the descriptions of the explicit and implicit iterative methods, the curves  $f''(0)$  and  $S'(0)$  versus  $\beta$  used to predict boundary conditions needed in the explicit method (Figs 1, 2, 3, and 4), and the discussion of solution accuracy. The sections pertaining to analysis and derivation include the derivation and complete summary of (1) the governing differential equations for similarity, (2) the integral quantity definitions, and (3) development and discussion of a power-law pressure variation for hypersonic similar flows.

Since much that is found in this report was adequately presented in the work of Cohen and Reshotko (Ref 4), some discussion of the goals of the report and the motivation behind it is in order. The report is designed to serve as a "working paper," hence, emphasis is placed upon presenting information in the most useable form. Information has been regularized and solutions have been systematically presented at even intervals of the independent variable and parameters to allow easier comparisons. Additionally, some new similarity solutions have been presented for regions of interest not previously considered. The following features of the report should enhance its usefulness. (1) An integrated temperature parameter,  $\int_0^\eta S d\eta$ , is tabulated for all  $\eta$  - values in the profiles of Tab. III. This parameter was not presented in Ref 4, and previously could only be obtained by an auxiliary numerical integration. The parameter is required for all transformations back to the physical

plane. With this additional tabulation, all quantities generally of interest in similarity work can be calculated from simple algebraic relations (i. e., no numerical integrations are required). (2) The "kinetic thickness" a global parameter not previously presented, is tabulated in the summary, Tab. IV. This quantity,  $\theta_{tF}^* N = \int_0^{\infty} (1 - f'^2) f' d\eta$ , is required in the Lees and Reeves method of solving separated boundary layers (Ref 6). (3) A significant extension of the work in Ref 4 is the presentation of numerous reversed flow solutions (i. e.,  $\frac{dp}{dx} > 0, \frac{\partial u}{\partial y}|_w < 0$ ). Although the assumptions of the Prandtl boundary layer equations are questionable in reverse flows (e. g. the transverse velocity component is no longer small compared to the longitudinal component), the solutions obtained in this flow regime are not physically unreasonable, and appear to be of value in the study of separated flows. While few solutions have been presented for similar flows with  $\beta > 2$ , (since they had previously been felt to have no physical significance), there are definite applications for these solutions. Flow accelerating around the shoulder of a blunt body at hypersonic speed or flow accelerating at the throat of a supersonic nozzle each undergoes an extreme favorable pressure gradient, exceeding  $\beta$  of two by an order of magnitude. (5) Solutions for a complete range of pressure gradients have been presented for several new values of the heat transfer parameter,  $S(0) \sim T(0)/T_{se}$ . For those who want approximate solutions not presented here, the additional heat transfer cases should make interpolation easier and more accurate. (6) Another feature of the presented solutions is improved accuracy. Due to the sophistication of some of the current so-called "approximate" techniques of boundary layer solution (such as the multiple moment integral and finite difference methods), there is a need for highly accurate exact solutions against which these techniques may be checked. The solutions presented in this report are accurate to five decimal places. The solutions of Ref 4, previously the only source of similarity solutions for a broad range of conditions, are reliably accurate to three decimal

places (four are presented). Fifteen years of advancement in computer technology has made this improvement in accuracy an easy task. (7) An attempt has been made to regularize the results, presenting solutions for the various heat transfer cases at matching, regular intervals of  $\beta$ , the pressure gradient parameter, to enable easy comparison between solutions of differing  $S(0)$ . (8) Finally, much of the analysis and derivation connected with the formulation of the problem has been presented, so that the report represents the most complete package available on the similarity solutions to the two-dimensional, laminar, compressible boundary layer with heat transfer.

## II. GOVERNING EQUATIONS

In this section the governing boundary layer equations are presented as they appear in the physical  $(x, y)$  plane, the transformed or "pseudo-incompressible"  $(X, Y)$  plane, and the similarity  $(\xi, \eta)$  plane, with all necessary transformation variables defined. Conditions for similar flow also are discussed. Integral quantities are defined for the physical and similarity planes and presented in Tab. I. Finally, a table of useful equations for physical quantities (properties, boundary layer thickness, heat transfer, and skin friction, etc.) is presented.

### A. DIFFERENTIAL EQUATIONS

-Problem Assumptions-

$$Pr = 1$$

Isothermal surface

-Equations in the Physical Plane-

Continuity

$$\frac{\partial}{\partial x} (\rho u) + \frac{\partial}{\partial y} (\rho v) = 0 \quad (1)$$

Momentum

$$\rho u \frac{\partial u}{\partial x} + \rho v \frac{\partial u}{\partial y} = \rho_e u_e \frac{\partial u_e}{\partial x} + \frac{\partial}{\partial y} \left( \mu \frac{\partial u}{\partial y} \right) \quad (2)$$

Energy

$$\rho u \frac{\partial h_s}{\partial x} + \rho v \frac{\partial h_s}{\partial y} = \frac{\partial}{\partial y} \left( \mu \frac{\partial h_s}{\partial y} \right) \quad (3)$$

Boundary Conditions

$$\left( \begin{array}{ll} u(x, 0) = 0 & u(x, \infty) = u_e \\ v(x, 0) = 0 & \\ h_s(x, 0) = h_s(0) & h_s(x, \infty) = h_{se} \end{array} \right) \quad (4)$$

Viscosity

$$\frac{\mu}{\mu_r} = \lambda \frac{T}{T_r} \quad (\text{Chapman and Rubesin, see Ref 4}) \quad (5)$$



**-Equations in the Transformed Plane-**

**Transformation Variables**

$$\psi_x \equiv -\frac{\rho}{\rho_0} v \quad (6)$$

$$\psi_y \equiv \frac{\rho}{\rho_0} u \quad (7)$$

$$X \equiv \int_0^x \lambda \frac{p_e a_e}{p_0 a_0} dx \quad (8)$$

$$Y \equiv \frac{a_e}{a_0} \int_0^y \frac{\rho}{\rho_0} dy \quad (9)$$

$$U \equiv \frac{a_0}{a_e} u \equiv \psi_Y \quad (10)$$

$$V \equiv -\psi_X \quad (11)$$

$$S \equiv \frac{h_s}{h_{se}} - 1 \quad (12)$$

**Conservation Equations**

**Continuity**

$$U_X + V_Y = 0 \quad (13)$$

**Momentum**

$$UU_X + VU_Y = (S + 1) U_e (U_e)_X + \nu_0 U_{YY} \quad (14)$$

**Energy**

$$US_X + VS_Y = \nu_0 S_{YY} \quad (15)$$

**Boundary Conditions**

$$\left( \begin{array}{ll} U(X, 0) = 0 & U(X, \infty) = U_e \\ V(X, 0) = 0 & \\ S(X, 0) = S_w & S(X, \infty) = 0 \end{array} \right) \quad (16)$$

**-Equations in the Similarity Plane-  
Transformation Variables**

$$\xi \equiv X \tag{17}$$

$$\eta \equiv N(\xi) Y \tag{18}$$

$$f'(\eta) \equiv \frac{U}{U_e} \tag{19}$$

**Conservation Equations**

**Momentum**

$$f''' + ff'' = \beta(f'^2 - S - 1) \tag{20}$$

**Energy**

$$S'' + fS' = 0 \tag{21}$$

**Boundary Conditions**

$$\left( \begin{array}{l} f(0) = 0 \\ f'(0) = 0 \\ S(0) = S_w \end{array} \right) \qquad \left( \begin{array}{l} f'(\infty) = 1 \\ S(\infty) = 0 \end{array} \right) \tag{22}$$

**B. CONDITIONS OF SIMILARITY**

For the compressible boundary layer, the condition of similarity is expressed in the transformed plane as

$$M_e = CX^m \tag{23}$$

This relation corresponds to  $u_e = cx^m$ , the similarity condition for incompressible flow problems. It should be stressed that Eq (23) is a purely mathematical condition of similarity, and can be misleading when used as a basis for physical arguments. Unlike the simple incompressible similarity condition, Eq (23) does not allow easy comparison with real flows.

By making an assumption applicable to hypersonic flow, that

$$\frac{T_{se}}{T_e} = 1 + \frac{\gamma-1}{2} M_e^2 \cong \frac{\gamma-1}{2} M_e^2 \tag{24}$$

the more physically meaningful similarity condition of Eq (25) can be developed (see App. C)

$$\frac{P_e}{P_o} = c_1 x^n \quad \text{where } n = \frac{-1}{1 + \frac{\gamma-1}{2\gamma} \left( \frac{m+1}{m} \right)} \quad (25)$$

The advantage of this pressure similarity condition is that, being expressed completely in terms of physical quantities, it provides easy comparison with real flows. Eq (25), when expressed logarithmically becomes a simple linear relation with slope,  $n$ . Therefore, a log-log plot of  $p_e$  versus  $x$  for a hypersonic flow will immediately show regions in which similarity can be approximately applied.

### C. INTEGRAL DEFINITIONS OF GLOBAL QUANTITIES

The following integral definitions derive naturally from the integrated continuity, momentum, and energy equations. They are useful in the manipulation of either exact or approximate forms of the boundary layer equations. The development which leads to these definitions is presented in Ref 2, Ball and Hankey.

TABLE I INTEGRAL DEFINITIONS FOR GLOBAL QUANTITIES

displacement thickness	
$\delta^* = \int_0^{\infty} \left( 1 - \frac{\rho u}{\rho_e u_e} \right) dy$	$\delta^*_{tr} N = \int_0^{\infty} (1 + S - f') d\eta$ (26)
momentum thickness	
$\theta = \int_0^{\infty} \left( 1 - \frac{u}{u_e} \right) \frac{\rho u}{\rho_e u_e} dy$	$\theta_{tr} N = \int_0^{\infty} (1 - f') f' d\eta$ (27)
energy thickness	
$\theta_h = \int_0^{\infty} \left( 1 - \frac{h_s}{h_{se}} \right) \frac{\rho u}{\rho_e u_e} dy$	$\theta_{h, tr} N = - \int_0^{\infty} S f' d\eta = S'(0)$ (28)
kinetic thickness	
$\theta^* = \int_0^{\infty} \left( 1 - \frac{u^2}{u_e^2} \right) \frac{\rho u}{\rho_e u_e} dy$	$\theta^*_{tr} N = \int_0^{\infty} (1 - f'^2) f' d\eta$ (29)
form factor	
$H = \delta^* / \theta$	$H_{tr} = \delta^*_{tr} / \theta_{tr}$ (30)
$H = H_{tr} + \frac{\gamma - 1}{2} M_e^2 (H_{tr} + 1)$ (31)	

D. TRANSFORMATIONS: SIMILARITY PLANE TO PHYSICAL PLANE

TABLE II

Physical Plane	Similarity Plane
	<u>Definitions Used Below</u>
$\phi$	$= 1 + \frac{\gamma - 1}{2} M_e^2 \quad (32)$
$N$	$= \left[ \frac{m+1}{2} \frac{a_0}{\nu_0} \frac{M_e}{X} \right]^{1/2} \quad (33)$
	<u>Coordinates</u>
$x$	$= \frac{X}{\lambda} \left( 1 + \frac{4(\phi - 1)}{2m + 1} + \frac{6(\phi - 1)^2}{4m + 1} + \frac{4(\phi - 1)^3}{6m + 1} + \frac{(\phi - 1)^4}{8m + 1} \right) \quad (34)$
$y$	$= \frac{\phi^4}{N} \left[ \left( 1 - \frac{\beta}{\beta + 1} \frac{\phi - 1}{\phi} \right) \int_0^\eta (S + 1) d\eta - \frac{1}{\beta + 1} \frac{\phi - 1}{\phi} (f'' + ff' - f''(0)) \right] \quad (35)$
	<u>Properties</u>
$\frac{u}{u_e}$	$= f' \quad (36)$
$\frac{T}{T_e}$	$= \phi (S + 1) - (\phi - 1) f'^2 \quad (37)$
$\frac{\rho}{\rho_e}$	$= \frac{T_e}{T} \quad (38)$
	-continued-

TABLE II (continued)

Physical Plane	Similarity Plane	
$\frac{p}{p_e}$	= 1	(39)
$\frac{h_s}{h_{se}}$	= S + 1	(40)
<u>Boundary Layer Thicknesses</u>		
$\theta$	$= \frac{(\theta_{tr} N) \phi^3}{N}$	(41)
$\frac{\delta^*}{\theta}$	$= H = H_{tr} + (\phi - 1)(H_{tr} + 1)$	(42)
$\frac{\theta^*}{\theta}$	$= \frac{(\theta^*_{tr} N)}{(\theta_{tr} N)}$	(43)
$\frac{\theta_h}{\theta}$	$= \frac{S'(0)}{(\theta_{tr} N)}$	(44)
<u>Wall Conditions</u>		
$\frac{C_f}{2}$	$= \frac{\tau_w}{\rho_e u_e^2} = N \lambda f''_w \frac{\nu_o}{a_o} \frac{1}{\phi M_e}$	(45)
St	$= \frac{-q_w}{\rho_e u_e (h_{se} - h_w)} = - \frac{C_f}{2} \frac{\left( \frac{S'_w}{S_w} \right)}{f'{}_w}$	(46)

### III. DISCUSSION

The purpose of this report is to provide, in a single source, the development of governing equations and tabulation of solutions to the two dimensional, laminar, compressible boundary layer with heat transfer. The solutions are presented without discussion of their physical implications, since all important flow trends are well presented in the work of Cohen and Reshotko (Ref 4).

While one cannot expect these solutions, under the severe constraint of similarity, to correspond to a large number of real physical flows, there are five such flows for which similar solutions do apply directly; (1) the Blasius solution for flow over a flat plate ( $\beta = 0$ ), (2) the Chapman solution for flow over a rearward facing step ( $\beta = 0, f''(0) = 0$ ), (3) the transformed stagnation point solution for an axisymmetric body ( $\beta = 0.5$ ), (4) the two-dimensional stagnation point solution ( $\beta = 1$ ), and (5) the strong interaction solution with induced hypersonic pressure gradient ( $\beta = (\gamma - 1) / \gamma$ ). In addition, many approximate solutions to real flows may be found by using similar solutions in conjunction with local similarity (see Refs 4 and 5).

The primary results of this report are (a) the graphs of the wall shear and heat transfer parameters,  $f''(0)$  and  $S'(0)$ , as a function of the pressure gradient parameter  $\beta$  (Figs 1 - 4), (b) the tables of temperature- and velocity-related profiles for the 116 cases of pressure gradient and wall temperature considered (Tab. III), and (c) a summary table of useful global quantities (wall shear and heat transfer parameters, displacement thickness, etc.) for each case considered (Tab. IV).

The curves of Figs 1 - 4 (pages 13-16) provide a broad understanding of the combined effects of pressure gradient and wall temperature upon skin friction and heat transfer over the complete range of solutions. Also, these curves predict the first-guess values of  $f''(0)$  and  $S'(0)$  needed to solve, by the explicit iterative method, cases not presented here.

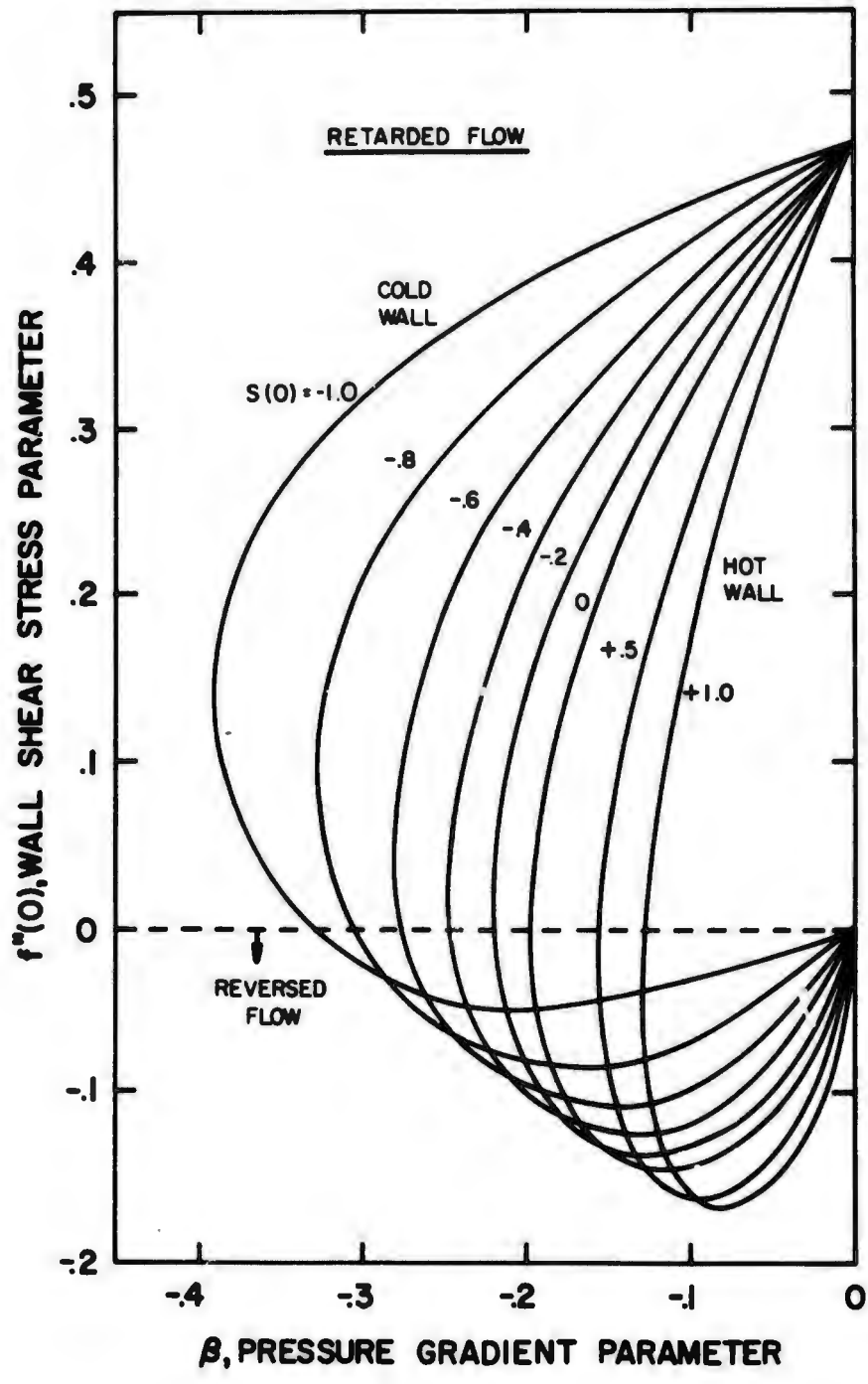


Figure 1 Wall Shear Stress--Retarded Flows



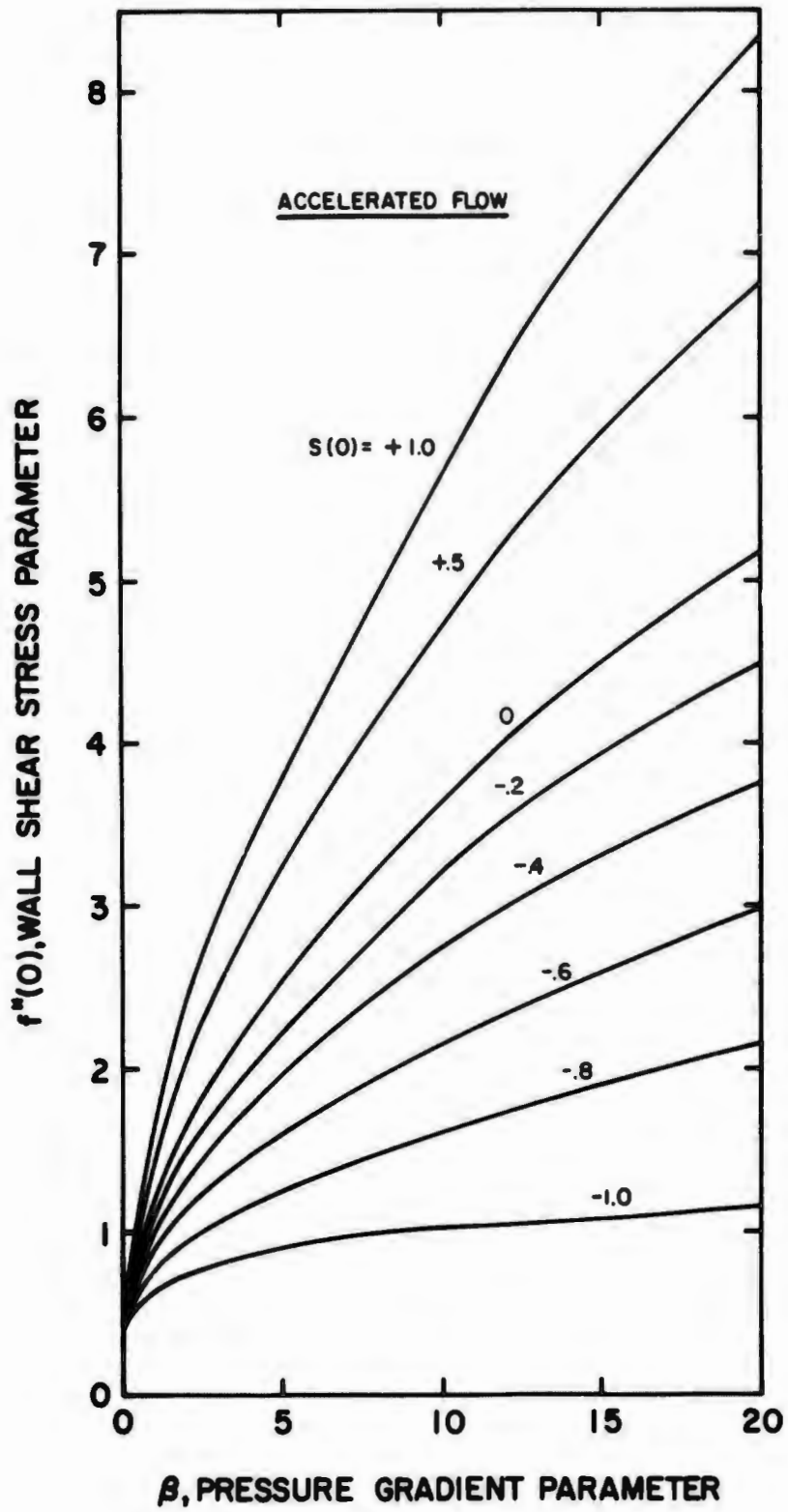


Figure 2 Wall Shear Stress--Accelerated Flows

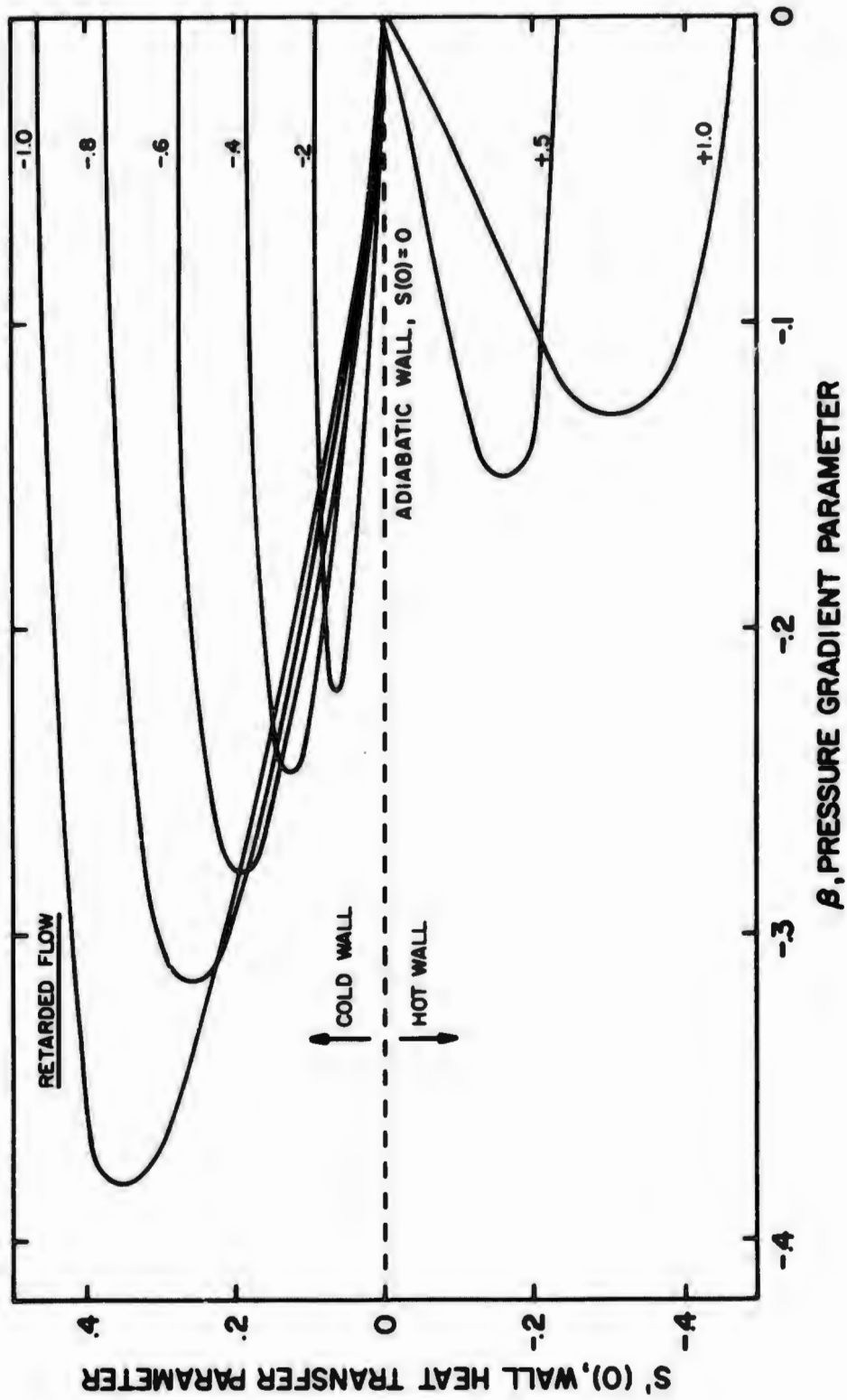


Figure 3 Wall Heat Transfer--Retarded Flows

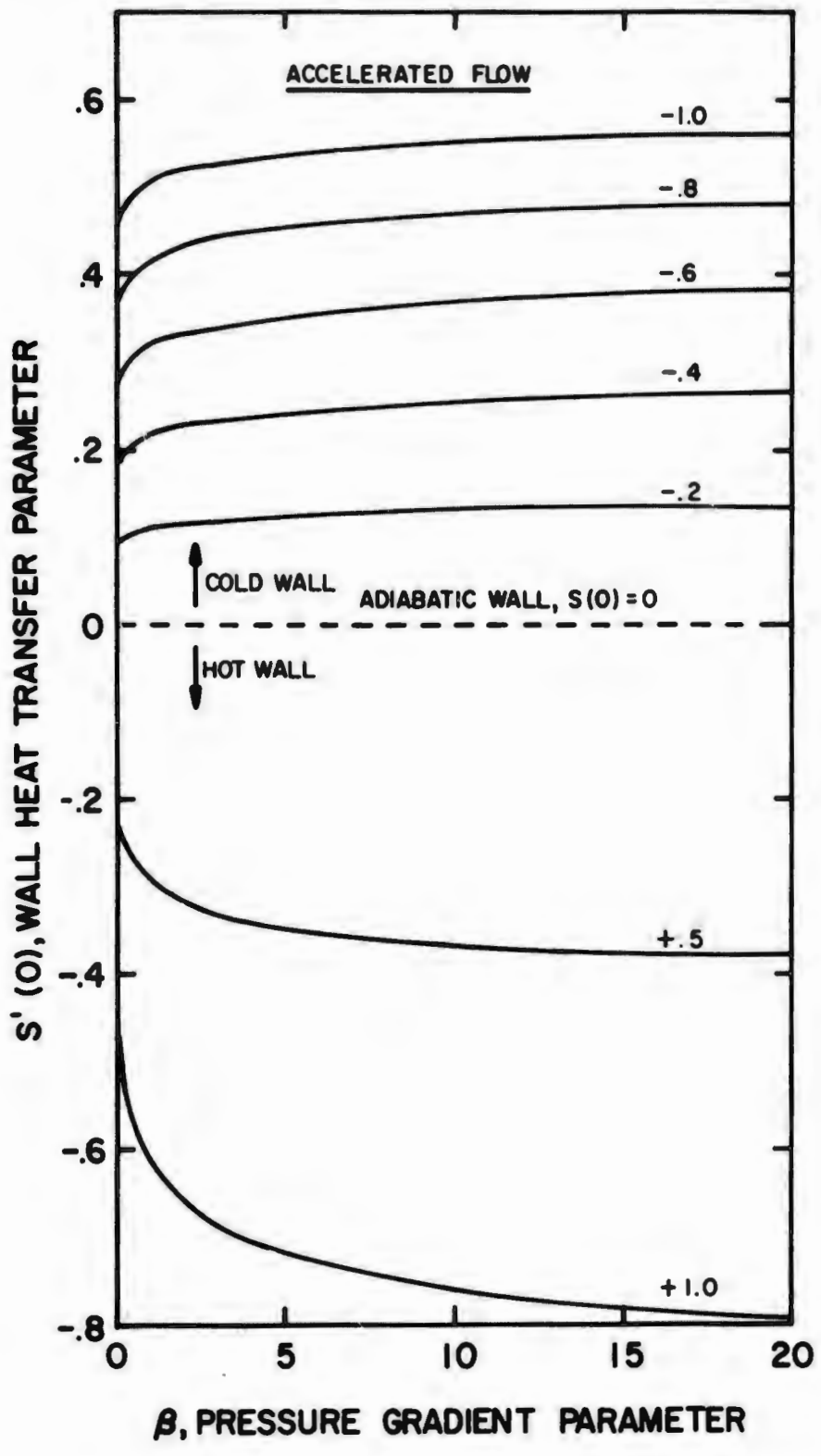


Figure 4 Wall Heat Transfer--Accelerated Flows

One feature of Tab. III is the addition of the S-integral profile, not presented with previously published similarity solutions. One can compute all quantities of interest at a given  $\eta$  with simple algebraic expressions-- numerical integration is no longer required. Another feature, the profile tables for all cases of  $\beta \geq 2$  are presented with a concentration of the data in the low  $\eta$  region where change is most rapid, and maximum definition is desirable.

In tabulating the global quantities of Tab. IV, the criterion used was that only quantities which could not be algebraically obtained would be presented. Hence,  $\delta^*_{tr}N$  can be computed from  $\theta_{tr}N$  and  $H_{tr}$ , and the useful heat transfer parameter,  $-S'(0)/S(0)$ , can be computed from its constituents. Note that for the adiabatic case this parameter appears indeterminate. It can however be calculated, and while having no physical meaning, does retain some usefulness for correlation. Because of the linearity of the energy equation when  $S$  is absent from the momentum equation, the solution for  $-S'(0)/S(0)$  is a function only of  $f$  -- independent of  $S$ . Hence, for any convenient choice of  $S(0)$ , where  $f$  is determined from the Falkner-Skan equation for the  $\beta$  of interest,  $-S'(0)/S(0)$  is found which applies to all cases of  $S(0)$  including the adiabatic case. These values appear with the adiabatic results of Tab. IV in place of  $S'(0)$ , the normally tabulated quantity. Finally, the transformation of the global quantities of Tab. IV into useful parameters in the physical plane can be accomplished with the aid of Tab. II. While such transformations are time consuming, the results of this report are presented in a form designed to minimize this task.

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## APPENDIX A: COMPRESSIBLE FLOW SIMILARITY EQUATION DERIVATIONS

The compressible forms of the boundary layer equations appear as follows:

$$\frac{\partial}{\partial x} (\rho u) + \frac{\partial}{\partial y} (\rho v) = 0 \quad (47)$$

$$\rho u \frac{\partial u}{\partial x} + \rho v \frac{\partial u}{\partial y} = \rho_e u_e \frac{\partial u_e}{\partial x} + \frac{\partial}{\partial y} \left( \mu \frac{\partial u}{\partial y} \right) \quad (48)$$

$$\frac{\partial p}{\partial y} = 0 \quad (49)$$

$$\rho u \frac{\partial h_s}{\partial x} + \rho v \frac{\partial h_s}{\partial y} = \frac{\partial}{\partial y} \left( \mu \frac{\partial h_s}{\partial y} \right) \quad (50)$$

where  $Pr = 1$  and the viscosity variation is described by a linear relationship

$$\frac{\mu}{\mu_r} = \lambda \frac{T}{T_r} \quad (51)$$

The momentum and energy equations (Eqs (47) and (48)) are second order, nonlinear partial differential equations with variable coefficients. As such, they can be solved in closed form only for the most specialized cases. It has been shown by Falkner and Skan (Ref 4) that for the incompressible case Eqs (47) and (48) can be reduced to ordinary differential equations by choosing similarity variables which allow a product solution for the stream function,  $\psi = f(\eta(x, y))g(\xi(x))$ . This simplification can also be applied to the compressible case with heat transfer, although with more difficulty.

Since there is strong temperature dependence of the density and viscosity in compressible flow, the momentum and energy equations are coupled and must be solved simultaneously. But the basic problem remains unchanged. As in the incompressible case, we are trying to transform the momentum and energy equations into ODE's properly set for solution. To do this, we will first attempt to transform these

equations into some "pseudo-incompressible" plane such that they have the same appearance as the incompressible equations in the physical plane. If this form is obtained, it is certain that the equations can then be transformed into ODE's in the similarity plane since this has been previously accomplished for the incompressible case.

K. Stewartson (Ref 8) is responsible for having found the transformation variables which make the compressible equations appear as the incompressible. Below, the general form of these transformation variables will be guessed; the continuity, momentum, and energy equations will be transformed by them, and the chosen variable forms will be justified.

The transformation  $((x, y) \rightarrow (X, Y))$  will be made with the following variables

$$X \equiv \int_0^x P(x)dx, \quad Y \equiv Q(x) \int_0^y \frac{\rho}{\rho_r} dy \quad (52)$$

For this compressible case the stream function is defined to account for density variation as follows

$$\frac{\partial \psi}{\partial y} \equiv \frac{\rho}{\rho_r} u, \quad \frac{\partial \psi}{\partial x} \equiv -\frac{\rho}{\rho_r} v \quad (53)$$

where the compressible stream function,  $\psi$ , is defined by the transformed velocity as

$$U \equiv \frac{\partial \psi}{\partial Y}, \quad V \equiv \frac{\partial \psi}{\partial X} \quad (54)$$

By chain rule the partial differential operators become

$$\frac{\partial(\quad)}{\partial x} = P \frac{\partial(\quad)}{\partial X} + \frac{\partial Y}{\partial x} \frac{\partial(\quad)}{\partial Y}, \quad \frac{\partial(\quad)}{\partial y} = \frac{\rho}{\rho_r} Q \frac{\partial(\quad)}{\partial Y} \quad (55)$$

## 1. CONTINUITY EQUATION

The continuity equation to be transformed is

$$\frac{\partial}{\partial x} \left( \frac{\rho}{\rho_r} u \right) + \frac{\partial}{\partial y} \left( \frac{\rho}{\rho_r} v \right) = 0 \quad (56)$$

We will first apply the differential operators to the  $u$  and  $v$  terms in parentheses above and substitute the transformed velocities wherever possible, leaving all remaining differentials expressed in the physical plane variables  $(x, y)$ . Having performed all possible cancellations in this form, we will carry out the remaining transformation to the  $X, Y$ -plane and obtain the transformed continuity equation.

$$\frac{\rho}{\rho_r} v = \left( PV - U \frac{\partial Y}{\partial x} \right), \quad \frac{\rho}{\rho_r} u = \frac{\rho}{\rho_r} QU$$

so

$$\frac{\partial}{\partial x} \left( \frac{\rho}{\rho_r} QU \right) + \frac{\partial}{\partial y} \left( PV - U \frac{\partial Y}{\partial x} \right) = 0 \quad (57)$$

and carrying out the operation of Eq (57) with cancellation, (noting that  $\left( \frac{\rho}{\rho_r} \right) Q = \frac{\partial Y}{\partial y}$ ), we obtain

$$\frac{\partial U}{\partial x} \frac{\partial Y}{\partial y} + P \frac{\partial V}{\partial y} - \frac{\partial U}{\partial y} \frac{\partial Y}{\partial x} = 0 \quad (58)$$

Now transforming completely to the  $X, Y$  plane

$$\frac{\rho}{\rho_r} Q \left( P \frac{\partial U}{\partial X} + \frac{\partial U}{\partial Y} \frac{\partial Y}{\partial x} \right) + \frac{\rho}{\rho_r} QP \frac{\partial V}{\partial Y} - \frac{\rho}{\rho_r} Q \frac{\partial U}{\partial Y} \frac{\partial Y}{\partial x} = 0$$

which becomes, after combining terms and dividing by  $\frac{\rho}{\rho_r} QP$ ,

$$\frac{\partial U}{\partial X} + \frac{\partial V}{\partial Y} = 0 \quad (59)$$

Thus, the form of the incompressible continuity equation has been achieved.

## 2. MOMENTUM EQUATION

Next, the compressible momentum equation will be transformed to appear like the incompressible equation, expressed below in terms of the stream function



$$\psi_y \psi_{yx} - \psi_x \psi_{yy} = (\psi_y \psi_{yx})_e + \nu \psi_{yyy} \quad (60)$$

First, the substantial derivative (needed in both the momentum and energy equations) will be developed using the differential operators of Eq (55).

$$\rho u \frac{\partial(\cdot)}{\partial x} + \rho v \frac{\partial(\cdot)}{\partial y} = \rho \Omega \psi_Y \left( P \frac{\partial(\cdot)}{\partial X} + \frac{\partial Y}{\partial x} \frac{\partial(\cdot)}{\partial Y} \right) - \rho \Omega \left( P \psi_X + \frac{\partial Y}{\partial x} \psi_Y \right) \frac{\partial(\cdot)}{\partial Y}$$

and with cancellation

$$\rho u \frac{\partial(\cdot)}{\partial x} + \rho v \frac{\partial(\cdot)}{\partial y} = \rho \Omega P \psi_Y \frac{\partial(\cdot)}{\partial X} - \psi_X \frac{\partial(\cdot)}{\partial Y} \quad (61)$$

Using the relation  $u = \Omega \psi_Y = \Omega U$  and applying the substantial derivative of Eq (61), the left-hand side of the momentum equation is obtained as

$$\begin{aligned} \rho \Omega P \left( \psi_Y \frac{\partial}{\partial X} (\Omega \psi_Y) - \psi_X \frac{\partial}{\partial Y} (\Omega \psi_Y) \right) = \\ \rho \Omega^2 P \left( \psi_Y \psi_{YX} - \psi_X \psi_{YY} \right) + \rho \Omega Q' P \psi_Y^2 \end{aligned}$$

Considering the right-hand side of the momentum equation, the pressure gradient can be written in terms of external velocity by applying Euler's equation. This term can then be transformed into the X, Y plane,

$$-\frac{dp}{dx} = \rho_e u_e \frac{du_e}{dx} = \rho_e u_e P \frac{du_e}{dX}$$

Next, the shear stress derivative term is transformed, making use of the linear viscosity law,  $\mu = \lambda \mu_e T / T_e$ , and the perfect gas law

$$\frac{\partial}{\partial y} \left( \mu \frac{\partial u}{\partial y} \right) = \frac{\rho}{\rho_r} \Omega \frac{\partial}{\partial Y} \left( \lambda \mu_e \frac{T}{T_e} \frac{\rho}{\rho_r} \Omega^2 \psi_{YY} \right) = \rho \Omega^2 P \frac{\Omega \lambda \mu_e \rho_e}{P \rho_r^2} \psi_{YYY}$$

Grouping all of the transformed terms of the momentum equation and dividing by  $\rho \Omega^2 P$ ,

$$\psi_Y \psi_{YX} - \psi_X \psi_{YY} = \underbrace{\left( \frac{\rho_e}{\rho} \frac{u_e u_e'}{\Omega^2} - \frac{Q'}{\Omega} \psi_Y^2 \right)}_{F_1} + \underbrace{\left( \frac{\Omega \lambda \mu_e \rho_e}{P \rho_r^2} \right)}_{F_2} \psi_{YYY} \quad (62)$$

We see that if terms  $F_1$  and  $F_2$  can be modified appropriately by the proper choice of  $Q$  and  $P$  a form similar in appearance to the incompressible form, Eq (60) can be obtained. First,  $Q$  must be chosen such that  $F_1 \sim (\psi_Y \psi_{YX})_e$ , then,  $Q$  being fixed,  $P$  must be chosen such that  $F_2 \sim \nu_T$ . Equality for these terms is most desirable, but a product solution in the similarity plane may be possible even if the terms differ in minor ways. First, let us consider the term,  $F_1$ .

$$F_1 = \frac{\rho_e}{\rho} \frac{u_e u_e'}{Q^2} - \frac{Q'}{Q} \psi_Y^2$$

$$\frac{\rho_e}{\rho} = \frac{T}{T_e} = \frac{T_s}{T_e} - \frac{u^2}{2c_p T_e} = \frac{T_s}{T_{se}} \frac{T_{se}}{T_e} - \frac{u^2}{2c_p T_e}$$

now define

$$S \equiv \frac{h_s}{h_{se}} - 1 \quad (63)$$

and assume  $c_p$  constant, implying  $S + 1 = T_s/T_{se}$  so

$$\frac{\rho_e}{\rho} = (S + 1) \left( 1 + \frac{u_e^2}{2c_p T_e} - \frac{u^2}{2c_p T_e} \right)$$

Using the identity  $(\psi_Y \psi_{YX})_e \equiv \frac{u_e u_e'}{Q^2} - \frac{Q'}{Q^3} u_e^2$ ,  $F_1$  is written in terms of physical velocity except for the term desired in the final form of the equation

$$F_1 = (S + 1) \left( 1 + \frac{u_e^2}{2c_p T_e} - \frac{u^2}{2c_p T_e} \right) \left( (\psi_Y \psi_{YX})_e + \frac{Q'}{Q^3} u_e^2 \right) - \frac{Q'}{Q^3} u^2 \quad (64)$$

Multiplying and grouping,  $F_1$  can be written in a form

$$F_1 = (S + 1) (\psi_Y \psi_{YX})_e + \Theta \quad (65)$$

where  $\Theta$  is

$$\Theta \equiv (S + 1) u_e^2 \frac{Q'}{Q^3} + \frac{(S + 1) u_e^3 u_e'}{2c_p T_e Q^2} - \frac{u^2 u_e u_e'}{2c_p T_e Q^2} - \frac{Q'}{Q^3} u^2 \quad (66)$$

Since the first term of  $F_1$  is very nearly of the incompressible form, it is desired that all other terms combine to equal zero. So we will attempt to find a  $Q$  such that  $\Theta = 0$ . Regrouping  $\Theta$ ,

$$\Theta = \frac{Q'}{Q^3} \left( (S+1) u_e^2 - u^2 \right) \underbrace{\left( 1 + \frac{u_e u_e'}{2c_p T_e} \frac{Q}{Q'} \right)}_{\theta(Q, Q')} \quad (67)$$

Since  $Q' \neq 0$ ,  $\theta(Q, Q')$  must be zero. To find  $Q$  corresponding to  $\theta = 0$ , we consider the differentiated external total temperature which is known to equal zero, and which can be made to resemble  $\theta(Q, Q')$  in form

$$\frac{T_{se}'}{T_e'} = 0 = 1 + \frac{u_e u_e'}{c_p T_e'} \quad (68)$$

Equating  $\theta$  to zero by combining Eq (68) and the definition of  $\theta$ , we have

$$1 + \frac{u_e u_e'}{c_p T_e'} = 1 + \frac{u_e u_e'}{2c_p T_e} \frac{Q}{Q'}$$

or

$$\frac{1}{T_e'} = \frac{Q}{Q'} \frac{1}{2T_e} \rightarrow \int \frac{T_e'}{T_e} = 2 \int \frac{Q'}{Q}$$

leading to

$$Q = (CT_e)^{1/2} \quad (69)$$

Having specified  $Q$  and forced the pressure gradient-x-inertia term to assume nearly the incompressible form, we next consider the shear stress derivative term,  $F_2 \psi_{YYY}$ .

$$F_2 = \frac{Q \lambda \mu_e Q_e}{P \rho r^2}$$

where  $P$  is now defined such that  $F_2 = \nu_r$ , which gives

$$P \equiv Q\lambda \frac{\rho_e \mu_e}{\rho_r \mu_r} \quad (70)$$

Finally, substituting in the values of  $F_1$  and  $F_2$  (for the specified  $Q$  and  $P$ ), the momentum equation in the "pseudo-incompressible"  $(X, Y)$  plane becomes

$$\psi_Y \psi_{YX} - \psi_X \psi_{YY} = (S+1) (\psi_Y \psi_{YX})_e + \nu_r \psi_{YYY} \quad (71)$$

Eq (71) is now nearly in the incompressible form (see Eq (60)). The task remains to see if a product solution can still be obtained when the equation is transformed into the  $(\xi, \eta)$  similarity plane. The transformation variables are

$$\xi \equiv X, \quad \eta \equiv N(X)Y \quad (72)$$

The differential operators become

$$\frac{\partial(\quad)}{\partial X} = \frac{\partial(\quad)}{\partial \xi} + \eta \frac{N'}{N} \frac{\partial(\quad)}{\partial \eta}, \quad \frac{\partial(\quad)}{\partial Y} = N \frac{\partial(\quad)}{\partial \eta} \quad (73)$$

Applying the operators of Eq (73) to the transformed momentum equation (Eq (71)), and making cancellations

$$NN' \psi_\eta^2 + N^2 \psi_\eta \psi_{\eta\xi} - N^2 \psi_\xi \psi_{\eta\eta} = U_e \frac{dU_e}{dX} (S+1) + \nu_r N^3 \psi_{\eta\eta\eta} \quad (74)$$

where  $N$  in Eq (74) is  $N = N(\xi)$ . Now, assuming a product solution of the form  $\psi = g(\xi)f(\eta)$ , and making this substitution into Eq (74),

$$(NN' g^2 + N^2 g g') f'^2 - N^2 g g' f f'' = (S+1) U_e U_e' + \nu_r N^3 g f'''$$

By dividing out  $N^2 g g'$  and defining coefficients,

$$\alpha f''' + f f'' = \beta f'^2 - \phi (S+1) \quad (75)$$

where

$$\alpha(\xi) = \frac{\nu_r N}{g'}, \quad \beta(\xi) = 1 + \frac{N'}{N} \frac{g}{g'}, \quad \phi(\xi) = \frac{U_e U_e'}{N^2 g g'} \quad (76)$$

Now, considering the boundary conditions (noting again that

$$U = \psi_Y = N\psi_\eta = Nf'(\eta)g(\xi),$$

$$\left( \begin{array}{l} U(\xi, 0) = Nf'(0)g(\xi) = 0 \quad \rightarrow f'(0) = 0 \\ V(\xi, 0) = -f(0)g'(\xi) - \eta \frac{N'}{N} f'(0)g(\xi) = 0 \quad \rightarrow f(0) = 0 \\ U(\xi, \infty) = Nf'(\infty)g(\xi) = U_e, \quad f'(\infty) = 1 \text{ (arbitrary)} \end{array} \right) \quad (77)$$

$$U_e = Ng \quad (78)$$

Considering  $\phi(\xi)$  and using Eq (78)

$$\phi = \frac{U_e U_e'}{N^2 g g'} = \frac{(Ng)(Ng)'}{(Ng) Ng'} = 1 + \frac{N'}{N} \frac{g}{g'} = \beta \quad (79)$$

We may also set  $\alpha$  arbitrarily at  $\alpha = 1$ , further simplifying the momentum equation in the similarity plane. (Differing  $\alpha$ 's give different results in the similarity plane, but due to the inclusion of  $\alpha$  in the transformation variables the results in the physical plane are unaffected by  $\alpha$ . Compare the flat plate similarity plane momentum equations of H. Schlichting ( $\alpha = 2$ ) with those of Falkner and Skan ( $\alpha = 1$ ) to see the arbitrary nature of  $\alpha$ ). Eq (75) now becomes

$$f''' + ff'' = \beta(f'^2 - S - 1) \quad (80)$$

Thus, we have transformed the compressible momentum equation into an ordinary differential equation. However, we cannot now independently solve Eq (80) because of its dependence upon  $S$ . The energy equation must be developed in terms of  $S$  and functions of  $\eta$  and solved simultaneously with the momentum equation.

### 3. ENERGY EQUATION

To develop the energy equation in the  $(\xi, \eta)$  similarity plane, we must first transform it from the physical plane,  $((x, y) \rightarrow (X, Y) \rightarrow (\xi, \eta))$ . Applying the substantial derivative (Eq (61)) to the stagnation enthalpy ( $h_g$ ) and transforming the heat conduction term by the differential operator (Eq (55)), we get

$$\rho QP \left( \psi_Y \frac{\partial h_s}{\partial X} - \psi_X \frac{\partial h_s}{\partial Y} \right) = \frac{\rho}{\rho_r} Q \frac{\partial}{\partial Y} \left( \lambda \mu_e \frac{T}{T_e} \frac{\rho}{\rho_r} Q \frac{\partial h_s}{\partial Y} \right)$$

Dividing by  $\rho QP$  the equation becomes

$$\psi_Y \frac{\partial h_s}{\partial X} - \psi_X \frac{\partial h_s}{\partial Y} = \frac{Q \lambda \mu_e \rho_e}{P \rho_r^2} \frac{\partial^2 h_s}{\partial Y^2}$$

where the coefficient of  $(\partial^2 h_s / \partial Y^2)$ , it is recalled from Eq (70) of the momentum equation derivation, is equal to  $\nu_r$ . Therefore, the final form of the transformed compressible energy equation is seen to correspond exactly to the incompressible form (see Eq (49)):

$$U \frac{\partial h_s}{\partial X} + V \frac{\partial h_s}{\partial Y} = \nu_r \frac{\partial^2 h_s}{\partial Y^2} \quad (81)$$

Now, rewriting Eq (81) in terms of stream function  $\psi$ , and substituting  $h_{se}(S+1)$  for  $h_s$ , we obtain

$$\psi_Y \frac{\partial S}{\partial X} - \psi_X \frac{\partial S}{\partial Y} = \nu_r \frac{\partial^2 S}{\partial Y^2} \quad (82)$$

Using the differential operators of Eq (73), Eq (82) becomes

$$N \psi_\eta \left( \eta \frac{N'}{N} S_\eta \right) - \left( \psi_\xi + \eta \frac{N'}{N} \psi_\eta \right) N S_\eta = \nu_r N^2 S_{\eta\eta}$$

Cancelling terms and dividing by  $N$  gives

$$\nu_r N S'' + \psi_\xi S' = 0$$

Now, substituting the product solution for the stream function,  $\psi = g(\xi)f(\eta)$ , and dividing by  $g'$ ,

$$\left( \frac{\nu_r N}{g'} \right) S'' + f S' = \alpha S'' + f S' = 0 \quad (83)$$

So, for  $\alpha$  arbitrarily set at  $\alpha = 1$ , the compressible energy equation in the similarity plane becomes

$$S'' + f S' = 0 \quad (84)$$

In summary, the compressible boundary layer equations in the similarity plane are

$$\begin{aligned} f''' + ff'' &= \beta(f'^2 - S - 1) \\ S'' + fS' &= 0 \end{aligned} \tag{85}$$

where the boundary conditions are

$$f(0) = f'(0) = 0, f'(\infty) = 1; S(0) = S_w, S(\infty) = 0$$

This system of equations is now properly set to be solved by numerical methods.

## APPENDIX B: TRANSFORMATION TO THE PHYSICAL PLANE

The primary purpose of this report is to present solutions to the compressible, non-adiabatic, laminar boundary layer equations in the similarity plane. Also of importance is the task of demonstrating how the problem can be formulated in similarity plane parameters, and, after solution, be expressed in the physical plane. Transformation to and from the similarity plane will, in many cases, constitute the majority of the effort required to solve a problem.

The longitudinal coordinate in the transformed plane is defined by the following integral:

$$X = \int_0^x \lambda \frac{p_e a_e}{p_o a_o} dx \quad (86)$$

Using isentropic relations to express pressure and sonic velocity ratios in terms of free stream Mach number, the differentiated relation becomes

$$dX = \lambda \left( 1 + \frac{\gamma-1}{2} M_e^2 \right)^{\frac{1-3\gamma}{2(\gamma-1)}} dx \quad (87)$$

Further, by using  $\gamma = 1.4$  for air and the governing similarity equation in the form,  $M_e = CX^m$ , Eq (86) can be integrated and manipulated to the following form:

$$x \left|_{x_1}^{x_2} = \frac{X}{\lambda} \left( 1 + \frac{4(M_e^2/5)}{2m+1} + \frac{6(M_e^2/5)^2}{4m+1} + \frac{4(M_e^2/5)^3}{6m+1} + \frac{(M_e^2/5)^4}{8m+1} \right) \right|_{X_1}^{X_2} \quad (88)$$

Typically, one might need to know a value for  $X$  to be used in finding a value of the transverse coordinate,  $y$ , in the physical plane (see Eq (89)). In this case one would know (a) how free stream Mach numbers vary along the body ( $M_e v_{ax}$ ), and (b) the value of the similarity parameter,  $m$ . Eq. (87) could then be evaluated between 0 and  $X$ .



To describe temperature and velocity profiles in the physical plane, the transverse coordinate in that plane must be obtained by combining the following defined transformation- and similarity-plane variables;

$$Y = \frac{a_e}{a_o} \int_0^y \frac{\rho}{\rho_o} dy, \quad U_e = \frac{a_o}{a_e} u_e, \quad \eta = Y \sqrt{\frac{m+1}{2} \frac{a_o}{\nu_o} \frac{M_e}{X}} \quad (89)$$

By combining the relations of Eq (89),  $y$  becomes

$$y = \frac{p_o a_o}{p_e a_e} \sqrt{\frac{2}{m+1} \frac{\nu_o}{a_o} \frac{X}{M_e}} \cdot \int_0^\eta \frac{T}{T_o} d\eta, \quad (\text{see Ref 4}) \quad (90)$$

To evaluate  $y$  corresponding to a given  $\eta$  at the desired longitudinal distance,  $x = x_1$ , Eq (90) is written as

$$y|_{x_1} = \frac{\phi^4}{N} \left( \left( 1 - \frac{\beta}{\beta+1} \frac{\phi-1}{\phi} \right) \int_0^\eta (S+1) d\eta - \frac{1}{\beta+1} \frac{\phi-1}{\phi} (f'' + ff' - f''(0)) \right) \quad (91)$$

where

$$\phi = \frac{T_{se}}{T_e} = 1 + \frac{\gamma-1}{2} M_e^2 \quad \text{and} \quad N = \sqrt{\frac{m+1}{2} \frac{a_o}{\nu_o} \frac{M_e}{X}} \quad (92)$$

Since the problem will have been previously solved in the similarity plane,  $m$  will be known. Further, the kinematic viscosity,  $\nu_o$ , can be found for known stagnation temperature and pressure; and  $X$  can be determined from Eq (88) as was explained above. The necessary similarity plane variables are found in Tab III. Thus, there is sufficient information to solve for the real transverse position,  $y$ , corresponding to a given  $\eta$  and  $x$ .

We have discussed how one can transform results out of the similarity plane and into the physical plane, but how does one express a problem in the similarity plane initially? A value for  $m$  and  $S(0)$  and knowledge of whether the flow is attached or separated is sufficient to define a unique solution in the similarity plane. Since  $S(0)$  is virtually

always known for a real or constructed problem, determination of  $m$  is the main task to be accomplished. For the case in which one wants to use a tabulated similarity solution to check the validity of an approximate method for solving the boundary layer equations,  $m$  can be arbitrarily stipulated and therefore poses no problem. In such a case the Mach number distribution described by the similarity relation  $M_e = CX^m$  need not correspond to a particular physical flow.

There are physical flow cases for which a particular similarity solution is an exact or satisfactorily approximate solution. Two examples of such real flows are stagnation flow ( $m = 1$ ), and flat plate flow ( $m = 0$ ). For Mach number distributions which appear to follow some exponential law, one can attempt to approximate the distribution with the similarity exponential form, obtaining optimum values of  $C$  and  $m$  by trial and error. Each trial  $m$  will predict a unique Mach number distribution which can then be compared with the known distribution. Following is a description of how this similarity parameter may be found.

To begin, let us account for all unknowns and available equations. In the similarity relation,  $M_e = CX^m$ ,  $C$ ,  $X$ , and  $m$  are unknown. If Eq (88) is evaluated between 0 and  $X$ , it appears as below. (Note that no new unknowns have been added.)

$$x = \frac{X}{\lambda} \left( 1 + \frac{4(M_e^2/5)}{2m+1} + \frac{6(M_e^2/5)^2}{4m+1} + \frac{4(M_e^2/5)^3}{6m+1} + \frac{(M_e^2/5)^4}{8m+1} \right) \quad (93)$$

Thus, with Eq (93) and the similarity relation, we have two equations and three unknowns. Now assume that the Mach number at two positions,  $x_1$  and  $x_2$  is known. By forming a ratio of the similarity relations evaluated at these two points and solving for  $m$ , we obtain

$$m = \frac{L_n \left( \frac{M_{e1}}{M_{e2}} \right)}{L_n \left( \frac{X_1}{X_2} \right)} \quad (94)$$

The unknown,  $C$ , has been eliminated, but an  $X$  has been added; the three unknowns are  $m$ ,  $X_1$ ,  $X_2$ . We now have three equations (Eq (93) evaluated at two positions, and Eq (94) ) and three unknowns, and can solve the system for  $m$ . Since Eqs (93) and (94) are implicit, a trial-and-error method of solution is required.

The single value of  $m$  which is found corresponds to a tabulated similarity solution which should now apply exactly at the two points,  $x_1$  and  $x_2$ . One way of checking the validity of the approximation is to compare the  $x$  at which the similarity relation predicts a given Mach number to the  $x$  at which that Mach number is known to occur from the initial data. By incorporating the similarity relation into Eq (93), this check can easily be made.

It will most often be found that a particular external flow field will not lend itself to description by a single value of  $m$ . In such a case the technique of local similarity might be advantageously applied. This technique is briefly discussed in Ref 4.

## APPENDIX C: STREAMWISE PRESSURE VARIATION FOR HYPERSONIC FLOW

In this appendix, the similarity pressure gradient parameter,  $\beta$ , and the related parameter,  $m$ , are derived in terms of quantities obtainable from physical flows. These parameters are then studied for hypersonic flows to determine the constraints needed for constant values of both parameters  $m$  and  $\beta$ . Finally, a method is described for usefully applying the results to real data.

By log differentiation of the defining similarity relation,  $M_e = CX^m$  the parameter  $m$  can be found as

$$m = \left( \frac{dM_e}{M_e} \bigg/ \frac{dX}{X} \right) \quad (95)$$

The numerator can be alternately expressed by log differentiation of a pressure-Mach number relation, and the denominator can be found from isentropic relations and the definition of  $X$ :  $m$  then becomes

$$m = -\left( \frac{\gamma-1}{2\gamma} \right) \left[ \frac{\int_0^X \zeta^a dx}{\zeta^a dx} \frac{d\zeta}{\zeta} \right] \quad (96)$$

where  $\zeta \equiv p_e/p_o$  and  $a \equiv (3\gamma-1)/2\gamma$ . The task is then to show the bracketed term to be constant, proving  $m$  to be constant.

Using  $g$  and its derivatives ( $g' \equiv \zeta^a$ ) to represent the bracketed term, and letting that term equal the constant,  $c_o$ , we obtain

$$gg'' - ac_o g'^2 = 0 \quad (97)$$

This differential equation is then solved (dividing by  $gg'$ ), and  $\zeta (= g'^{1/a})$  is of the form

$$\zeta = c_1 x^n \quad \text{where} \quad n = \frac{c_o}{1 - ac_o} \quad (98)$$

Solving for  $c_o$  in terms of  $n$  and  $a(\gamma)$ , and substituting into Eq (97)  $m$  becomes

$$m = \frac{n(\gamma-1)}{-n(3\gamma-1)-2\gamma} \quad (99)$$

which leads to the parameter  $\beta$ ,

$$\beta = -\left(\frac{\gamma-1}{\gamma}\right)\left(\frac{n}{n+1}\right) \quad (100)$$

We have now related the streamwise pressure variation to a similarity parameter such that the complete streamwise pressure distribution is easily calculated for any hypersonic similar flow. Conversely, if test pressure data varies according to the exponential law of Eq (98), a corresponding similar flow can be identified and the boundary layer can be completely described. Such a flow can be most easily identified by a log-log plot of pressure versus axial position.

## APPENDIX D: METHOD OF SOLUTION

Two methods of solution were applied to the boundary layer equations under study. These will be named the "explicit iterative" and "implicit iterative" methods. These methods correspond closely to the forward integration (explicit) and successive approximation (implicit) methods referred to by Cohen and Reshotko (Ref 4). A description of the basic features of each of these methods and a discussion of solution accuracy follow.

### 1. EXPLICIT ITERATIVE METHOD

The set of boundary layer equations being considered has split boundary conditions. Hence, there are too few known initial conditions to allow a simple forward integration to the correct solution (i. e. the solution which satisfies both wall and free stream boundary conditions). Two additional initial boundary conditions,  $f''(0)$  and  $S'(0)$ , must be guessed at the wall. From these prescribed conditions a trial solution is found which is then checked against the required free stream conditions,  $f'(\infty) = 1$  and  $S(\infty) = 0$ . An iteration scheme is now described which modifies the guessed initial conditions in a systematic way such that each successive trial solution will move toward the final problem solution.

Difficulty arises in placing a boundary condition at infinity. Based on some intuition as to the boundary layer thickness of the problem, a check point is established at some large  $\eta = \eta_k$  where  $\eta_k$  is generally at least fifty percent larger than the estimated boundary layer thickness (e. g.  $\eta$  at  $f'(\eta) = 0.99$ ). At this check point, if  $f'(k)$  and  $S(k)$  differ by no more than the amount of a predetermined tolerance\* from the ideal free stream values, a problem solution has been found. More probably, the first guess will result in a trial solution which fails to meet

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\*This tolerance was  $10^{-6}$  or smaller for the solutions presented in Tabs III and IV.

the prescribed tolerance. When this occurs, some scheme is desired by which the guessed boundary conditions can be changed in a systematic way, hopefully always moving closer to the problem solution. Such a systematic scheme of iteration was devised for this problem. The difficulty in finding such a scheme arises from the fact that two parameters are being simultaneously varied, and the effects of varying the one parameter are quite often masked by variation of the other.

One can write a partial differential equation for both  $f'(k)$  and  $S(k)$ , expressing their variation with successively different guess conditions  $f''(0)$  and  $S'(0)$  (denoted by subscript  $n$ ). Those equations appear as follows:

$$f'(k)_{n+1} = f'(k)_n + \left( \frac{\partial f'(k)}{\partial f''(0)} \right)_{n, S'(0)} \Delta f''(0) + \left( \frac{\partial f'(k)}{\partial S'(0)} \right)_{n, f''(0)} \Delta S'(0) \quad (101)$$

$$S(k)_{n+1} = S(k)_n + \left( \frac{\partial S(k)}{\partial f''(0)} \right)_{n, S'(0)} \Delta f''(0) + \left( \frac{\partial S(k)}{\partial S'(0)} \right)_{n, f''(0)} \Delta S'(0) \quad (102)$$

By assuming that  $f'(k)$  and  $S(k)$  both vary linearly with  $f''(0)$  and  $S'(0)$ , Eqs (101) and (102) can be expressed in a simple finite difference form. In this form,  $f'(k)$  and  $S(k)$  for the  $n+1$ st iteration are set equal to the free stream boundary conditions,  $f'(\infty) = 1$  and  $S(\infty) = 0$ . In order to form the differences required, the effects upon  $f'(k)$  and  $S(k)$  of a step in  $f''(0)$  (at constant  $S'(0)$ ) must be determined. The finite difference equations can then be written as follows:

$$\left( \frac{\Delta f'(k)}{\Delta f''(0)} \right)_{n, n-1} \Big|_{S'(0)} \Delta f''(0) + \left( \frac{\Delta f'(k)}{\Delta S'(0)} \right)_{n-1, n-2} \Big|_{f''(0)} \Delta S'(0) = 1 - f'(k)_n \quad (103)$$

$$\left( \frac{\Delta S(k)}{\Delta f''(0)} \right)_{n, n-1} \Big|_{S'(0)} \Delta f''(0) + \left( \frac{\Delta S(k)}{\Delta S'(0)} \right)_{n-1, n-2} \Big|_{f''(0)} \Delta S'(0) = -S(k)_n \quad (104)$$

To form the differences and slopes required in Eqs (103) and (104), three trial solutions must be found for different sets of guessed wall conditions --

(a)  $f''(0)$ (1st) and  $S'(0)$ (1st), (b)  $f''(0)$ (2nd) and  $S'(0)$ (1st), and (c)  $f''(0)$ (2nd) and  $S'(0)$ (2nd). Once the slopes have been calculated, the two remaining unknowns are the differences  $\Delta f''(0)$  and  $\Delta S'(0)$  which, when added to  $f''(0)_n$  and  $S'(0)_n$  for a new trial solution, will bring  $f'(k)$  and  $S(k)$  nearer to the correct boundary values,  $f'(k)_{n+1} = 1$  and  $S(k)_{n+1} = 0$ . Kramer's rule may now be applied to Eqs (103) and (104) and  $\Delta f''(0)$  and  $\Delta S'(0)$  may be found. Assuming that the initial guesses for  $f''(0)$  and  $S'(0)$  were reasonable, the trial solution will have moved closer to the desired solution. If the guessed conditions are not within a reasonable neighborhood of the correct values, then the assumption that  $f'(k)$  and  $S(k)$  vary linearly with the guessed conditions was invalid. The subsequent trial solution will then diverge from the desired problem solution.

What is the next step if the first iteration approached the solution, but failed to meet the prescribed tolerance? One possibility would be to completely repeat the procedure, recalculating the slopes of Eqs (103) and (104) after each iteration. In this way, the equation would need to be solved for each of three sets of guesses for every iteration. However, since guess conditions are assumed to be in the neighborhood of the final solution conditions, reasonable accuracy and some economy of computer time can be achieved by using the initially computed slopes for all iterations. In this way, every run after the three initial runs is a complete iteration. Such an iteration scheme was used to obtain the results for cases of  $\beta \leq 0$  in Tabs III and IV.

This iteration scheme was found to be quite effective when a reasonable guess (i. e. within fifty per cent of the correct values) could be made for the two initial boundary conditions. Tolerance was met within seven iterations (ten runs) for almost all cases. It was found that errors in the initial guesses were an order of magnitude more important than error incurred by neglecting to recalculate slopes for the later iterations. The nature of the scheme is such that one either obtains the desired



solution or, in the case of bad initial guesses, absolutely no information.  
For this reason, some care is required in guessing boundary conditions.

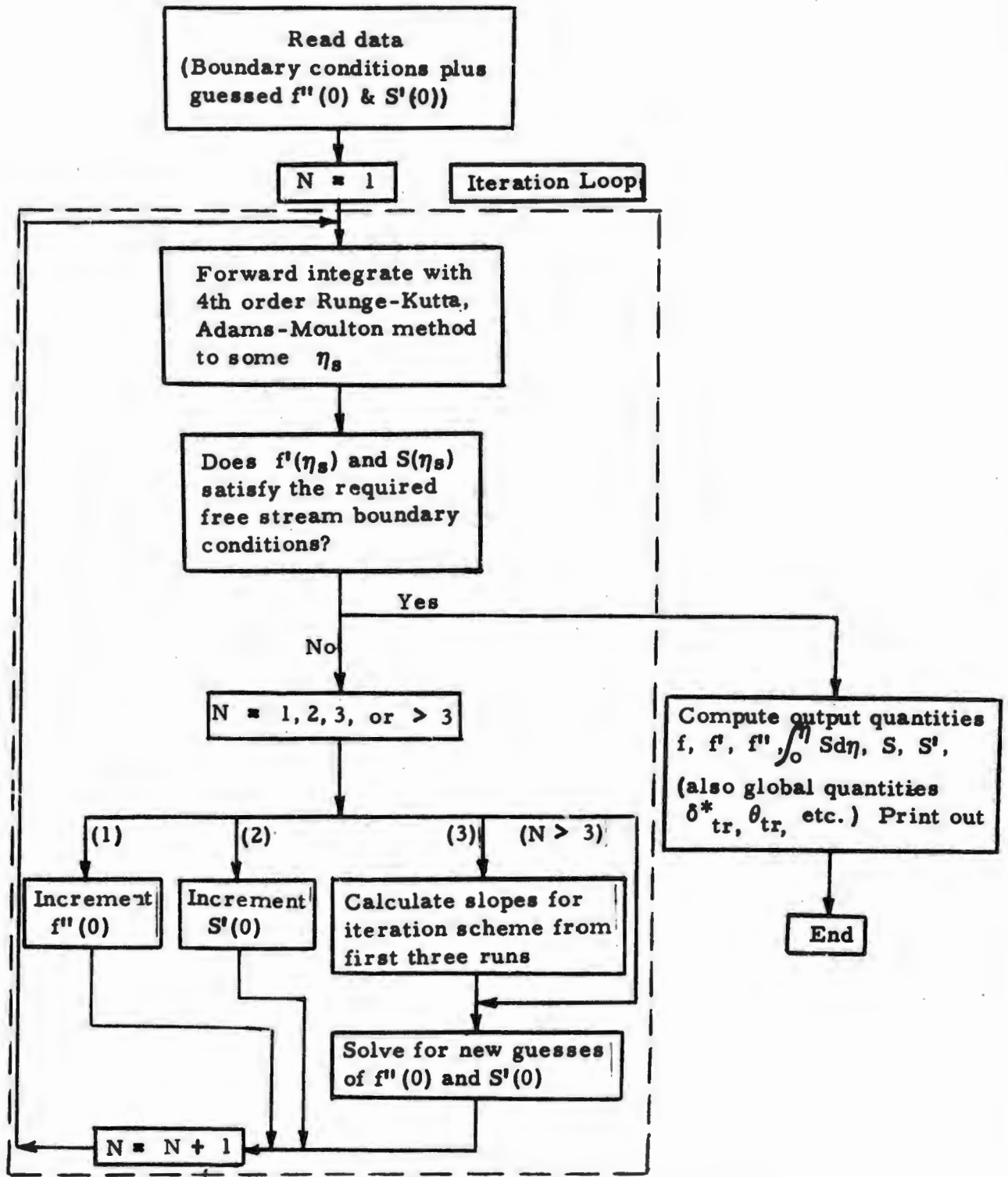


Fig 5 Explicit Iterative Solution Scheme

## 2. IMPLICIT ITERATIVE METHOD

It was found that the explicit iterative method of solution began to break down and become unstable for values of  $\beta$  greater than two. For this reason, it was necessary to develop the implicit program for solution of high  $\beta$  cases corresponding to flows with extreme favorable pressure gradients.

This method of solution employed the technique of linearization in which the nonlinear, ordinary differential equations of momentum and energy (in the similar plane) were made to appear linear by guessing values for several of the variables. In the governing equations

$$g'' + \bar{f}g' - \beta\bar{g}g = -\beta(S + 1) \quad (g \equiv f') \quad (105)$$

$$S'' + \bar{f}S' = 0 \quad (106)$$

the barred quantities are the quantities which are guessed, resulting in the linearization of the equations. These linear ordinary differential equations are then expressed as  $n$  simultaneous finite difference equations,  $n$  corresponding to the number of steps in  $\eta$ . These finite difference equations were written in the form of combined operators to be applied to the vectors  $g(\eta)$  (Eq (105)) and  $S(\eta)$  (Eq (106)). They appear as follows:

$$\left[ \frac{d^2(\ )}{d\eta^2} + \bar{f} \frac{d(\ )}{d\eta} - \beta\bar{g}(\ ) \right] g = -\beta(S + 1) \quad (107)$$

$$\left[ \frac{d^2(\ )}{d\eta^2} + \bar{f} \frac{d(\ )}{d\eta} \right] S = 0 \quad (108)$$

All derivatives were expressed as fourth order central differences (with some variation in the differencing schemes applied at boundaries and other singular points). Integrations were performed by a modified Simpson's rule expressed in finite difference form to fourth order accuracy. To conserve computer storage space the step size was increased over the portion of the  $\eta$  range in which changes occur slowly. Thus, for a given number of steps, much more detail can be obtained in the region

of rapid change with variable step size than with constant step size.

The scheme used for changing step size was the Fibonacci sequence (. . . . . 1, 1, 2, 3, 5, 5 . . . .) in which the initial step size was one fifth as large as that used over the majority of the  $\eta$  range.

Consider the general flow chart of Fig 6 describing the program logic of this implicit method of solution. The solution is an iterative one in which the barred quantities  $\bar{g}$  and  $\bar{f}$  are obtained from some  $k$ th solution of the governing equations (Eqs (104) and (105) ) and are used to linearize these equations for the  $k+1$ st solution. The solution attempt is started by guessing an exponential profile for the vector  $g_0$ , and integrating  $g_0$  to form  $f_0$ . These two vectors are then used as the barred quantities  $\bar{f}_0$  and  $\bar{g}_0$  in the combined operators of Eqs (107) and (108) to solve the  $n$  simultaneous equations for the new vectors,  $f_1$ ,  $g_1$ , and  $S_1$ . If the numerical scheme is stable, these vectors should converge monotonically or by diminishing oscillations to the desired solution.

The rate of convergence was found to be rapid for  $\beta$  near zero, and extremely slow for high  $\beta$ , (ten and twenty). Hence, weighted averages of the  $k$ th and  $k+1$ st values of  $f$  and  $g$  were calculated (according to the equation  $\bar{x} = (x_{k+1} + wx_k)/(1+w)$ , where  $x$  is a quantity of interest and  $w$  is the weight factor) and used to determine  $f_2$ ,  $g_2$ , and  $S_2$ . The weight factor ranged from  $w = 0$  ( $k$ th value not considered, as in cases of  $\beta \approx 0$ ) to  $w = 1$  ( $k$ th and  $k+1$ st values equally weighted, as in high  $\beta$  cases), yielding the best rate of convergence for each case, given a proper choice of  $w$ .

Next, a global defect (related to RMS error) between  $g_1$  and  $g_2$  is formed as a measure of the degree of convergence of the solution. This defect is compared to some specified tolerance. If tolerance is not met,  $g_2$  becomes  $g_0$  for a new iteration: if tolerance is met, all further desired quantities are calculated and printed, completing the problem.

The implicit and explicit methods of solution require comparable amounts of computation time (the order of one minute per solution, IBM 7094 computer). The implicit method has the advantage that no refined

guesses are required to obtain a solution. Indeed, it was found that convergence to a solution could be obtained by using a linear relation for the guessed velocity profile,  $f'(\eta)$ . Although the implicit method can solve virtually all attached flow problems, it cannot, in its present form, solve reversed flow problems. In this pressure gradient regime, the explicit method works quite well. The two programs used together allow one to solve the general two-dimensional boundary layer equations over the complete range normally of interest.

#### A Note On the Solution of Simultaneous Equations by Matrix Methods

In a normal matrix solution of multiple simultaneous equations, the complexity of computer programming multiplies rapidly as the number of equations increases. The FORTRAN IV programming language has no special features which enable it to handle matrix operations easily: programs must be written to handle operations between matrices element by element, using complex arrangements of nested DO-loops.

One of the authors has devised a modified FORTRAN language (Ref 7) designed to aid in the manipulation of vectors and band matrices. The language, FORTRAN M, was conceived as a tool for use in the numerical solution of boundary value problems in one space dimension. It handles vectors and matrices symbolically in a manner similar to ordinary matrix algebra.

The FORTRAN M language was used to program the problem of this report and was quite successful. The number of lines in the source program was reduced by more than one half. This simplification of programming was found to be a great advantage.

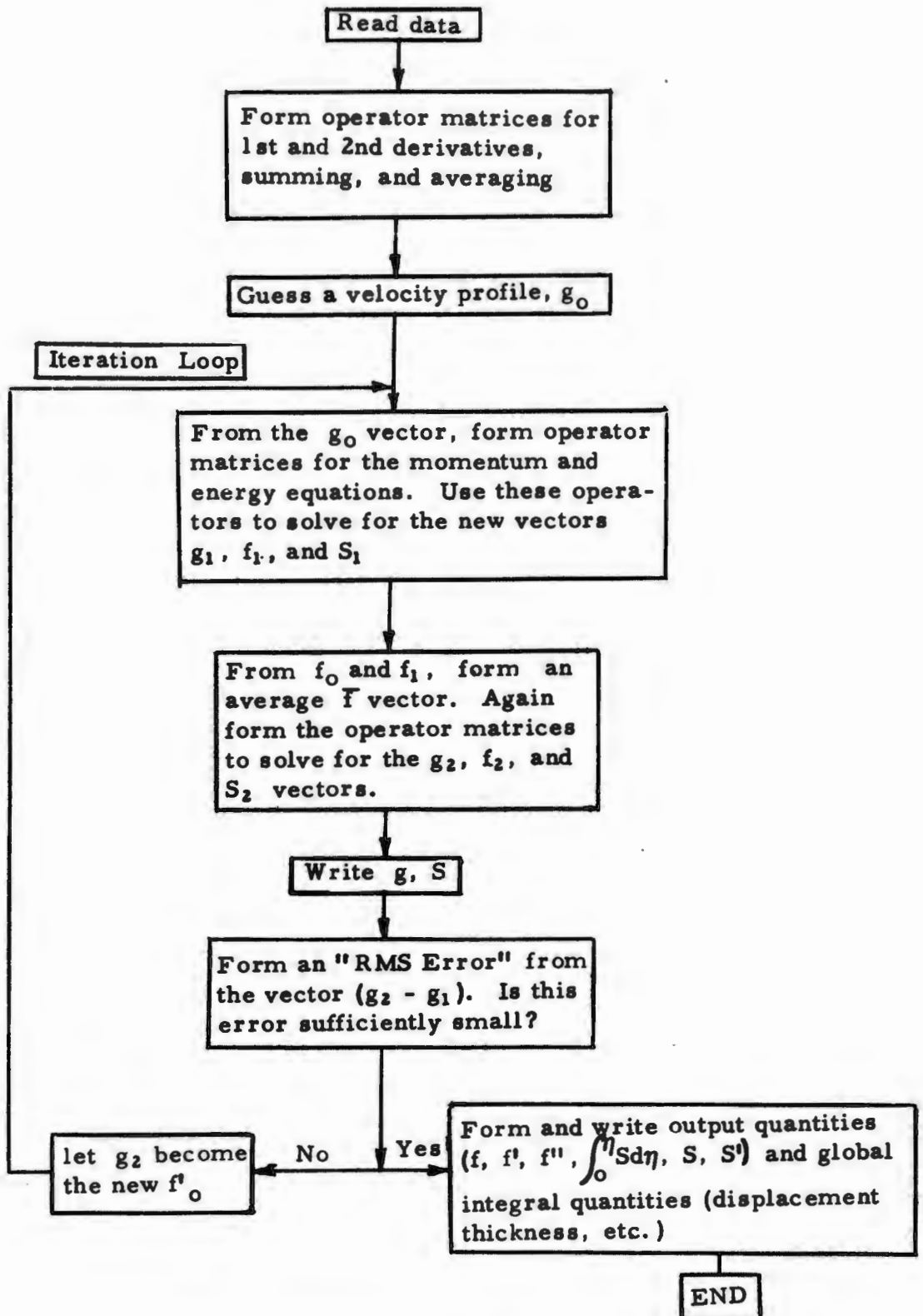


Fig 6 Implicit Iterative Solution Scheme

### 3. SOLUTION ACCURACY

There are two ways to evaluate the accuracy of a solution. Accuracy is most easily checked by comparing the solution values of the free stream boundary conditions with the prescribed values. Another effective method for checking the solution is to use the following two relationships resulting from integration of the momentum and energy similarity equations:

$$f''(0) = \theta_{tr} N (1 + \beta(1 + H_{tr})) \quad (109)$$

$$S'(0) = \theta_{h, tr} N \quad (110)$$

In the explicit program the initial guesses of  $f''(0)$  and  $S'(0)$  can be compared with those values predicted from Eqs (109) and (110) above. The difference between the guessed values and those of the check calculation is a measure of the extent to which the solution is in error. In the implicit program  $f''(0)$  and  $S'(0)$  are not guessed, but are calculated from the  $f$  and  $S$  profiles of the final iteration. Again, any discrepancy between solution and check calculation values indicates the error. The solutions contained in this report were checked both by the agreement of free stream boundary conditions and by the check calculations of Eqs (109) and (110) and were found to be accurate in the fifth decimal place.

TABLE III VELOCITY- AND TEMPERATURE-RELATED PROFILES

S(0) = +1.0

$\beta = 20.00$

$\beta = 10.00$

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	0.32032	0.00000	1.00000	-0.79348
0.025	0.00250	0.19959	7.33170	0.02475	0.98016	-0.79347
0.050	0.00950	0.36695	4.38695	0.04981	0.96033	-0.79335
0.075	0.02065	0.51949	5.50863	0.07277	0.94050	-0.79306
0.100	0.03510	0.64305	4.70926	0.09463	0.92068	-0.79251
0.125	0.05265	0.73166	3.99384	0.11080	0.90087	-0.79165
0.150	0.07262	0.84344	3.36208	0.14108	0.88110	-0.79041
0.175	0.09470	0.92043	2.81023	0.16206	0.86136	-0.78876
0.200	0.11853	0.98456	2.33242	0.18415	0.84166	-0.78667
0.225	0.14383	1.03761	1.92170	0.20494	0.82203	-0.78409
0.250	0.17014	1.08115	1.57076	0.22525	0.80246	-0.78102
0.275	0.19782	1.11658	1.27230	0.24507	0.78298	-0.77744
0.300	0.22611	1.14515	1.01977	0.26440	0.76359	-0.77333
0.325	0.25503	1.16790	0.80664	0.28325	0.74432	-0.76869
0.350	0.28446	1.18576	0.62738	0.30161	0.72516	-0.76353
0.380	0.46050	1.22668	0.42503	0.40194	0.61354	-0.72177
0.750	0.77027	1.19432	-0.20662	0.33375	0.44591	-0.61027
1.000	1.06217	1.14102	-0.20592	0.27705	0.30634	-0.49156
1.250	1.34139	1.09452	-0.16374	0.23962	0.19959	-0.36391
1.500	1.61039	1.05942	-0.11767	0.21937	0.12369	-0.25150
1.750	1.87200	1.03513	-0.07009	0.20327	0.07162	-0.16277
2.000	2.12868	1.01956	-0.04016	0.18687	0.03963	-0.09071
2.250	2.38230	1.01026	-0.02770	0.17419	0.02667	-0.05616
2.500	2.63415	1.00507	-0.01989	0.16491	0.01810	-0.03000
2.750	2.88505	1.00234	-0.00750	0.15969	0.00474	-0.01505
3.000	3.13545	1.00104	-0.00354	0.15800	0.00208	-0.00789
3.250	3.38562	1.00043	-0.00157	0.15805	0.00066	-0.00314
3.500	3.63569	1.00017	-0.00065	0.15809	0.00034	-0.00130
3.750	3.88572	1.00006	-0.00025	0.15805	0.00012	-0.00051
4.000	4.13573	1.00002	-0.00009	0.15806	0.00004	-0.00019
4.250	4.38573	1.00001	-0.00003	0.15807	0.00001	-0.00006
4.500	4.63573	1.00000	-0.00001	0.15807	0.00000	-0.00002
4.750	4.88573	1.00000	0.00000	0.15807	0.00000	-0.00001
5.000	5.13573	1.00000	0.00000	0.15807	0.00000	0.00000
5.250	5.38573	1.00000	0.00000	0.15807	0.00000	0.00000
5.500	5.63573	1.00000	0.00000	0.15807	0.00000	0.00000
5.750	5.88573	1.00000	0.00000	0.15807	0.00000	0.00000
6.000	6.13573	1.00000	0.00000	0.15807	0.00000	0.00000
6.250	6.38573	1.00000	0.00000	0.15807	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	3.79995	0.00000	1.00000	-0.75907
0.025	0.00176	0.13077	5.30348	0.02476	0.98100	-0.75906
0.050	0.00684	0.26329	4.82074	0.04985	0.96200	-0.75900
0.075	0.01493	0.37997	4.35705	0.07284	0.94301	-0.75900
0.100	0.02574	0.48336	3.91941	0.09420	0.92402	-0.75900
0.125	0.03901	0.57617	3.50830	0.11986	0.90504	-0.75900
0.150	0.05447	0.65904	3.12639	0.14145	0.88609	-0.75781
0.175	0.07188	0.73274	2.77404	0.16337	0.86716	-0.75662
0.200	0.09103	0.79799	2.45111	0.18481	0.84826	-0.75500
0.225	0.11172	0.85593	2.15679	0.20570	0.82941	-0.75317
0.250	0.13375	0.90606	1.88964	0.22620	0.81060	-0.75000
0.275	0.15697	0.95024	1.64878	0.24631	0.79187	-0.74614
0.300	0.18122	0.98870	1.43108	0.26600	0.77320	-0.74199
0.325	0.20636	1.02202	1.23737	0.28497	0.75462	-0.74139
0.350	0.23228	1.05074	1.06347	0.30361	0.73614	-0.74139
0.500	0.39073	1.15111	0.35920	0.40504	0.62700	-0.70339
0.750	0.69160	1.17412	-0.07706	0.54167	0.46247	-0.61303
1.000	0.90129	1.13984	-0.16750	0.63527	0.32317	-0.49701
1.250	1.26100	1.09837	-0.15622	0.70570	0.21359	-0.37613
1.500	1.53107	1.06371	-0.11970	0.76872	0.13417	-0.26527
1.750	1.79366	1.03855	-0.08230	0.77497	0.07962	-0.17504
2.000	2.05104	1.02191	-0.05220	0.79016	0.04469	-0.10224
2.250	2.30515	1.01172	-0.03073	0.79040	0.02371	-0.06270
2.500	2.55728	1.00590	-0.01609	0.80278	0.01190	-0.03419
2.750	2.80833	1.00260	-0.00668	0.80488	0.00563	-0.01748
3.000	3.05881	1.00124	-0.00418	0.80503	0.00252	-0.00848
3.250	3.30902	1.00073	-0.00209	0.80428	0.00106	-0.00379
3.500	3.55911	1.00021	-0.00090	0.80345	0.00042	-0.00161
3.750	3.80914	1.00008	-0.00032	0.80252	0.00016	-0.00064
4.000	4.05915	1.00003	-0.00012	0.80154	0.00006	-0.00024
4.250	4.30916	1.00001	-0.00004	0.80055	0.00002	-0.00008
4.500	4.55916	1.00000	-0.00001	0.80055	0.00001	-0.00003
4.750	4.80916	1.00000	0.00000	0.80055	0.00000	-0.00001
5.000	5.05916	1.00000	0.00000	0.80055	0.00000	0.00000
5.250	5.30916	1.00000	0.00000	0.80055	0.00000	0.00000
5.500	5.55916	1.00000	0.00000	0.80055	0.00000	0.00000
5.750	5.80916	1.00000	0.00000	0.80055	0.00000	0.00000
6.000	6.05916	1.00000	0.00000	0.80055	0.00000	0.00000



$$S(0) = +1.0$$

 $\beta = 2.00$ 

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	2.48768	0.00000	1.00000	-0.66143
0.025	0.00077	0.00095	2.38815	0.02479	0.98346	-0.66145
0.050	0.00303	0.11942	2.28970	0.04917	0.96693	-0.66142
0.075	0.00672	0.17544	2.19261	0.07314	0.95039	-0.66134
0.100	0.01178	0.22906	2.09707	0.09669	0.93386	-0.66119
0.125	0.01815	0.28331	2.00329	0.11983	0.91733	-0.66095
0.150	0.02577	0.32924	1.91143	0.14256	0.90081	-0.66058
0.175	0.03459	0.37590	1.82163	0.16487	0.88431	-0.66009
0.200	0.04455	0.42034	1.73402	0.18678	0.86781	-0.65944
0.225	0.05559	0.46262	1.64869	0.20826	0.85134	-0.65861
0.250	0.06766	0.50273	1.56573	0.22934	0.83488	-0.65760
0.275	0.08072	0.54093	1.48520	0.25001	0.81846	-0.65638
0.300	0.09469	0.57708	1.40716	0.27027	0.80207	-0.65495
0.325	0.10955	0.61131	1.33165	0.29011	0.78571	-0.65328
0.350	0.12524	0.64368	1.25867	0.30955	0.76940	-0.65137
0.500	0.23443	0.88251	0.87425	0.41769	0.67286	-0.63422
0.750	0.45710	0.98004	0.42235	0.56655	0.52019	-0.58217
1.000	0.70714	1.02938	0.15660	0.67916	0.38401	-0.50351
1.250	0.96774	1.04999	0.02303	0.76040	0.26902	-0.40844
1.500	1.23023	1.04739	-0.03414	0.81612	0.18005	-0.31031
1.750	1.49078	1.03644	-0.04861	0.85240	0.11393	-0.22083
2.000	1.74840	1.02469	-0.04347	0.87479	0.06829	-0.14729
2.250	2.00312	1.01521	-0.03203	0.88708	0.03874	-0.09215
2.500	2.25425	1.00865	-0.02082	0.89513	0.02078	-0.05411
2.750	2.50786	1.00457	-0.01229	0.89991	0.01054	-0.02983
3.000	2.75868	1.00226	-0.00667	0.90079	0.00505	-0.01544
3.250	3.00997	1.00184	-0.00335	0.90164	0.00228	-0.00751
3.500	3.25925	1.00045	-0.00157	0.90205	0.00097	-0.00343
3.750	3.50933	1.00018	-0.00069	0.90221	0.00039	-0.00147
4.000	3.75936	1.00007	-0.00028	0.90227	0.00015	-0.00059
4.250	4.00937	1.00003	-0.00011	0.90229	0.00005	-0.00022
4.500	4.25937	1.00001	-0.00004	0.90230	0.00002	-0.00008
4.750	4.50937	1.00000	-0.00001	0.90231	0.00001	-0.00003
5.000	4.75937	1.00000	0.00000	0.90231	0.00000	-0.00001
5.250	5.00937	1.00000	0.00000	0.90231	0.00000	0.00000
5.500	5.25937	1.00000	0.00000	0.90231	0.00000	0.00000
5.750	5.50937	1.00000	0.00000	0.90231	0.00000	0.00000
6.000	5.75937	1.00000	0.00000	0.90231	0.00000	0.00000

 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	1.73468	0.00000	1.00000	-0.61559
0.025	0.00054	0.04279	1.68688	0.02481	0.98461	-0.61558
0.050	0.00213	0.08435	1.63751	0.04923	0.96922	-0.61554
0.075	0.00474	0.12467	1.58662	0.07327	0.95383	-0.61551
0.100	0.00835	0.16378	1.54024	0.09692	0.93845	-0.61541
0.125	0.01292	0.20169	1.49241	0.12019	0.92306	-0.61525
0.150	0.01843	0.23841	1.44516	0.14308	0.90768	-0.61501
0.175	0.02463	0.27395	1.39854	0.16558	0.89231	-0.61468
0.200	0.03212	0.30834	1.35257	0.18769	0.87693	-0.61424
0.225	0.04024	0.34159	1.30729	0.20942	0.86160	-0.61369
0.250	0.04919	0.37371	1.26271	0.23077	0.84627	-0.61300
0.275	0.05892	0.40473	1.21886	0.25174	0.83095	-0.61218
0.300	0.06941	0.43466	1.17577	0.27232	0.81564	-0.61120
0.325	0.08064	0.46352	1.13345	0.29252	0.80039	-0.61005
0.350	0.09258	0.49134	1.09192	0.31234	0.78516	-0.60873
0.500	0.17767	0.63737	0.86827	0.42330	0.69466	-0.59660
0.750	0.36037	0.81108	0.54417	0.57866	0.54978	-0.55838
1.000	0.57794	0.91666	0.31422	0.69924	0.41742	-0.49680
1.250	0.81474	0.97454	0.16827	0.78888	0.30283	-0.41764
1.500	1.06227	1.00183	0.06670	0.85241	0.20928	-0.33884
1.750	1.31420	1.01150	0.01645	0.89531	0.13745	-0.26546
2.000	1.56790	1.01237	-0.00595	0.92281	0.08565	-0.17122
2.250	1.82010	1.00982	-0.01267	0.93953	0.05097	-0.11211
2.500	2.07216	1.00664	-0.01200	0.94916	0.02826	-0.06892
2.750	2.32347	1.00402	-0.00885	0.95441	0.01494	-0.03978
3.000	2.57424	1.00222	-0.00564	0.95712	0.00746	-0.02157
3.250	2.82444	1.00113	-0.00322	0.95844	0.00352	-0.01090
3.500	3.07484	1.00053	-0.00168	0.95904	0.00157	-0.00525
3.750	3.32494	1.00024	-0.00080	0.95930	0.00064	-0.00234
4.000	3.57497	1.00010	-0.00036	0.95941	0.00026	-0.00100
4.250	3.82499	1.00004	-0.00015	0.95945	0.00010	-0.00040
4.500	4.07500	1.00001	-0.00006	0.95947	0.00003	-0.00015
4.750	4.32500	1.00000	-0.00002	0.95947	0.00001	-0.00005
5.000	4.57500	1.00000	-0.00001	0.95948	0.00000	-0.00002
5.250	4.82500	1.00000	0.00000	0.95948	0.00000	-0.00001
5.500	5.07500	1.00000	0.00000	0.95948	0.00000	0.00000
5.750	5.32500	1.00000	0.00000	0.95948	0.00000	0.00000
6.000	5.57500	1.00000	0.00000	0.95948	0.00000	0.00000
6.250	5.82500	1.00000	0.00000	0.95948	0.00000	0.00000

S(0) = +1.0

$\beta = 0.50$

$\beta = 0.28571$

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	1.20401	0.00000	1.00000	-0.57200	
0.125	0.00030	0.00050	1.20990	0.02407	0.99500	-0.57200	
0.250	0.00142	0.00090	1.18510	0.04928	0.97130	-0.57207	
0.375	0.00340	0.00202	1.10001	0.07339	0.93703	-0.57204	
0.500	0.00601	0.11053	1.13024	0.09714	0.90271	-0.57277	
0.625	0.00912	0.14003	1.11200	0.12092	0.86840	-0.57266	
0.750	0.01310	0.17413	1.08009	0.14396	0.81400	-0.57290	
0.875	0.01803	0.20194	1.00424	0.16623	0.69977	-0.57228	
1.000	0.02310	0.22735	1.00001	0.18894	0.60547	-0.57198	
1.125	0.02930	0.25307	1.01710	0.21090	0.67117	-0.57160	
1.250	0.03603	0.27821	0.99394	0.23210	0.65600	-0.57114	
1.375	0.04320	0.30277	0.97090	0.25335	0.64262	-0.57057	
1.500	0.05083	0.32675	0.90400	0.27423	0.62830	-0.56990	
1.625	0.05893	0.35017	0.92964	0.29470	0.61412	-0.56911	
1.750	0.06607	0.37303	0.90302	0.31404	0.70991	-0.56820	
1.875	0.13420	0.40004	0.77322	0.42096	0.71524	-0.56975	
2.000	0.20100	0.40000	0.57794	0.50012	0.57040	-0.53100	
2.125	0.26302	0.70001	0.41013	0.71054	0.40000	-0.40002	
2.250	0.32064	0.87004	0.27967	0.81670	0.33797	-0.42000	
2.375	0.36079	0.93010	0.17391	0.88660	0.24130	-0.34902	
2.500	1.13995	0.90410	0.10210	0.93904	0.16463	-0.28020	
2.625	1.37061	0.90390	0.05517	0.97299	0.10670	-0.19992	
2.750	1.62663	0.90324	0.02600	0.99304	0.06575	-0.13493	
2.875	1.87370	0.90705	0.01157	1.00660	0.03837	-0.08005	
3.000	2.12993	0.90900	0.00405	1.01307	0.02110	-0.05267	
3.125	2.37953	1.00023	0.00007	1.01779	0.01107	-0.03000	
3.250	2.62960	1.00019	-0.00010	1.01970	0.00547	-0.01604	
3.375	2.87966	1.00021	-0.00030	1.02074	0.00295	-0.00807	
3.500	3.12971	1.00012	-0.00090	1.02110	0.00112	-0.00381	
4.000	3.37973	1.00000	-0.00010	1.02130	0.00047	-0.00160	
4.250	3.62974	1.00003	-0.00009	1.02144	0.00010	-0.00071	
4.500	3.87970	1.00001	-0.00004	1.02147	0.00007	-0.00020	
4.750	4.12974	1.00000	-0.00002	1.02140	0.00002	-0.00010	
5.000	4.37974	1.00000	-0.00001	1.02140	0.00001	-0.00004	
5.250	4.62974	1.00000	0.00000	1.02140	0.00000	-0.00001	
5.500	4.87974	1.00000	0.00000	1.02140	0.00000	0.00000	
5.750	5.12974	1.00000	0.00000	1.02140	0.00000	0.00000	
6.000	5.37974	1.00000	0.00000	1.02140	0.00000	0.00000	
6.250	5.62974	1.00000	0.00000	1.02140	0.00000	0.00000	

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.90305	0.00000	1.00000	-0.54332	
0.125	0.00030	0.00030	0.94001	0.02403	0.98662	-0.54331	
0.250	0.00119	0.00104	0.93466	0.04932	0.97203	-0.54330	
0.375	0.00267	0.00203	0.92060	0.07307	0.95925	-0.54320	
0.500	0.00472	0.00347	0.90642	0.09720	0.94567	-0.54323	
0.625	0.00734	0.11996	0.89271	0.12076	0.93209	-0.54315	
0.750	0.01052	0.13011	0.87800	0.14309	0.91851	-0.54303	
0.875	0.01424	0.15901	0.86512	0.16400	0.90494	-0.54280	
1.000	0.01851	0.18130	0.85142	0.18914	0.89137	-0.54264	
1.125	0.02331	0.20240	0.83776	0.21125	0.87781	-0.54230	
1.250	0.02863	0.22325	0.82420	0.23303	0.86425	-0.54200	
1.375	0.03447	0.24360	0.81060	0.25440	0.85071	-0.54150	
1.500	0.04081	0.26379	0.79721	0.27550	0.83710	-0.54107	
1.625	0.04765	0.28355	0.78380	0.29632	0.82350	-0.54067	
1.750	0.05499	0.30290	0.77044	0.31674	0.81010	-0.54020	
1.875	0.10000	0.41299	0.69130	0.43221	0.72962	-0.53330	
2.000	0.23221	0.50941	0.56620	0.59014	0.59071	-0.51100	
2.125	0.30003	0.69334	0.44404	0.73210	0.47925	-0.47304	
2.250	0.37791	0.79277	0.33603	0.85673	0.36331	-0.41900	
2.375	0.70921	0.80499	0.24365	0.91910	0.26000	-0.39400	
2.500	1.00024	0.91003	0.16704	0.97137	0.16672	-0.20304	
2.625	1.24103	0.99829	0.10003	1.00004	0.12474	-0.21300	
2.750	1.40220	0.97207	0.04790	1.00011	0.07923	-0.15204	
2.875	1.72714	0.90513	0.00910	1.00073	0.04776	-0.10100	
3.000	1.97044	0.90292	0.02142	1.00001	0.02720	-0.06400	
3.125	2.22312	0.90045	0.01101	1.00003	0.01475	-0.03703	
3.250	2.47250	0.90042	0.00551	1.00072	0.00794	-0.02100	
3.500	2.72224	0.90934	0.00200	1.00007	0.00304	-0.01102	
3.750	2.97213	0.90974	0.00101	1.00070	0.00104	-0.00541	
4.000	3.22200	0.90900	0.00040	1.00000	0.00071	-0.00240	
4.250	3.47207	0.90907	0.00015	1.07010	0.00020	-0.00100	
4.500	3.72207	0.90900	0.00005	1.07015	0.00011	-0.00044	
4.750	3.97207	1.00000	0.00002	1.07017	0.00004	-0.00017	
5.000	4.22207	1.00000	0.00000	1.07017	0.00001	-0.00000	
5.250	4.47207	1.00000	0.00000	1.07010	0.00000	-0.00002	
5.500	4.72207	1.00000	0.00000	1.07010	0.00000	-0.00001	
5.750	4.97207	1.00000	0.00000	1.07010	0.00000	0.00000	
6.000	5.22207	1.00000	0.00000	1.07010	0.00000	0.00000	
6.250	5.47207	1.00000	0.00000	1.07010	0.00000	0.00000	

$$S(0) = +1.0$$

$$\beta = 0.00$$

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.44960	0.00000	1.00000	-0.44960
0.2	0.00939	0.09391	0.44931	0.19061	0.90609	-0.44931
0.4	0.03755	0.18761	0.44725	0.34245	0.81239	-0.44725
0.6	0.08439	0.28058	0.44173	0.51561	0.71942	-0.44173
0.8	0.14967	0.37196	0.43119	0.69033	0.62804	-0.43119
1.0	0.23299	0.46063	0.43438	0.14701	0.53937	-0.43438
1.2	0.33366	0.54525	0.41057	0.26634	0.45475	-0.41057
1.4	0.45072	0.62439	0.37949	0.39428	0.37561	-0.37949
1.6	0.58296	0.69670	0.34249	1.01704	0.30330	-0.34249
1.8	0.72887	0.76106	0.30045	1.07113	0.23894	-0.30045
2.0	0.88680	0.81669	0.25947	1.11320	0.18331	-0.25947
2.2	1.05495	0.86370	0.21058	1.14505	0.13670	-0.21058
2.4	1.23153	0.90107	0.16754	1.16847	0.09893	-0.16754
2.6	1.41482	0.93060	0.12861	1.18518	0.06940	-0.12861
2.8	1.60326	0.95288	0.09511	1.19672	0.04712	-0.09511
3.0	1.79557	0.96905	0.06771	1.20443	0.03095	-0.06771
3.2	1.99058	0.98037	0.04637	1.20942	0.01963	-0.04637
3.4	2.18747	0.98797	0.03054	1.21253	0.01203	-0.03054
3.6	2.38559	0.99289	0.01933	1.21441	0.00711	-0.01933
3.8	2.58450	0.99594	0.01176	1.21550	0.00406	-0.01176
4.0	2.78389	0.99777	0.00687	1.21611	0.00223	-0.00687
4.2	2.98356	0.99882	0.00386	1.21644	0.00118	-0.00386
4.4	3.18338	0.99940	0.00208	1.21662	0.00060	-0.00208
4.6	3.38330	0.99970	0.00108	1.21670	0.00030	-0.00108
4.8	3.58325	0.99986	0.00054	1.21675	0.00014	-0.00054
5.0	3.78323	0.99994	0.00026	1.21677	0.00006	-0.00026
5.2	3.98323	0.99997	0.00012	1.21677	0.00003	-0.00012
5.4	4.18322	0.99999	0.00005	1.21678	0.00001	-0.00005
5.6	4.38322	1.00000	0.00002	1.21678	0.00000	-0.00002
5.8	4.58322	1.00000	0.00001	1.21678	0.00000	-0.00001

$$\beta = -.04$$

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.37182	0.00000	1.00000	-0.45001
0.2	0.00754	0.07593	0.38725	0.19100	0.91001	-0.44978
0.4	0.03057	0.15477	0.40066	0.36401	0.82018	-0.44819
0.6	0.06961	0.23596	0.41059	0.51911	0.73092	-0.44384
0.8	0.12505	0.31867	0.41552	0.65646	0.64291	-0.43541
1.0	0.19710	0.40174	0.41401	0.77642	0.55710	-0.42172
1.2	0.28568	0.48377	0.40489	0.87953	0.47463	-0.40196
1.4	0.39043	0.56314	0.38748	0.96658	0.39675	-0.37578
1.6	0.51065	0.63820	0.36179	1.03862	0.32473	-0.34348
1.8	0.64531	0.70736	0.32868	1.09694	0.25970	-0.30606
2.0	0.79311	0.76929	0.28977	1.14502	0.20254	-0.26511
2.2	0.95248	0.82304	0.24736	1.17851	0.15376	-0.22268
2.4	1.12175	0.86817	0.20404	1.20509	0.11342	-0.18100
2.6	1.29918	0.90476	0.16236	1.22442	0.08117	-0.14210
2.8	1.48312	0.93337	0.12448	1.23805	0.05620	-0.10760
3.0	1.67205	0.95490	0.09184	1.24736	0.03777	-0.07849
3.2	1.86488	0.97050	0.06517	1.25351	0.02451	-0.05511
3.4	2.05994	0.98137	0.04445	1.25743	0.01534	-0.03722
3.6	2.25699	0.98864	0.02913	1.25986	0.00929	-0.02417
3.8	2.45523	0.99332	0.01834	1.26130	0.00543	-0.01599
4.0	2.65420	0.99622	0.01109	1.26213	0.00304	-0.00995
4.2	2.85363	0.99793	0.00644	1.26258	0.00166	-0.00522
4.4	3.05333	0.99891	0.00359	1.26263	0.00087	-0.00289
4.6	3.25317	0.99944	0.00192	1.26295	0.00044	-0.00154
4.8	3.45309	0.99973	0.00099	1.26302	0.00021	-0.00079
5.0	3.65305	0.99987	0.00049	1.26305	0.00010	-0.00039
5.2	3.85304	0.99994	0.00023	1.26306	0.00004	-0.00018
5.4	4.05303	0.99998	0.00011	1.26307	0.00002	-0.00008
5.6	4.25302	0.99999	0.00005	1.26307	0.00001	-0.00004
5.8	4.45302	1.00000	0.00002	1.26307	0.00000	-0.00002
6.0	4.65302	1.00000	0.00001	1.26307	0.00000	-0.00001

S(0) = +1.0

$\beta = -.08$

$\beta = -.12$

$\eta$	$f$	$f'$	$f''$	$f_{3d\eta}$	$s$	$s'$
0.	0.00000	0.00000	0.25415	0.00000	1.00000	-0.42283
0.2	0.00530	0.05402	0.28554	0.19154	0.91544	-0.42288
0.4	0.02201	0.11408	0.31464	0.36618	0.83099	-0.42161
0.6	0.05130	0.17967	0.34057	0.52394	0.74642	-0.41842
0.8	0.09420	0.25002	0.36204	0.66501	0.66374	-0.41267
1.0	0.15156	0.32410	0.37768	0.78994	0.58212	-0.40274
1.2	0.22400	0.40060	0.38597	0.89802	0.50294	-0.38801
1.4	0.31195	0.47792	0.38570	0.99098	0.42728	-0.36786
1.6	0.41510	0.55425	0.37605	1.06924	0.35618	-0.34214
1.8	0.53334	0.62770	0.35691	1.13383	0.29074	-0.31127
2.0	0.66554	0.69643	0.32899	1.18599	0.23194	-0.27616
2.2	0.81151	0.75882	0.29305	1.22710	0.18040	-0.23828
2.4	0.96889	0.81364	0.25382	1.25849	0.13671	-0.19945
2.6	1.13641	0.86020	0.21163	1.28230	0.10064	-0.16161
2.8	1.31240	0.89834	0.17004	1.29944	0.07188	-0.12653
3.0	1.49521	0.92843	0.13154	1.31150	0.04975	-0.09554
3.2	1.68329	0.95128	0.09785	1.31972	0.03332	-0.06955
3.4	1.87531	0.96794	0.06995	1.32514	0.02158	-0.04673
3.6	2.07014	0.97964	0.04803	1.32859	0.01350	-0.03284
3.8	2.26692	0.98754	0.03167	1.33072	0.00816	-0.02129
4.0	2.46497	0.99264	0.02075	1.33198	0.00475	-0.01324
4.2	2.66384	0.99581	0.01219	1.33271	0.00267	-0.00794
4.4	2.86321	0.99770	0.00711	1.33311	0.00145	-0.00457
4.6	3.06287	0.99879	0.00398	1.33332	0.00076	-0.00253
4.8	3.26270	0.99930	0.00214	1.33343	0.00038	-0.00134
5.0	3.46261	0.99970	0.00111	1.33349	0.00018	-0.00068
5.2	3.66254	0.99984	0.00055	1.33351	0.00009	-0.00034
5.4	3.86254	0.99994	0.00026	1.33353	0.00004	-0.00016
5.6	4.06254	0.99997	0.00012	1.33353	0.00002	-0.00007
5.8	4.26253	0.99999	0.00005	1.33353	0.00001	-0.00003
6.0	4.46253	1.00000	0.00002	1.33353	0.00000	-0.00001
6.2	4.66253	1.00000	0.00001	1.33353	0.00000	-0.00001
6.4	4.86253	1.00000	0.00000	1.33353	0.00000	0.00000
6.6	5.06253	1.00000	0.00000	1.33353	0.00000	0.00000
6.8	5.26253	1.00000	0.00000	1.33353	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f_{3d\eta}$	$s$	$s'$
0.	0.00000	0.00000	0.00379	0.70000	1.00000	-0.37229
0.2	0.00199	0.02150	0.13088	0.19259	0.92554	-0.37224
0.4	0.00921	0.05222	0.17600	0.37022	0.85113	-0.37184
0.6	0.02347	0.09174	0.21078	0.53301	0.77605	-0.37070
0.8	0.04448	0.13954	0.25057	0.68990	0.70294	-0.36817
1.0	0.07979	0.19491	0.29442	0.81423	0.62922	-0.36362
1.2	0.12407	0.25606	0.32513	0.92399	0.55767	-0.35633
1.4	0.18294	0.32453	0.34929	1.03742	0.48761	-0.34561
1.6	0.25495	0.39614	0.36543	1.12000	0.41970	-0.33000
1.8	0.34155	0.47080	0.37225	1.20553	0.35535	-0.31170
2.0	0.44301	0.54634	0.36882	1.27851	0.29527	-0.28834
2.2	0.55910	0.61690	0.35489	1.32397	0.24029	-0.26091
2.4	0.68952	0.68565	0.33184	1.34701	0.19112	-0.23033
2.6	0.83307	0.74674	0.29884	1.40084	0.14820	-0.19704
2.8	0.98855	0.80478	0.26057	1.42676	0.11201	-0.16403
3.0	1.15444	0.85278	0.21910	1.44600	0.08224	-0.13313
3.2	1.32910	0.89241	0.17741	1.46007	0.05859	-0.10307
3.4	1.51004	0.92391	0.13617	1.46900	0.04045	-0.07820
3.6	1.69017	0.94798	0.10342	1.47356	0.02703	-0.05674
3.8	1.86963	0.96545	0.07434	1.48095	0.01744	-0.03963
4.0	2.04808	0.97612	0.05130	1.48374	0.01098	-0.02664
4.2	2.22604	0.98055	0.03390	1.48546	0.00657	-0.01722
4.4	2.40351	0.98204	0.02159	1.48640	0.00382	-0.01070
4.6	2.58072	0.98246	0.01317	1.48706	0.00214	-0.00639
4.8	2.75760	0.98250	0.00771	1.48730	0.00116	-0.00367
5.0	2.93423	0.98248	0.00433	1.48755	0.00060	-0.00202
5.2	3.11064	0.98233	0.00233	1.48764	0.00030	-0.00107
5.4	3.28594	0.98207	0.00121	1.48760	0.00015	-0.00055
5.6	3.46089	0.98174	0.00060	1.48770	0.00007	-0.00027
5.8	3.63587	0.98133	0.00029	1.48771	0.00003	-0.00013
6.0	3.81080	0.98097	0.00013	1.48771	0.00001	-0.00006
6.2	3.98580	0.98079	0.00006	1.48772	0.00001	-0.00002
6.4	4.16085	0.98079	0.00002	1.48772	0.00000	-0.00001
6.6	4.33595	1.00000	0.00001	1.48772	0.00000	0.00000

S(O) = +1.0

$\beta = -.12950(S)$

$\beta = -.12(R)$

q	f	f'	f''	fSd <sub>q</sub>	S	S'
0.	0.00000	0.00000	0.00000	0.00000	1.00000	-0.33892
0.2	0.00034	0.00512	0.05092	0.19322	0.93222	-0.33891
0.4	0.00272	0.02025	0.10006	0.37289	0.86444	-0.33883
0.6	0.00909	0.04502	0.14731	0.53900	0.79670	-0.33866
0.8	0.02134	0.07903	0.19236	0.69156	0.72910	-0.33747
1.0	0.04128	0.12178	0.23469	0.83066	0.66179	-0.33541
1.2	0.07040	0.17267	0.27348	0.95633	0.59504	-0.33173
1.4	0.11084	0.23087	0.30763	1.06874	0.52924	-0.32583
1.6	0.16336	0.29532	0.33582	1.16812	0.46490	-0.31789
1.8	0.22929	0.36470	0.35656	1.25484	0.40264	-0.30895
2.0	0.30946	0.43736	0.36844	1.32936	0.34317	-0.29902
2.2	0.40433	0.51161	0.37032	1.39234	0.28729	-0.28918
2.4	0.51398	0.58477	0.36160	1.44457	0.23575	-0.27952
2.6	0.63805	0.65535	0.34249	1.48698	0.18925	-0.27095
2.8	0.77500	0.72115	0.31407	1.52064	0.14832	-0.19012
3.0	0.92600	0.78049	0.27837	1.54670	0.11326	-0.16040
3.2	1.08740	0.83219	0.23805	1.56634	0.08412	-0.13117
3.4	1.25840	0.87560	0.19611	1.58073	0.06067	-0.10376
3.6	1.43717	0.91072	0.15546	1.59096	0.04243	-0.07925
3.8	1.62217	0.93803	0.11845	1.59800	0.02873	-0.05837
4.0	1.81192	0.95845	0.08669	1.60270	0.01882	-0.04141
4.2	2.00516	0.97311	0.06092	1.60573	0.01191	-0.02827
4.4	2.20086	0.98321	0.04108	1.60762	0.00728	-0.01856
4.6	2.39827	0.98990	0.02658	1.60875	0.00430	-0.01172
4.8	2.59666	0.99414	0.01651	1.60941	0.00244	-0.00711
5.0	2.79577	0.99673	0.00994	1.60978	0.00134	-0.00415
5.2	2.99520	0.99824	0.00562	1.60998	0.00071	-0.00232
5.4	3.19502	0.99909	0.00309	1.61008	0.00036	-0.00125
5.6	3.39489	0.99955	0.00163	1.61013	0.00018	-0.00065
5.8	3.59482	0.99978	0.00082	1.61016	0.00008	-0.00032
6.0	3.79479	0.99990	0.00040	1.61017	0.00004	-0.00015
6.2	3.99478	0.99996	0.00019	1.61018	0.00002	-0.00007
6.4	4.19477	0.99998	0.00008	1.61018	0.00001	-0.00003
6.6	4.39477	0.99999	0.00004	1.61018	0.00000	-0.00001
6.8	4.59477	1.00000	0.00001	1.61018	0.00000	-0.00001
7.0	4.79477	1.00000	0.00001	1.61018	0.00000	0.00000

q	f	f'	f''	fSd <sub>q</sub>	S	S'
0.	0.00000	0.00000	-0.12588	0.00000	1.00000	-0.25909
0.2	-0.00220	-0.02042	-0.07852	0.19482	0.94818	-0.25913
0.4	-0.00754	-0.03149	-0.03245	0.37927	0.89633	-0.25917
0.6	-0.01419	-0.03348	0.01240	0.55335	0.84441	-0.25904
0.8	-0.02034	-0.02661	0.05614	0.71702	0.79234	-0.26084
1.0	-0.02426	-0.01109	0.09887	0.87027	0.74005	-0.26202
1.2	-0.02422	0.01288	0.14060	1.01303	0.68752	-0.26332
1.4	-0.01856	0.04507	0.18114	1.14524	0.63474	-0.26447
1.6	-0.00566	0.08523	0.22014	1.26691	0.58176	-0.26515
1.8	0.01604	0.13298	0.25696	1.37796	0.52874	-0.26492
2.0	0.04801	0.18781	0.29067	1.47842	0.47589	-0.26327
2.2	0.09159	0.24897	0.32009	1.56835	0.42356	-0.25966
2.4	0.14795	0.31546	0.34381	1.64790	0.37218	-0.25359
2.6	0.21804	0.38601	0.36033	1.71732	0.32232	-0.24453
2.8	0.30252	0.45902	0.36827	1.77697	0.27459	-0.23218
3.0	0.40170	0.53267	0.36657	1.82735	0.22967	-0.21645
3.2	0.51550	0.60497	0.35474	1.86907	0.18823	-0.19753
3.4	0.64346	0.67392	0.33314	1.90291	0.15084	-0.17595
3.6	0.78472	0.73766	0.30300	1.92971	0.11797	-0.15257
3.8	0.93808	0.79469	0.26639	1.95041	0.08986	-0.12845
4.0	1.10208	0.84396	0.22600	1.96598	0.06656	-0.10476
4.2	1.27511	0.88503	0.18474	1.97734	0.04786	-0.08261
4.4	1.45555	0.91798	0.14531	1.98540	0.03335	-0.06287
4.6	1.64181	0.94342	0.10988	1.99093	0.02251	-0.04613
4.8	1.83248	0.96230	0.07982	1.99460	0.01469	-0.03259
5.0	2.02634	0.97575	0.05568	1.99696	0.00926	-0.02214
5.2	2.22249	0.98495	0.03728	1.99843	0.00564	-0.01449
5.4	2.42013	0.99100	0.02396	1.99930	0.00331	-0.00911
5.6	2.61874	0.99481	0.01478	1.99981	0.00188	-0.00550
5.8	2.81796	0.99712	0.00875	2.00009	0.00103	-0.00320
6.0	3.01753	0.99846	0.00497	2.00025	0.00056	-0.00178
6.2	3.21730	0.99921	0.00271	2.00033	0.00027	-0.00096
6.4	3.41719	0.99961	0.00142	2.00036	0.00013	-0.00049
6.6	3.61713	0.99981	0.00071	2.00038	0.00006	-0.00024
6.8	3.81711	0.99991	0.00034	2.00039	0.00003	-0.00012
7.0	4.01709	0.99996	0.00016	2.00040	0.00001	-0.00005
7.2	4.21709	0.99998	0.00007	2.00040	0.00001	-0.00002
7.4	4.41709	0.99999	0.00003	2.00040	0.00000	-0.00001
7.6	4.61709	1.00000	0.00001	2.00040	0.00000	0.00000
7.8	4.81709	1.00000	0.00000	2.00040	0.00000	0.00000

S(O) = +1.0

$\beta = -.08(R)$

$\eta$	$f$	$f'$	$f''$	$f_{Sd\eta}$	$S$	$S'$
0.	0.00000	0.00000	-0.16908	0.00000	1.00000	-0.16518
0.2	-0.00317	-0.03064	-0.13739	0.19670	0.96496	-0.16522
0.4	-0.01104	-0.05500	-0.10630	0.38670	0.93300	-0.16545
0.6	-0.02476	-0.07324	-0.07600	0.57025	0.90074	-0.16605
0.8	-0.04073	-0.08548	-0.04644	0.74708	0.86745	-0.16713
1.0	-0.05856	-0.09184	-0.01724	0.91721	0.83387	-0.16880
1.2	-0.07708	-0.09240	0.01165	1.08060	0.79989	-0.17110
1.4	-0.09514	-0.08719	0.04050	1.23713	0.76530	-0.17408
1.6	-0.11157	-0.07619	0.06950	1.38670	0.73021	-0.17772
1.8	-0.12522	-0.05937	0.09883	1.52916	0.69425	-0.18199
2.0	-0.13692	-0.03663	0.12857	1.66434	0.65738	-0.18680
2.2	-0.13948	-0.00791	0.15874	1.79205	0.61951	-0.19201
2.4	-0.09514	0.02688	0.18918	1.91200	0.58054	-0.19743
2.6	-0.12632	0.06774	0.21957	2.02420	0.54054	-0.20270
2.8	-0.11018	0.11467	0.24938	2.12822	0.49948	-0.20771
3.0	-0.08206	0.16742	0.27782	2.22394	0.45751	-0.21178
3.2	-0.04284	0.22564	0.30385	2.31118	0.41486	-0.21448
3.4	0.00852	0.28872	0.32622	2.38905	0.37185	-0.21526
3.6	0.07291	0.35578	0.34340	2.45993	0.32892	-0.21357
3.8	0.15102	0.42567	0.35420	2.52166	0.28662	-0.20988
4.0	0.24327	0.49694	0.35708	2.57466	0.24559	-0.20486
4.2	0.34970	0.56792	0.35119	2.61983	0.20651	-0.19834
4.4	0.47030	0.63681	0.33625	2.65744	0.17008	-0.17447
4.6	0.60424	0.70184	0.31270	2.68808	0.13692	-0.15673
4.8	0.75067	0.76140	0.28185	2.71246	0.10753	-0.13690
5.0	0.90835	0.81423	0.24574	2.73137	0.08223	-0.11599
5.2	1.07586	0.85951	0.20687	2.74563	0.06113	-0.09513
5.4	1.25164	0.89697	0.16789	2.75609	0.04411	-0.07538
5.6	1.43414	0.92683	0.13120	2.76353	0.03084	-0.05763
5.8	1.62190	0.94973	0.09862	2.76865	0.02088	-0.04246
6.0	1.81363	0.96662	0.07126	2.77206	0.01367	-0.03012
6.2	2.00822	0.97860	0.04947	2.77426	0.00865	-0.02055
6.4	2.20482	0.98677	0.03298	2.77563	0.00528	-0.01349
6.6	2.40274	0.99210	0.02112	2.77645	0.00311	-0.00851
6.8	2.60193	0.99546	0.01298	2.77693	0.00177	-0.00516
7.0	2.80084	0.99748	0.00766	2.77720	0.00097	-0.00301
7.2	3.00046	0.99864	0.00434	2.77734	0.00051	-0.00168
7.4	3.20027	0.99931	0.00236	2.77741	0.00026	-0.00090
7.6	3.40017	0.99968	0.00123	2.77745	0.00013	-0.00047
7.8	3.60012	0.99984	0.00062	2.77747	0.00006	-0.00023
8.0	3.80010	0.99993	0.00030	2.77748	0.00003	-0.00011
8.2	4.00008	0.99997	0.00014	2.77748	0.00001	-0.00005
8.4	4.20008	0.99999	0.00006	2.77748	0.00001	-0.00002
8.6	4.40008	0.99999	0.00003	2.77748	0.00000	-0.00001
8.8	4.60008	1.00000	0.00001	2.77748	0.00000	0.00000
9.0	4.80008	1.00000	0.00000	2.77748	0.00000	0.00000

$\beta = -.04(R)$

$\eta$	$f$	$f'$	$f''$	$f_{Sd\eta}$	$S$	$S'$
0.	0.00000	0.00000	-0.13782	0.00000	1.00000	-0.08544
0.2	-0.00245	-0.02597	-0.12191	0.19829	0.98291	-0.08548
0.4	-0.01018	-0.04070	-0.10626	0.39316	0.96508	-0.08550
0.6	-0.02194	-0.06050	-0.09094	0.58641	0.94664	-0.08583
0.8	-0.03737	-0.08518	-0.07595	0.77262	0.93145	-0.08635
1.0	-0.05583	-0.09900	-0.06127	0.95718	0.91610	-0.08716
1.2	-0.07674	-0.10970	-0.04662	1.13825	0.90056	-0.08812
1.4	-0.09952	-0.11764	-0.03252	1.31579	0.88475	-0.08909
1.6	-0.12360	-0.12271	-0.01824	1.48973	0.86858	-0.09019
1.8	-0.14841	-0.12492	0.00304	1.65999	0.85199	-0.09145
2.0	-0.17330	-0.12423	0.01001	1.82647	0.83276	-0.09254
2.2	-0.19791	-0.12057	0.02580	1.98989	0.81099	-0.10113
2.4	-0.22140	-0.11384	0.04152	2.14757	0.78723	-0.10956
2.6	-0.24323	-0.10391	0.05792	2.30100	0.76062	-0.11699
2.8	-0.26274	-0.09062	0.07521	2.45175	0.73194	-0.12353
3.0	-0.27924	-0.07376	0.09354	2.59607	0.71484	-0.12282
3.2	-0.29200	-0.05313	0.11302	2.73200	0.69877	-0.13005
3.4	-0.30022	-0.02867	0.13373	2.87230	0.68197	-0.13799
3.6	-0.30310	0.00045	0.15565	3.00106	0.66353	-0.14659
3.8	-0.29975	0.03386	0.17868	3.12517	0.64330	-0.15572
4.0	-0.28924	0.07198	0.20260	3.24315	0.62122	-0.16518
4.2	-0.27063	0.11494	0.22701	3.35604	0.59722	-0.17472
4.4	-0.24294	0.16270	0.25133	3.45702	0.57135	-0.18396
4.6	-0.20520	0.21541	0.27473	3.54645	0.54369	-0.19242
4.8	-0.15648	0.27254	0.29617	3.62329	0.51447	-0.19955
5.0	-0.09592	0.33366	0.31443	3.72415	0.48401	-0.20469
5.2	-0.02280	0.39801	0.32813	3.79684	0.54277	-0.20718
5.4	0.06343	0.46452	0.33593	3.84125	0.58135	-0.20630
5.6	0.16307	0.53191	0.33663	3.91762	0.26647	-0.20101
5.8	0.27615	0.59865	0.32943	3.96593	0.22090	-0.19310
6.0	0.40238	0.66313	0.31408	4.00592	0.18947	-0.18094
6.2	0.54114	0.72377	0.29106	4.03918	0.14992	-0.16432
6.4	0.69153	0.77913	0.26161	4.06573	0.11792	-0.14529
6.6	0.85237	0.82810	0.22759	4.08654	0.08892	-0.12453
6.8	1.02230	0.87001	0.19130	4.10238	0.06015	-0.10325
7.0	1.19989	0.90463	0.15512	4.11408	0.04097	-0.08269
7.2	1.38368	0.93221	0.12110	4.12247	0.03096	-0.06307
7.4	1.57234	0.95337	0.09113	4.12630	0.02306	-0.04753
7.6	1.76466	0.96899	0.06592	4.12522	0.01575	-0.03464
7.8	1.95963	0.98087	0.04503	4.11976	0.01005	-0.02346
8.0	2.15646	0.98764	0.03062	4.11636	0.00619	-0.01554
8.2	2.35452	0.98961	0.01964	4.11333	0.00366	-0.00990
8.4	2.55338	0.99573	0.01212	4.11009	0.00211	-0.00606
8.6	2.75273	0.99763	0.00718	4.10621	0.00117	-0.00357
8.8	2.95237	0.99873	0.00400	4.10190	0.00062	-0.00202
9.0	3.15219	0.99934	0.00223	4.10640	0.00032	-0.00109
9.2	3.35209	0.99967	0.00117	4.13652	0.00016	-0.00057
9.4	3.55205	0.99984	0.00059	4.13655	0.00008	-0.00029
9.6	3.75202	0.99993	0.00029	4.13656	0.00003	-0.00014
9.8	3.95202	0.99997	0.00013	4.13656	0.00002	-0.00006
10.0	4.15201	0.99999	0.00004	4.13656	0.00001	-0.00003
10.2	4.35201	0.99999	0.00003	4.13657	0.00000	-0.00001
10.4	4.55201	1.00000	0.00001	4.13657	0.00000	0.00000
10.6	4.75201	1.00000	0.00000	4.13657	0.00000	0.00000

$$S(0) = +.5$$

 $\beta = 20.00$ 
 $\beta = 10.00$ 

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	6.80892	0.00000	0.50000	-0.37756
0.025	0.00205	0.16090	6.06561	0.01238	0.49056	-0.37756
0.050	0.00789	0.30352	5.35019	0.02453	0.48112	-0.37751
0.075	0.01708	0.42877	4.67866	0.03644	0.47169	-0.37740
0.100	0.02920	0.53190	4.06062	0.04811	0.46225	-0.37718
0.125	0.04385	0.63229	3.50066	0.05955	0.45283	-0.37684
0.150	0.06070	0.71362	2.99973	0.07075	0.44341	-0.37635
0.175	0.07943	0.78275	2.55826	0.08172	0.43401	-0.37569
0.200	0.09975	0.84169	2.16699	0.09245	0.42463	-0.37485
0.225	0.12143	0.89152	1.82775	0.10295	0.41527	-0.37382
0.250	0.14426	0.93345	1.53384	0.11322	0.40594	-0.37258
0.275	0.16805	0.96855	1.28048	0.12325	0.39664	-0.37113
0.300	0.19264	0.99777	1.06300	0.13305	0.38739	-0.36946
0.325	0.21790	1.02194	0.87700	0.14262	0.37817	-0.36757
0.350	0.24370	1.04185	0.71839	0.15196	0.36901	-0.36545
0.500	0.40545	1.10110	0.16347	0.20326	0.31539	-0.34812
0.750	0.68210	1.10238	-0.08093	0.27164	0.23355	-0.30387
1.000	0.95469	1.07747	-0.10473	0.32110	0.16444	-0.24762
1.250	1.22092	1.05314	-0.08753	0.35510	0.10994	-0.18861
1.500	1.48171	1.03414	-0.06451	0.37728	0.06973	-0.13454
1.750	1.73846	1.02067	-0.04386	0.39190	0.04189	-0.08995
2.000	1.99243	1.01182	-0.02780	0.39903	0.02382	-0.05642
2.250	2.24465	1.00639	-0.01447	0.40349	0.01281	-0.03322
2.500	2.49582	1.00325	-0.00914	0.40583	0.00652	-0.01837
2.750	2.74639	1.00156	-0.00476	0.40699	0.00313	-0.00954
3.000	2.99647	1.00071	-0.00232	0.40754	0.00142	-0.00465
3.250	3.24679	1.00030	-0.00107	0.40778	0.00061	-0.00213
3.500	3.49684	1.00012	-0.00046	0.40788	0.00024	-0.00092
3.750	3.74686	1.00005	-0.00019	0.40792	0.00009	-0.00037
4.000	3.99686	1.00002	-0.00007	0.40793	0.00003	-0.00014
4.250	4.24687	1.00001	-0.00003	0.40793	0.00001	-0.00005
4.500	4.49687	1.00000	-0.00001	0.40794	0.00000	-0.00002
4.750	4.74687	1.00000	0.00000	0.40794	0.00000	-0.00001
5.000	4.99687	1.00000	0.00000	0.40794	0.00000	0.00000
5.250	5.24687	1.00000	0.00000	0.40794	0.00000	0.00000
5.500	5.49687	1.00000	0.00000	0.40794	0.00000	0.00000
5.750	5.74687	1.00000	0.00000	0.40794	0.00000	0.00000
6.000	5.99687	1.00000	0.00000	0.40794	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	4.77911	0.00000	0.50000	-0.36224
0.025	0.00145	0.11471	4.40230	0.01239	0.49094	-0.36224
0.050	0.00566	0.22018	4.03766	0.02455	0.48189	-0.36221
0.075	0.01239	0.31670	3.68578	0.03648	0.47283	-0.36213
0.100	0.02142	0.40461	3.35004	0.04819	0.46378	-0.36198
0.125	0.03255	0.48435	3.03277	0.05967	0.45474	-0.36173
0.150	0.04558	0.55641	2.73538	0.07093	0.44570	-0.36139
0.175	0.06031	0.62129	2.45862	0.08196	0.43667	-0.36091
0.200	0.07658	0.67952	2.20261	0.09276	0.42765	-0.36029
0.225	0.09424	0.73159	1.96707	0.10334	0.41865	-0.35952
0.250	0.11312	0.77803	1.75137	0.11369	0.40968	-0.35859
0.275	0.13309	0.81932	1.55667	0.12382	0.40073	-0.35749
0.300	0.15404	0.85592	1.37595	0.13373	0.39180	-0.35621
0.325	0.17585	0.88826	1.21409	0.14341	0.38292	-0.35475
0.350	0.19842	0.91675	1.06793	0.15287	0.37407	-0.35309
0.500	0.34527	1.02606	0.45670	0.20506	0.32207	-0.33905
0.750	0.61042	1.07826	0.04394	0.27533	0.24172	-0.30095
1.000	0.87980	1.07246	-0.06372	0.32687	0.17269	-0.24979
1.250	1.14567	1.05392	-0.07490	0.36281	0.11722	-0.19390
1.500	1.40685	1.03613	-0.06340	0.38643	0.07549	-0.14092
1.750	1.66408	1.02248	-0.04559	0.40159	0.04608	-0.09599
2.000	1.91845	1.01313	-0.02984	0.41049	0.02663	-0.06134
2.250	2.17994	1.00722	-0.01812	0.41552	0.01456	-0.03679
2.500	2.42227	1.00375	-0.01027	0.41819	0.00753	-0.02072
2.750	2.67294	1.00183	-0.00545	0.41954	0.00368	-0.01096
3.000	2.92326	1.00085	-0.00272	0.42019	0.00170	-0.00544
3.250	3.17340	1.00037	-0.00127	0.42047	0.00074	-0.00254
3.500	3.42346	1.00015	-0.00056	0.42060	0.00030	-0.00111
3.750	3.67349	1.00006	-0.00023	0.42065	0.00012	-0.00044
4.000	3.92350	1.00002	-0.00009	0.42066	0.00004	-0.00018
4.250	4.17350	1.00001	-0.00003	0.42067	0.00001	-0.00006
4.500	4.42350	1.00000	-0.00001	0.42067	0.00000	-0.00002
4.750	4.67350	1.00000	0.00000	0.42067	0.00000	-0.00001
5.000	4.92350	1.00000	0.00000	0.42067	0.00000	0.00000
5.250	5.17350	1.00000	0.00000	0.42067	0.00000	0.00000
5.500	5.42350	1.00000	0.00000	0.42067	0.00000	0.00000
5.750	5.67350	1.00000	0.00000	0.42067	0.00000	0.00000
6.000	5.92350	1.00000	0.00000	0.42067	0.00000	0.00000
6.250	6.17350	1.00000	0.00000	0.42067	0.00000	0.00000

$$S(0) = +.5$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	2.09961	0.00000	0.50000	-0.31772
0.025	0.00065	0.05155	2.02484	0.01240	0.49206	-0.31772
0.050	0.00256	0.10125	1.95067	0.02460	0.48411	-0.31770
0.075	0.00570	0.14909	1.87726	0.03661	0.47617	-0.31767
0.100	0.01000	0.19512	1.80479	0.04841	0.46823	-0.31761
0.125	0.01544	0.23934	1.73339	0.06002	0.46029	-0.31751
0.150	0.02195	0.28180	1.66219	0.07143	0.45236	-0.31736
0.175	0.02951	0.32251	1.59131	0.08264	0.44442	-0.31716
0.200	0.03807	0.36152	1.52083	0.09365	0.43650	-0.31689
0.225	0.04757	0.39887	1.46085	0.10446	0.42858	-0.31655
0.250	0.05800	0.43458	1.39643	0.11509	0.42067	-0.31614
0.275	0.06929	0.46870	1.33363	0.12549	0.41277	-0.31563
0.300	0.08142	0.50128	1.27251	0.13572	0.40489	-0.31504
0.325	0.09434	0.53234	1.21310	0.14574	0.39702	-0.31435
0.350	0.10802	0.56195	1.15543	0.15557	0.38917	-0.31356
0.500	0.20410	0.71130	0.84666	0.21044	0.34262	-0.30639
0.750	0.40401	0.87229	0.46808	0.28672	0.26853	-0.28420
1.000	0.61393	0.95718	0.23132	0.34530	0.20156	-0.24973
1.250	0.82883	0.99641	0.09621	0.38832	0.14438	-0.20674
1.500	1.13008	1.01075	0.02698	0.41843	0.09843	-0.16084
1.750	1.58322	1.01312	-0.00329	0.43647	0.06374	-0.11748
2.000	1.63626	1.01081	-0.01285	0.45114	0.03915	-0.08055
2.250	1.88855	1.00747	-0.01296	0.45873	0.02278	-0.05184
2.500	2.14004	1.00459	-0.00982	0.46304	0.01254	-0.03133
2.750	2.39092	1.00258	-0.00638	0.46535	0.00653	-0.01778
3.000	2.64139	1.00134	-0.00371	0.46653	0.00321	-0.00948
3.250	2.89163	1.00065	-0.00197	0.46709	0.00149	-0.00475
3.500	3.14175	1.00029	-0.00097	0.46734	0.00065	-0.00222
3.750	3.39179	1.00012	-0.00044	0.46745	0.00027	-0.00099
4.000	3.64181	1.00005	-0.00019	0.46750	0.00011	-0.00041
4.250	3.89182	1.00002	-0.00007	0.46751	0.00004	-0.00016
4.500	4.14183	1.00001	-0.00003	0.46752	0.00001	-0.00006
4.750	4.39183	1.00000	-0.00001	0.46752	0.00000	-0.00002
5.000	4.64183	1.00000	0.00000	0.46752	0.00000	0.00001
5.250	4.89183	1.00000	0.00000	0.46752	0.00000	0.00000
5.500	5.14183	1.00000	0.00000	0.46752	0.00000	0.00000
5.750	5.39183	1.00000	0.00000	0.46752	0.00000	0.00000
6.000	5.64183	1.00000	0.00000	0.46752	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	1.49158	0.00000	0.50000	-0.29727
0.025	0.00046	0.03682	1.45418	0.01241	0.49257	-0.29726
0.050	0.00183	0.07271	1.41700	0.02463	0.48514	-0.29726
0.075	0.00409	0.10767	1.38007	0.03666	0.47771	-0.29723
0.100	0.00721	0.14172	1.34342	0.04851	0.47028	-0.29719
0.125	0.01117	0.17405	1.30708	0.06018	0.46285	-0.29713
0.150	0.01594	0.20707	1.27168	0.07166	0.45542	-0.29703
0.175	0.02151	0.23840	1.23545	0.08295	0.44800	-0.29689
0.200	0.02786	0.26885	1.20020	0.09406	0.44058	-0.29670
0.225	0.03495	0.29842	1.16537	0.10498	0.43316	-0.29647
0.250	0.04277	0.32712	1.13097	0.11571	0.42575	-0.29618
0.275	0.05130	0.35497	1.09782	0.12627	0.41835	-0.29584
0.300	0.06051	0.38198	1.06554	0.13663	0.41096	-0.29542
0.325	0.07039	0.40815	1.03356	0.14661	0.40358	-0.29494
0.350	0.08091	0.43351	0.99807	0.15601	0.39621	-0.29438
0.500	0.20846	0.56920	0.81458	0.21295	0.35240	-0.28926
0.750	0.32134	0.73920	0.55555	0.29215	0.28193	-0.27273
1.000	0.52130	0.85204	0.35705	0.35437	0.21692	-0.24561
1.250	0.74384	0.92241	0.21460	0.40128	0.15906	-0.20976
1.500	0.98005	0.96327	0.11927	0.43510	0.11244	-0.16913
1.750	1.22390	0.98504	0.06017	0.45836	0.07529	-0.12842
2.000	1.47164	0.99548	0.02660	0.47357	0.04790	-0.09169
2.250	1.72113	0.99972	0.00943	0.48081	0.02890	-0.06152
2.500	1.97126	1.00000	0.00104	0.48657	0.01651	-0.03870
2.750	2.22152	1.00105	-0.00083	0.49164	0.00893	-0.02296
3.000	2.47175	1.00075	-0.00131	0.49638	0.00457	-0.01277
3.250	2.72190	1.00045	-0.00105	0.49911	0.00220	-0.00667
3.500	2.97199	1.00024	-0.00064	0.49950	0.00101	-0.00327
3.750	3.22203	1.00012	-0.00036	0.49947	0.00043	-0.00151
4.000	3.47205	1.00005	-0.00018	0.49944	0.00010	-0.00065
4.250	3.72206	1.00002	-0.00008	0.49947	0.00007	-0.00027
4.500	3.97206	1.00001	-0.00003	0.49948	0.00002	-0.00010
4.750	4.22206	1.00000	-0.00001	0.49948	0.00001	-0.00004
5.000	4.47206	1.00000	0.00000	0.49948	0.00000	-0.00001
5.250	4.72206	1.00000	0.00000	0.49948	0.00000	0.00000
5.500	4.97206	1.00000	0.00000	0.49948	0.00000	0.00000
5.750	5.22206	1.00000	0.00000	0.49948	0.00000	0.00000
6.000	5.47206	1.00000	0.00000	0.49948	0.00000	0.00000
6.250	5.72206	1.00000	0.00000	0.49948	0.00000	0.00000



$$S(0) = +.5$$

 $\beta = 0.50$ 

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	1.08492	0.00000	0.50000	-0.27844
0.325	0.00034	0.02689	1.06621	0.01241	0.49304	-0.27844
0.650	0.00134	0.05131	1.04759	0.02465	0.48608	-0.27844
0.975	0.00300	0.07927	1.02906	0.03672	0.47912	-0.27842
1.300	0.00530	0.10477	1.01062	0.04861	0.47216	-0.27839
1.625	0.00823	0.12980	0.99227	0.06032	0.46520	-0.27835
1.950	0.01179	0.15438	0.97400	0.07187	0.45824	-0.27828
2.275	0.01595	0.17850	0.95583	0.08324	0.45128	-0.27818
2.600	0.02071	0.20217	0.93776	0.09443	0.44433	-0.27805
2.925	0.02605	0.22539	0.91978	0.10543	0.43738	-0.27789
3.250	0.03197	0.24816	0.90189	0.11630	0.43044	-0.27769
3.575	0.03846	0.27049	0.88411	0.12698	0.42350	-0.27745
3.900	0.04549	0.29237	0.86644	0.13748	0.41656	-0.27716
4.225	0.05307	0.31381	0.84887	0.14780	0.40964	-0.27682
4.550	0.06118	0.33481	0.83141	0.15796	0.40272	-0.27642
4.875	0.12037	0.45180	0.72914	0.21527	0.36151	-0.27274
5.200	0.25441	0.61386	0.56999	0.29723	0.29468	-0.26608
5.525	0.42616	0.73827	0.42853	0.36295	0.23200	-0.23945
5.850	0.62081	0.82991	0.30835	0.41176	0.17566	-0.21023
6.175	0.83685	0.89439	0.21142	0.45145	0.12737	-0.17527
6.500	1.06622	0.93795	0.13761	0.47820	0.08818	-0.13820
6.825	1.30431	0.96494	0.08475	0.49631	0.05813	-0.10277
7.150	1.54778	0.98137	0.04924	0.50796	0.03641	-0.07196
7.475	1.79440	0.99066	0.02691	0.51309	0.02163	-0.04739
7.800	2.04275	0.99599	0.01380	0.51922	0.01217	-0.02933
8.125	2.29200	0.99805	0.00662	0.52149	0.00668	-0.01706
8.450	2.54147	0.99920	0.00296	0.52266	0.00326	-0.00932
8.775	2.79154	0.99949	0.00123	0.52324	0.00155	-0.00479
9.100	3.04149	0.99989	0.00047	0.52351	0.00070	-0.00231
9.425	3.29140	0.99997	0.00017	0.52363	0.00029	-0.00105
9.750	3.54147	0.99999	0.00005	0.52367	0.00012	-0.00045
10.075	3.79147	1.00000	0.00001	0.52369	0.00004	-0.00018
10.400	4.04147	1.00000	0.00000	0.52370	0.00002	-0.00007
10.725	4.29147	1.00000	0.00000	0.52370	0.00001	-0.00002
11.050	4.54147	1.00000	0.00000	0.52370	0.00000	-0.00001
11.375	4.79147	1.00000	0.00000	0.52370	0.00000	0.00000
11.700	5.04147	1.00000	0.00000	0.52370	0.00000	0.00000
12.025	5.29147	1.00000	0.00000	0.52370	0.00000	0.00000
12.350	5.54147	1.00000	0.00000	0.52370	0.00000	0.00000

 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.86493	0.00000	0.50000	-0.26559
0.325	0.00027	0.02149	0.85423	0.01242	0.49336	-0.26559
0.650	0.00107	0.04271	0.84359	0.02467	0.48672	-0.26558
0.975	0.00240	0.06367	0.83298	0.03678	0.48008	-0.26557
1.300	0.00425	0.08436	0.82240	0.04867	0.47344	-0.26555
1.625	0.00662	0.10479	0.81185	0.06043	0.46680	-0.26552
1.950	0.00949	0.12495	0.80133	0.07201	0.46017	-0.26546
2.275	0.01286	0.14486	0.79083	0.08343	0.45353	-0.26539
2.600	0.01673	0.16450	0.78036	0.09469	0.44690	-0.26529
2.925	0.02109	0.18387	0.76990	0.10578	0.44027	-0.26517
3.250	0.02592	0.20299	0.75945	0.11670	0.43364	-0.26501
3.575	0.03123	0.22135	0.74902	0.12746	0.42702	-0.26482
3.900	0.03701	0.24044	0.73860	0.13805	0.42040	-0.26459
4.225	0.04325	0.25878	0.72819	0.14848	0.41379	-0.26433
4.550	0.04995	0.27685	0.71779	0.15874	0.40718	-0.26402
4.875	0.05732	0.29484	0.70749	0.16886	0.36777	-0.26113
5.200	0.11369	0.53079	0.55228	0.30073	0.30357	-0.25131
5.525	0.36258	0.65617	0.45131	0.36892	0.24274	-0.23400
5.850	0.53971	0.75689	0.35561	0.42254	0.18720	-0.20915
6.175	0.73912	0.83472	0.26879	0.46311	0.13867	-0.17832
6.500	0.95538	0.89229	0.19405	0.49256	0.09831	-0.14433
6.825	1.18385	0.93291	0.13337	0.51298	0.06649	-0.11049
7.150	1.42072	0.96015	0.08494	0.52648	0.04280	-0.07900
7.475	1.66310	0.97748	0.05348	0.53497	0.02616	-0.05428
7.800	1.90889	0.98790	0.03134	0.54003	0.01516	-0.03473
8.125	2.15648	0.99384	0.01728	0.54290	0.00832	-0.02089
8.450	2.40558	0.99703	0.00899	0.54443	0.00432	-0.01181
8.775	2.65506	0.99864	0.00441	0.54520	0.00212	-0.00628
9.100	2.90483	0.99941	0.00204	0.54558	0.00098	-0.00313
9.425	3.15473	0.99976	0.00089	0.54576	0.00043	-0.00147
9.750	3.40469	0.99991	0.00036	0.54581	0.00018	-0.00065
10.075	3.65468	0.99997	0.00014	0.54584	0.00007	-0.00027
10.400	3.90467	0.99999	0.00005	0.54585	0.00003	-0.00010
10.725	4.15467	1.00000	0.00002	0.54586	0.00001	-0.00004
11.050	4.40467	1.00000	0.00001	0.54586	0.00000	-0.00001
11.375	4.65467	1.00000	0.00000	0.54586	0.00000	0.00000
11.700	4.90467	1.00000	0.00000	0.54586	0.00000	0.00000
12.025	5.15467	1.00000	0.00000	0.54586	0.00000	0.00000
12.350	5.40467	1.00000	0.00000	0.54586	0.00000	0.00000

S(0) = +.5

$\beta = 0.00$

$\beta = -.04$

$\eta$	f	f'	f''	fS <sub>0</sub>	S	S'
0.	0.00000	0.00000	0.46960	0.00000	0.50000	-0.23480
0.2	0.00939	0.09391	0.46931	0.09330	0.45305	-0.23465
0.4	0.03755	0.18761	0.46725	0.18123	0.40620	-0.23363
0.6	0.08439	0.28058	0.46173	0.25781	0.35971	-0.23087
0.8	0.14967	0.37196	0.45119	0.32516	0.31402	-0.22560
1.0	0.23299	0.46063	0.43638	0.38350	0.26968	-0.21719
1.2	0.33366	0.54525	0.41057	0.43317	0.22738	-0.20528
1.4	0.45072	0.62439	0.37969	0.47464	0.18781	-0.18985
1.6	0.58296	0.69670	0.34249	0.50852	0.15165	-0.17124
1.8	0.72887	0.76106	0.30045	0.53556	0.11947	-0.15022
2.0	0.88800	0.81649	0.25567	0.55660	0.09165	-0.12783
2.2	1.05495	0.86330	0.21058	0.57253	0.06835	-0.10529
2.4	1.23153	0.90107	0.16756	0.58424	0.04947	-0.08378
2.6	1.41482	0.93060	0.12861	0.59259	0.03470	-0.06431
2.8	1.60328	0.95288	0.09511	0.59836	0.02356	-0.04756
3.0	1.79557	0.96964	0.06771	0.60222	0.01547	-0.03386
3.2	1.99058	0.98037	0.04637	0.60471	0.00982	-0.02319
3.4	2.18747	0.98797	0.03054	0.60627	0.00601	-0.01527
3.6	2.38559	0.99289	0.01933	0.60720	0.00356	-0.00966
3.8	2.58450	0.99594	0.01176	0.60775	0.00203	-0.00588
4.0	2.78389	0.99777	0.00687	0.60806	0.00111	-0.00364
4.2	2.98356	0.99882	0.00386	0.60822	0.00059	-0.00193
4.4	3.18338	0.99940	0.00208	0.60831	0.00030	-0.00104
4.6	3.38330	0.99970	0.00108	0.60835	0.00015	-0.00054
4.8	3.58325	0.99986	0.00054	0.60837	0.00007	-0.00027
5.0	3.78323	0.99994	0.00026	0.60838	0.00003	-0.00013
5.2	3.98323	0.99997	0.00012	0.60839	0.00001	-0.00006
5.4	4.18322	0.99999	0.00005	0.60839	0.00001	-0.00003
5.6	4.38322	1.00000	0.00002	0.60839	0.00000	-0.00001
5.8	4.58322	1.00000	0.00001	0.60839	0.00000	0.00000

$\eta$	f	f'	f''	fS <sub>0</sub>	S	S'
0.	0.00000	0.00000	0.39363	0.00000	0.50000	-0.22717
0.2	0.00795	0.07990	0.40521	0.09546	0.45457	-0.22705
0.4	0.03211	0.16197	0.41501	0.18183	0.40923	-0.22627
0.6	0.07285	0.24568	0.42149	0.25917	0.36419	-0.22391
0.8	0.13044	0.33024	0.42308	0.32755	0.31981	-0.21966
1.0	0.20492	0.41449	0.41835	0.38717	0.27658	-0.21229
1.2	0.29612	0.49708	0.40617	0.43830	0.23518	-0.20197
1.4	0.40356	0.57642	0.38596	0.48137	0.19602	-0.18837
1.6	0.52637	0.65093	0.35787	0.51691	0.15996	-0.17188
1.8	0.66349	0.71911	0.32285	0.54559	0.12751	-0.15246
2.0	0.81351	0.77973	0.28265	0.56818	0.09909	-0.13155
2.2	0.97482	0.83197	0.23990	0.58551	0.07493	-0.11003
2.4	1.14572	0.87554	0.19422	0.59844	0.05505	-0.08902
2.6	1.32447	0.91061	0.15503	0.60780	0.03922	-0.06954
2.8	1.50944	0.93783	0.11800	0.61438	0.02707	-0.05239
3.0	1.69914	0.95817	0.08445	0.61884	0.01808	-0.03801
3.2	1.89232	0.97201	0.06091	0.62178	0.01147	-0.02654
3.4	2.08796	0.98293	0.04125	0.62365	0.00726	-0.01783
3.6	2.28527	0.99044	0.02684	0.62479	0.00438	-0.01151
3.8	2.48367	0.99396	0.01678	0.62547	0.00255	-0.00715
4.0	2.68274	0.99660	0.01008	0.62586	0.00143	-0.00426
4.2	2.88223	0.99815	0.00581	0.62607	0.00077	-0.00244
4.4	3.08196	0.99903	0.00322	0.62619	0.00040	-0.00135
4.6	3.28182	0.99951	0.00171	0.62624	0.00020	-0.00071
4.8	3.48175	0.99976	0.00088	0.62627	0.00010	-0.00036
5.0	3.68172	0.99989	0.00043	0.62629	0.00005	-0.00018
5.2	3.88170	0.99995	0.00020	0.62629	0.00002	-0.00009
5.4	4.08170	0.99998	0.00009	0.62630	0.00001	-0.00004
5.6	4.28169	0.99999	0.00004	0.62630	0.00000	-0.00002
5.8	4.48169	1.00000	0.00002	0.62630	0.00000	-0.00001
6.0	4.68169	1.00000	0.00001	0.62630	0.00000	0.00000

S(0) = +.5

$\beta = -.08$

$\beta = -.12$

$\eta$	f	f'	f''	fSd $\eta$	S	S'
0.	0.00000	0.00000	0.30568	0.00000	0.50000	-0.21731
0.2	0.00627	0.06351	0.32918	0.09565	0.45654	-0.21722
0.4	0.02571	0.13154	0.35094	0.18262	0.41315	-0.21657
0.6	0.05917	0.20369	0.36978	0.26093	0.36999	-0.21479
0.8	0.10741	0.27910	0.38422	0.33065	0.32735	-0.21130
1.0	0.17099	0.35699	0.39274	0.39193	0.28562	-0.20555
1.2	0.25027	0.43579	0.39398	0.44499	0.24531	-0.19712
1.4	0.34527	0.51402	0.38680	0.49018	0.20697	-0.18577
1.6	0.45572	0.58991	0.37066	0.52795	0.17119	-0.17152
1.8	0.58097	0.66170	0.34579	0.55887	0.13854	-0.15466
2.0	0.72002	0.72772	0.31323	0.58361	0.10946	-0.13523
2.2	0.87157	0.78660	0.27487	0.60291	0.08428	-0.11586
2.4	1.03412	0.83744	0.23119	0.61759	0.06312	-0.09578
2.6	1.20599	0.87984	0.18990	0.62843	0.04591	-0.07657
2.8	1.38550	0.91394	0.15059	0.63620	0.03238	-0.05909
3.0	1.57105	0.94035	0.11433	0.64160	0.02212	-0.04397
3.2	1.76119	0.96003	0.08347	0.64523	0.01461	-0.03151
3.4	1.95489	0.97413	0.05854	0.64759	0.00933	-0.02173
3.6	2.15055	0.98385	0.03947	0.64907	0.00574	-0.01442
3.8	2.34801	0.98927	0.02555	0.64998	0.00343	-0.00919
4.0	2.54650	0.99135	0.01588	0.65050	0.00197	-0.00544
4.2	2.74564	0.99184	0.00947	0.65080	0.00109	-0.00332
4.4	2.94517	0.99129	0.00543	0.65094	0.00058	-0.00188
4.6	3.14492	0.98911	0.00299	0.65105	0.00030	-0.00102
4.8	3.34479	0.98556	0.00158	0.65109	0.00015	-0.00053
5.0	3.54473	0.98079	0.00080	0.65111	0.00007	-0.00027
5.2	3.74470	0.97490	0.00039	0.65112	0.00003	-0.00013
5.4	3.94468	0.96796	0.00018	0.65113	0.00001	-0.00006
5.6	4.14468	0.95998	0.00008	0.65113	0.00001	-0.00003
5.8	4.34467	0.95099	0.00004	0.65113	0.00000	-0.00001
6.0	4.54467	1.00000	0.00001	0.65113	0.00000	0.00000
6.2	4.74467	1.00000	0.00001	0.65113	0.00000	0.00000

$\eta$	f	f'	f''	fSd $\eta$	S	S'
0.	0.00000	0.00000	0.19545	0.00000	0.50000	-0.20285
0.2	0.00415	0.04265	0.23089	0.09594	0.45943	-0.20280
0.4	0.01752	0.09225	0.26481	0.18378	0.41890	-0.20239
0.6	0.04149	0.14842	0.29641	0.26351	0.37852	-0.20124
0.8	0.07729	0.21059	0.32459	0.33521	0.33849	-0.19891
1.0	0.12607	0.27794	0.34801	0.39895	0.29907	-0.19495
1.2	0.18875	0.34938	0.36518	0.45490	0.26064	-0.18895
1.4	0.26600	0.42350	0.37463	0.50330	0.22365	-0.18059
1.6	0.35821	0.49863	0.37510	0.54449	0.18858	-0.16971
1.8	0.46540	0.57289	0.36585	0.57890	0.15593	-0.15633
2.0	0.58718	0.64432	0.34685	0.60706	0.12619	-0.14074
2.2	0.72281	0.71104	0.31895	0.62959	0.09975	-0.12349
2.4	0.87117	0.77142	0.28387	0.64719	0.07686	-0.10532
2.6	1.03088	0.82427	0.24406	0.66058	0.05762	-0.08709
2.8	1.20033	0.86892	0.20236	0.67048	0.04197	-0.06968
3.0	1.37789	0.90527	0.16157	0.67759	0.02964	-0.05385
3.2	1.56192	0.93377	0.12408	0.68253	0.02028	-0.04014
3.4	1.75093	0.95524	0.09159	0.68587	0.01343	-0.02882
3.6	1.94362	0.97079	0.06493	0.68804	0.00859	-0.01992
3.8	2.13893	0.98161	0.04420	0.68941	0.00531	-0.01324
4.0	2.33604	0.98883	0.02888	0.69024	0.00317	-0.00847
4.2	2.53429	0.99347	0.01811	0.69073	0.00182	-0.00520
4.4	2.73329	0.99632	0.01090	0.69101	0.00101	-0.00307
4.6	2.93274	0.99800	0.00630	0.69114	0.00054	-0.00174
4.8	3.13244	0.99895	0.00349	0.69124	0.00028	-0.00095
5.0	3.33229	0.99947	0.00186	0.69128	0.00014	-0.00050
5.2	3.53222	0.99974	0.00095	0.69130	0.00007	-0.00025
5.4	3.73218	0.99988	0.00047	0.69130	0.00003	-0.00012
5.6	3.93217	0.99995	0.00022	0.69131	0.00001	-0.00006
5.8	4.13216	0.99998	0.00010	0.69131	0.00001	-0.00003
6.0	4.33215	0.99999	0.00004	0.69131	0.00000	-0.00001
6.2	4.53215	1.00000	0.00002	0.69131	0.00000	0.00000
6.4	4.73215	1.00000	0.00001	0.69131	0.00000	0.00000

S(O) = +.5

$\beta = -.15735(S)$

$\beta = -.12(R)$

$\eta$	f	f'	f''	fSd $\eta$	S	S'
0.	0.00000	0.00000	0.00000	0.00000	0.50000	-0.16709
0.2	0.00031	0.00469	0.00868	0.09666	0.48658	-0.16709
0.4	0.00249	0.01860	0.03228	0.18863	0.43317	-0.16709
0.6	0.00835	0.04152	0.13671	0.26993	0.39977	-0.16688
0.8	0.01968	0.07119	0.17970	0.34655	0.36643	-0.16643
1.0	0.03819	0.11327	0.22074	0.41651	0.33323	-0.16549
1.2	0.06552	0.16131	0.25913	0.47985	0.30029	-0.16381
1.4	0.10320	0.21468	0.29377	0.53665	0.26777	-0.16110
1.6	0.15262	0.27668	0.32337	0.58701	0.23593	-0.15706
1.8	0.21495	0.34959	0.34662	0.63109	0.20506	-0.15143
2.0	0.29111	0.41652	0.36142	0.66912	0.17544	-0.14399
2.2	0.38170	0.48952	0.36701	0.70139	0.14759	-0.13465
2.4	0.48693	0.56263	0.36233	0.72829	0.12174	-0.12348
2.6	0.60662	0.63376	0.34720	0.75025	0.09830	-0.11072
2.8	0.74016	0.70086	0.32233	0.76779	0.07753	-0.09679
3.0	0.88657	0.76215	0.28937	0.78145	0.05962	-0.08227
3.2	1.04454	0.81623	0.25076	0.79183	0.04462	-0.06784
3.4	1.21253	0.86227	0.20942	0.79949	0.03244	-0.05414
3.6	1.38890	0.90002	0.16833	0.80498	0.02288	-0.04174
3.8	1.57201	0.92980	0.13007	0.80880	0.01563	-0.03103
4.0	1.76033	0.95237	0.09654	0.81136	0.01033	-0.02225
4.2	1.95254	0.96880	0.06880	0.81303	0.00660	-0.01535
4.4	2.14753	0.98029	0.04705	0.81408	0.00407	-0.01019
4.6	2.34441	0.98799	0.03087	0.81472	0.00243	-0.00650
4.8	2.54254	0.99295	0.01943	0.81509	0.00139	-0.00399
5.0	2.74146	0.99601	0.01174	0.81530	0.00077	-0.00235
5.2	2.94086	0.99783	0.00680	0.81542	0.00041	-0.00133
5.4	3.14054	0.99886	0.00378	0.81548	0.00021	-0.00073
5.6	3.34038	0.99943	0.00202	0.81551	0.00011	-0.00038
5.8	3.54029	0.99972	0.00103	0.81553	0.00005	-0.00019
6.0	3.74025	0.99987	0.00051	0.81553	0.00002	-0.00009
6.2	3.94024	0.99994	0.00024	0.81554	0.00001	-0.00004
6.4	4.14023	0.99997	0.00011	0.81554	0.00000	-0.00002
6.6	4.34023	0.99999	0.00005	0.81554	0.00000	-0.00001
6.8	4.54022	1.00000	0.00002	0.81554	0.00000	0.00000
7.0	4.74022	1.00000	0.00001	0.81554	0.00000	0.00000

$\eta$	f	f'	f''	fSd $\eta$	S	S'
0.	0.00000	0.00000	-0.15091	0.00000	0.50000	-0.10264
0.2	-0.00278	-0.02660	-0.11518	0.09795	0.47947	-0.10264
0.4	-0.01017	-0.06611	-0.08007	0.19179	0.45693	-0.10279
0.6	-0.02076	-0.09867	-0.04554	0.28152	0.43854	-0.10310
0.8	-0.03318	-0.06437	-0.01152	0.36712	0.41767	-0.10366
1.0	-0.04606	-0.06330	0.02220	0.44698	0.39686	-0.10440
1.2	-0.05805	-0.05550	0.05580	0.52583	0.37564	-0.10558
1.4	-0.06781	-0.04098	0.08943	0.59890	0.35462	-0.10692
1.6	-0.07399	-0.01972	0.12318	0.66760	0.33300	-0.10845
1.8	-0.07524	0.00830	0.15701	0.73211	0.31123	-0.11010
2.0	-0.07022	0.04308	0.19075	0.79215	0.28984	-0.11172
2.2	-0.05756	0.08457	0.21980	0.84771	0.26855	-0.11317
2.4	-0.03595	0.13260	0.24410	0.89875	0.24360	-0.11426
2.6	-0.00411	0.18688	0.26418	0.94522	0.22099	-0.11473
2.8	0.03918	0.24686	0.27107	0.98710	0.19794	-0.11436
3.0	0.09497	0.31180	0.25536	1.02442	0.17522	-0.11286
3.2	0.16416	0.38060	0.21156	1.05722	0.15291	-0.11000
3.4	0.24738	0.45192	0.16020	1.08563	0.13113	-0.10559
3.6	0.34498	0.52410	0.10009	1.10982	0.11079	-0.09954
3.8	0.45696	0.59532	0.35053	1.13003	0.09162	-0.09169
4.0	0.58292	0.66368	0.33156	1.14658	0.07412	-0.08283
4.2	0.72212	0.72736	0.30400	1.15981	0.05856	-0.07271
4.4	0.87349	0.78486	0.26985	1.17014	0.04500	-0.06200
4.6	1.03557	0.83503	0.23128	1.17799	0.03376	-0.05123
4.8	1.20694	0.87727	0.19113	1.18379	0.02455	-0.04085
5.0	1.38595	0.91156	0.15209	1.18794	0.01732	-0.03168
5.2	1.57106	0.93833	0.11641	1.19083	0.01183	-0.02351
5.4	1.76084	0.95845	0.08563	1.19277	0.00782	-0.01685
5.6	1.95406	0.97266	0.06050	1.19403	0.00499	-0.01162
5.8	2.14973	0.98003	0.04104	1.19483	0.00308	-0.00771
6.0	2.34705	0.98972	0.02673	1.19531	0.00183	-0.00492
6.2	2.54545	0.99400	0.01671	1.19559	0.00105	-0.00302
6.4	2.74454	0.99663	0.01102	1.19575	0.00058	-0.00178
6.6	2.94403	0.99817	0.00777	1.19584	0.00031	-0.00101
6.8	3.14376	0.99905	0.00519	1.19589	0.00016	-0.00055
7.0	3.34363	0.99952	0.00349	1.19591	0.00008	-0.00029
7.2	3.54356	0.99977	0.00286	1.19592	0.00004	-0.00014
7.4	3.74353	0.99989	0.00242	1.19592	0.00002	-0.00007
7.6	3.94351	0.99995	0.00200	1.19593	0.00001	-0.00003
7.8	4.14350	0.99998	0.00009	1.19593	0.00000	-0.00001
8.0	4.34350	0.99999	0.00004	1.19593	0.00000	-0.00001
8.2	4.54350	1.00000	0.00002	1.19593	0.00000	0.00000
8.4	4.74350	1.00000	0.00001	1.19593	0.00000	0.00000
8.6	4.94350	1.00000	0.00000	1.19593	0.00000	0.00000
8.8	5.14350	1.00000	0.00000	1.19593	0.00000	0.00000

S(O) = +.5

$\beta = -.08(R)$

q	f	f'	f''	/Sd <sub>q</sub>	S	S'
0.	0.00000	0.00000	-0.19550	0.00000	0.50000	-0.06787
0.2	-0.09295	-0.02871	-0.13164	0.09864	0.48643	-0.06788
0.4	-0.08117	-0.05268	-0.10815	0.19457	0.47284	-0.06797
0.6	-0.02371	-0.07200	-0.08508	0.28778	0.45923	-0.06821
0.8	-0.03966	-0.06674	-0.06240	0.37826	0.44554	-0.06864
1.0	-0.05811	-0.06690	-0.04001	0.46599	0.43175	-0.06931
1.2	-0.07815	-0.10275	-0.01776	0.55095	0.41700	-0.07026
1.4	-0.09891	-0.10400	0.00453	0.63309	0.40261	-0.07151
1.6	-0.11949	-0.10093	0.02705	0.71250	0.38917	-0.07309
1.8	-0.13890	-0.09323	0.05001	0.78874	0.37437	-0.07501
2.0	-0.15647	-0.08000	0.07359	0.86210	0.35915	-0.07726
2.2	-0.17181	-0.06374	0.09795	0.93237	0.34344	-0.07984
2.4	-0.18463	-0.04164	0.12310	0.99904	0.32719	-0.08271
2.6	-0.19433	-0.01441	0.14930	1.06321	0.31034	-0.08593
2.8	-0.19704	0.01813	0.17424	1.12494	0.29285	-0.08911
3.0	-0.19271	0.05612	0.20374	1.18330	0.27469	-0.09245
3.2	-0.18123	0.09964	0.23140	1.23837	0.25580	-0.09570
3.4	-0.16349	0.14865	0.25656	1.28961	0.23643	-0.09887
3.6	-0.14041	0.20297	0.27835	1.33791	0.21644	-0.10112
3.8	-0.09797	0.26222	0.30763	1.38316	0.19604	-0.10280
4.0	0.00876	0.32577	0.32700	1.42630	0.17540	-0.10341
4.2	0.07256	0.39270	0.34126	1.46732	0.15476	-0.10280
4.4	0.13799	0.46183	0.34875	1.50623	0.13443	-0.10106
4.6	0.20534	0.53167	0.34836	1.54313	0.11473	-0.09830
4.8	0.27668	0.60259	0.33936	1.57819	0.09603	-0.09466
5.0	0.35240	0.66604	0.32168	1.61163	0.07866	-0.09029
5.2	0.43305	0.72073	0.29602	1.64376	0.06294	-0.08540
5.4	0.51891	0.76682	0.26390	1.67461	0.04910	-0.08045
5.6	0.60951	0.80400	0.22745	1.70439	0.03727	-0.07504
5.8	0.70541	0.83268	0.18922	1.73321	0.02749	-0.06939
6.0	0.80727	0.85274	0.15171	1.76116	0.01966	-0.06366
6.2	0.91562	0.86456	0.11709	1.78832	0.01363	-0.05780
6.4	1.03096	0.86802	0.08692	1.81471	0.00914	-0.05192
6.6	1.15378	0.87168	0.06262	1.84034	0.00593	-0.04535
6.8	1.28454	0.87206	0.04251	1.86531	0.00371	-0.03901
7.0	1.42369	0.86901	0.02799	1.88964	0.00225	-0.03285
7.2	1.57162	0.86352	0.01770	1.91334	0.00131	-0.02695
7.4	1.72879	0.85632	0.01074	1.93649	0.00074	-0.02119
7.6	1.89573	0.84790	0.00626	1.95909	0.00040	-0.01526
7.8	2.07293	0.83893	0.00350	1.98114	0.00021	-0.00970
8.0	2.26080	0.82966	0.00188	1.99999	0.00011	-0.00537
8.2	2.45972	0.82047	0.00097	1.99900	0.00005	-0.00219
8.4	2.66914	0.81168	0.00048	1.98801	0.00002	-0.00089
8.6	2.88944	0.80350	0.00023	1.98601	0.00001	-0.00040
8.8	3.12114	0.79590	0.00010	1.98402	0.00000	-0.00002
9.0	3.36463	0.78899	0.00005	1.98202	0.00000	-0.00001
9.2	3.62033	0.78280	0.00002	1.98002	0.00000	0.00000
9.4	3.88773	0.77733	0.00001	1.97802	0.00000	0.00000

$\beta = -.04(R)$

q	f	f'	f''	/Sd <sub>q</sub>	S	S'
0.	0.00000	0.00000	-0.11958	0.00000	0.50000	-0.03423
0.2	-0.00231	-0.02272	-0.10742	0.07932	0.49315	-0.03423
0.4	-0.00893	-0.04306	-0.09562	0.19726	0.48630	-0.03427
0.6	-0.01938	-0.06186	-0.08423	0.29384	0.47944	-0.03434
0.8	-0.03320	-0.07677	-0.07288	0.38904	0.47255	-0.03454
1.0	-0.04994	-0.09022	-0.06172	0.48205	0.46562	-0.03483
1.2	-0.06914	-0.10147	-0.05076	0.57328	0.45861	-0.03525
1.4	-0.09038	-0.11054	-0.03993	0.66429	0.45151	-0.03581
1.6	-0.11321	-0.11744	-0.02915	0.75507	0.44428	-0.03655
1.8	-0.13721	-0.12219	-0.01833	0.84599	0.43680	-0.03747
2.0	-0.16194	-0.12477	-0.00737	0.93661	0.42927	-0.03861
2.2	-0.18847	-0.12512	0.00305	1.02660	0.42162	-0.03990
2.4	-0.21684	-0.12320	0.01546	1.09914	0.41326	-0.04161
2.6	-0.23609	-0.11891	0.02750	1.16097	0.40475	-0.04352
2.8	-0.25924	-0.11212	0.04036	1.21603	0.39583	-0.04573
3.0	-0.28077	-0.10271	0.05394	1.26527	0.38644	-0.04827
3.2	-0.30013	-0.09048	0.06848	1.30957	0.37650	-0.05116
3.4	-0.31674	-0.07524	0.08410	1.34903	0.36595	-0.05441
3.6	-0.33081	-0.05676	0.10094	1.38361	0.35471	-0.05805
3.8	-0.33923	-0.03478	0.11907	1.41366	0.34271	-0.06208
4.0	-0.34368	-0.00904	0.13856	1.43903	0.32996	-0.06647
4.2	-0.34258	0.02073	0.15938	1.46061	0.31610	-0.07120
4.4	-0.33510	0.05479	0.18139	1.47831	0.30136	-0.07620
4.6	-0.32036	0.09335	0.20435	1.49262	0.28561	-0.08137
4.8	-0.29745	0.13657	0.22784	1.50368	0.26881	-0.08657
5.0	-0.26542	0.18448	0.25122	1.51148	0.25099	-0.09190
5.2	-0.22335	0.23699	0.27566	1.51601	0.23220	-0.09620
5.4	-0.17034	0.29381	0.29910	1.51830	0.21256	-0.10060
5.6	-0.10557	0.35441	0.31120	1.51879	0.19224	-0.10290
5.8	-0.02837	0.41802	0.32385	1.51617	0.17149	-0.10431
6.0	0.06176	0.48356	0.33648	1.51038	0.15063	-0.10399
6.2	0.16509	0.54973	0.33803	1.50144	0.13003	-0.10168
6.4	0.28160	0.61585	0.32177	1.48944	0.11019	-0.09726
6.6	0.41095	0.67791	0.30556	1.47455	0.09127	-0.09077
6.8	0.55250	0.73678	0.28197	1.45689	0.07392	-0.08245
7.0	0.70538	0.79229	0.25220	1.43624	0.05830	-0.07272
7.2	0.86810	0.83741	0.21845	1.41261	0.04449	-0.06214
7.4	1.03980	0.87754	0.18272	1.38601	0.03354	-0.05135
7.6	1.21873	0.91853	0.14761	1.35749	0.02532	-0.04097
7.8	1.40394	0.93667	0.11650	1.32728	0.01799	-0.03153
8.0	1.59298	0.95663	0.08972	1.29565	0.01162	-0.02336
8.2	1.78506	0.97120	0.06168	1.26279	0.00763	-0.01667
8.4	1.98121	0.98164	0.04266	1.22910	0.00486	-0.01144
8.6	2.17829	0.98864	0.02835	1.19466	0.00298	-0.00754
8.8	2.37651	0.99325	0.01811	1.16052	0.00177	-0.00470
9.0	2.57547	0.99612	0.01111	1.12669	0.00101	-0.00297
9.2	2.77489	0.99705	0.00654	1.10004	0.00056	-0.00171
9.4	2.97457	0.99885	0.00370	1.13093	0.00029	-0.00096
9.6	3.17440	0.99941	0.00201	1.23097	0.00015	-0.00052
9.8	3.37431	0.99971	0.00105	1.33099	0.00007	-0.00027
10.0	3.57427	0.99984	0.00053	1.43100	0.00004	-0.00013
10.2	3.77429	0.99994	0.00025	1.53101	0.00002	-0.00006
10.4	3.97424	0.99997	0.00012	1.63101	0.00001	-0.00003
10.6	4.17424	0.99999	0.00005	1.73101	0.00000	-0.00001
10.8	4.37424	1.00000	0.00002	1.83101	0.00000	-0.00001
11.0	4.57424	1.00000	0.00001	1.93101	0.00000	0.00000

$$S(0) = 0.0$$

 $\beta = 20.00$ 

$\eta$	$f$	$f'$	$f''$	$fSd_\eta$	$S$	$S'$
0.	0.00000	0.00000	5.18872	0.00000	0.00000	0.00000
0.025	0.00157	0.12328	4.68325	0.00000	0.00000	0.00000
0.050	0.00606	0.23420	4.19953	0.00000	0.00000	0.00000
0.075	0.01318	0.31344	3.73958	0.00000	0.00000	0.00000
0.100	0.02264	0.42151	3.30994	0.00000	0.00000	0.00000
0.125	0.03417	0.49924	2.91436	0.00000	0.00000	0.00000
0.150	0.04753	0.56753	2.55443	0.00000	0.00000	0.00000
0.175	0.06248	0.62726	2.23015	0.00000	0.00000	0.00000
0.200	0.07882	0.67932	1.94039	0.00000	0.00000	0.00000
0.225	0.09639	0.72455	1.68326	0.00000	0.00000	0.00000
0.250	0.11500	0.76374	1.45642	0.00000	0.00000	0.00000
0.275	0.13453	0.79760	1.25730	0.00000	0.00000	0.00000
0.300	0.15484	0.82681	1.08326	0.00000	0.00000	0.00000
0.325	0.17584	0.85195	0.93168	0.00000	0.00000	0.00000
0.350	0.19741	0.87356	0.80008	0.00000	0.00000	0.00000
0.400	0.33521	0.95167	0.31332	0.00000	0.00000	0.00000
0.450	0.57925	0.99864	0.06216	0.00000	0.00000	0.00000
0.500	0.82812	0.99826	0.01182	0.00000	0.00000	0.00000
0.550	1.07791	0.99969	0.00217	0.00000	0.00000	0.00000
0.600	1.32787	0.99995	0.00038	0.00000	0.00000	0.00000
0.650	1.57787	0.99999	0.00007	0.00000	0.00000	0.00000
0.700	1.82787	1.00000	0.00001	0.00000	0.00000	0.00000
0.750	2.07787	1.00000	0.00000	0.00000	0.00000	0.00000
0.800	2.32787	1.00000	0.00000	0.00000	0.00000	0.00000
0.850	2.57787	1.00000	0.00000	0.00000	0.00000	0.00000

 $\beta = 10.00$ 

$\eta$	$f$	$f'$	$f''$	$fSd_\eta$	$S$	$S'$
0.	0.00000	0.00000	3.47523	0.00000	0.00000	0.00000
0.025	0.00112	0.08876	3.42387	0.00000	0.00000	0.00000
0.050	0.00439	0.17132	3.18884	0.00000	0.00000	0.00000
0.075	0.00964	0.24782	2.94869	0.00000	0.00000	0.00000
0.100	0.01673	0.31643	2.70999	0.00000	0.00000	0.00000
0.125	0.02551	0.38340	2.48958	0.00000	0.00000	0.00000
0.150	0.03589	0.44300	2.28861	0.00000	0.00000	0.00000
0.175	0.04762	0.49753	2.08380	0.00000	0.00000	0.00000
0.200	0.06069	0.54730	1.89949	0.00000	0.00000	0.00000
0.225	0.07495	0.59261	1.72779	0.00000	0.00000	0.00000
0.250	0.09029	0.63379	1.56853	0.00000	0.00000	0.00000
0.275	0.10661	0.67114	1.42142	0.00000	0.00000	0.00000
0.300	0.12381	0.70496	1.28681	0.00000	0.00000	0.00000
0.325	0.14183	0.73554	1.16176	0.00000	0.00000	0.00000
0.350	0.16057	0.76314	1.04687	0.00000	0.00000	0.00000
0.400	0.28469	0.87954	0.55193	0.00000	0.00000	0.00000
0.450	0.51687	0.96261	0.17829	0.00000	0.00000	0.00000
0.500	0.76144	0.98887	0.05478	0.00000	0.00000	0.00000
0.550	1.00985	0.99681	0.01618	0.00000	0.00000	0.00000
0.600	1.25939	0.99912	0.00461	0.00000	0.00000	0.00000
0.650	1.50927	0.99976	0.00126	0.00000	0.00000	0.00000
0.700	1.75924	0.99994	0.00033	0.00000	0.00000	0.00000
0.750	2.00923	0.99998	0.00009	0.00000	0.00000	0.00000
0.800	2.25923	1.00000	0.00002	0.00000	0.00000	0.00000
0.850	2.50923	1.00000	0.00000	0.00000	0.00000	0.00000
0.900	2.75923	1.00000	0.00000	0.00000	0.00000	0.00000
0.950	3.00923	1.00000	0.00000	0.00000	0.00000	0.00000
1.000	3.25923	1.00000	0.00000	0.00000	0.00000	0.00000
1.050	3.50923	1.00000	0.00000	0.00000	0.00000	0.00000

$$S(0) = 0.0$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fSd_\eta$	$S$	$S'$
0.	0.00000	0.00000	1.40722	0.00000	0.00000	0.00000
0.025	0.00052	0.04156	1.43724	0.00000	0.00000	0.00000
0.050	0.00207	0.08186	1.50739	0.00000	0.00000	0.00000
0.075	0.00464	0.12093	1.53778	0.00000	0.00000	0.00000
0.100	0.00810	0.15876	1.48853	0.00000	0.00000	0.00000
0.125	0.01253	0.19536	1.43973	0.00000	0.00000	0.00000
0.150	0.01786	0.23075	1.39147	0.00000	0.00000	0.00000
0.175	0.02406	0.26494	1.34384	0.00000	0.00000	0.00000
0.200	0.03110	0.29794	1.29690	0.00000	0.00000	0.00000
0.225	0.03895	0.32976	1.25072	0.00000	0.00000	0.00000
0.250	0.04758	0.36049	1.20536	0.00000	0.00000	0.00000
0.275	0.05696	0.39006	1.16086	0.00000	0.00000	0.00000
0.300	0.06707	0.41854	1.11728	0.00000	0.00000	0.00000
0.325	0.07788	0.44593	1.07465	0.00000	0.00000	0.00000
0.350	0.08936	0.47220	1.03299	0.00000	0.00000	0.00000
0.500	0.17693	0.60944	0.80477	0.00000	0.00000	0.00000
0.750	0.34513	0.77165	0.50845	0.00000	0.00000	0.00000
1.000	0.55161	0.87172	0.30613	0.00000	0.00000	0.00000
1.250	0.77759	0.93075	0.17620	0.00000	0.00000	0.00000
1.500	1.01486	0.96408	0.09722	0.00000	0.00000	0.00000
1.750	1.25937	0.98211	0.05136	0.00000	0.00000	0.00000
2.000	1.50520	0.99146	0.02598	0.00000	0.00000	0.00000
2.250	1.75371	0.99609	0.01257	0.00000	0.00000	0.00000
2.500	2.00304	0.99829	0.00581	0.00000	0.00000	0.00000
2.750	2.25276	0.99928	0.00256	0.00000	0.00000	0.00000
3.000	2.50264	0.99971	0.00108	0.00000	0.00000	0.00000
3.250	2.75259	0.99989	0.00043	0.00000	0.00000	0.00000
3.500	3.00250	0.99994	0.00016	0.00000	0.00000	0.00000
3.750	3.25257	0.99999	0.00004	0.00000	0.00000	0.00000
4.000	3.50257	1.00000	0.00002	0.00000	0.00000	0.00000
4.250	3.75257	1.00000	0.00001	0.00000	0.00000	0.00000
4.500	4.00257	1.00000	0.00000	0.00000	0.00000	0.00000
4.750	4.25257	1.00000	0.00000	0.00000	0.00000	0.00000
5.000	4.50257	1.00000	0.00000	0.00000	0.00000	0.00000
5.250	4.75257	1.00000	0.00000	0.00000	0.00000	0.00000
5.500	5.00257	1.00000	0.00000	0.00000	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fSd_\eta$	$S$	$S'$
0.	0.00000	0.00000	1.23259	0.00000	0.00000	0.00000
0.025	0.00038	0.03050	1.20759	0.00000	0.00000	0.00000
0.050	0.00152	0.06038	1.18262	0.00000	0.00000	0.00000
0.075	0.00340	0.08963	1.15769	0.00000	0.00000	0.00000
0.100	0.00600	0.11826	1.13283	0.00000	0.00000	0.00000
0.125	0.00930	0.14628	1.10806	0.00000	0.00000	0.00000
0.150	0.01331	0.17367	1.08339	0.00000	0.00000	0.00000
0.175	0.01798	0.20045	1.05885	0.00000	0.00000	0.00000
0.200	0.02332	0.22661	1.03445	0.00000	0.00000	0.00000
0.225	0.02931	0.25217	1.01022	0.00000	0.00000	0.00000
0.250	0.03593	0.27712	0.98616	0.00000	0.00000	0.00000
0.275	0.04316	0.30148	0.96229	0.00000	0.00000	0.00000
0.300	0.05099	0.32524	0.93863	0.00000	0.00000	0.00000
0.325	0.05942	0.34841	0.91519	0.00000	0.00000	0.00000
0.350	0.06841	0.37100	0.89199	0.00000	0.00000	0.00000
0.500	0.13359	0.49465	0.75831	0.00000	0.00000	0.00000
0.750	0.27880	0.65880	0.56053	0.00000	0.00000	0.00000
1.000	0.45923	0.77787	0.39801	0.00000	0.00000	0.00000
1.250	0.66472	0.86079	0.27115	0.00000	0.00000	0.00000
1.500	0.88733	0.91617	0.17696	0.00000	0.00000	0.00000
1.750	1.12114	0.95158	0.11045	0.00000	0.00000	0.00000
2.000	1.36197	0.97322	0.06583	0.00000	0.00000	0.00000
2.250	1.60700	0.98584	0.03748	0.00000	0.00000	0.00000
2.500	1.85443	0.99283	0.02023	0.00000	0.00000	0.00000
2.750	2.10316	0.99656	0.01040	0.00000	0.00000	0.00000
3.000	2.35256	0.99862	0.00508	0.00000	0.00000	0.00000
3.250	2.60229	0.99931	0.00235	0.00000	0.00000	0.00000
3.500	2.85217	0.99972	0.00103	0.00000	0.00000	0.00000
3.750	3.10213	0.99989	0.00043	0.00000	0.00000	0.00000
4.000	3.35211	0.99996	0.00017	0.00000	0.00000	0.00000
4.250	3.60210	0.99999	0.00004	0.00000	0.00000	0.00000
4.500	3.85210	1.00000	0.00002	0.00000	0.00000	0.00000
4.750	4.10210	1.00000	0.00001	0.00000	0.00000	0.00000
5.000	4.35210	1.00000	0.00000	0.00000	0.00000	0.00000
5.250	4.60210	1.00000	0.00000	0.00000	0.00000	0.00000
5.500	4.85210	1.00000	0.00000	0.00000	0.00000	0.00000
5.750	5.10210	1.00000	0.00000	0.00000	0.00000	0.00000

$$S(0) = 0.0$$

$$\beta = 0.50$$

$$\beta = 0.28571$$

$q$	$f$	$f'$	$f''$	$f_{84q}$	$S$	$S'$
0.	0.00000	0.00000	0.92768	0.00000	0.00000	0.00000
0.025	0.00029	0.02304	0.91510	0.00000	0.00000	0.00000
0.050	0.00115	0.04576	0.90260	0.00000	0.00000	0.00000
0.075	0.00257	0.06817	0.89010	0.00000	0.00000	0.00000
0.100	0.00456	0.09027	0.87768	0.00000	0.00000	0.00000
0.125	0.00709	0.11200	0.86518	0.00000	0.00000	0.00000
0.150	0.01016	0.13353	0.85269	0.00000	0.00000	0.00000
0.175	0.01378	0.15489	0.84020	0.00000	0.00000	0.00000
0.200	0.01789	0.17594	0.82771	0.00000	0.00000	0.00000
0.225	0.02253	0.19667	0.81523	0.00000	0.00000	0.00000
0.250	0.02769	0.21630	0.80275	0.00000	0.00000	0.00000
0.275	0.03335	0.23521	0.79029	0.00000	0.00000	0.00000
0.300	0.03950	0.25381	0.77783	0.00000	0.00000	0.00000
0.325	0.04613	0.27210	0.76537	0.00000	0.00000	0.00000
0.350	0.05325	0.29008	0.75296	0.00000	0.00000	0.00000
0.500	0.10555	0.46146	0.67882	0.00000	0.00000	0.00000
0.750	0.22586	0.55598	0.55821	0.00000	0.00000	0.00000
1.000	0.38109	0.68112	0.44428	0.00000	0.00000	0.00000
1.250	0.53644	0.77699	0.34074	0.00000	0.00000	0.00000
1.500	0.76856	0.85262	0.25000	0.00000	0.00000	0.00000
1.750	0.98874	0.90570	0.17655	0.00000	0.00000	0.00000
2.000	1.22004	0.94225	0.11850	0.00000	0.00000	0.00000
2.250	1.45982	0.96222	0.07566	0.00000	0.00000	0.00000
2.500	1.70240	0.96817	0.04585	0.00000	0.00000	0.00000
2.750	1.94690	0.96001	0.02634	0.00000	0.00000	0.00000
3.000	2.19708	0.94484	0.01432	0.00000	0.00000	0.00000
3.250	2.44618	0.92759	0.00736	0.00000	0.00000	0.00000
3.500	2.69576	0.90890	0.00358	0.00000	0.00000	0.00000
3.750	2.94550	0.88953	0.00164	0.00000	0.00000	0.00000
4.000	3.19550	0.86961	0.00071	0.00000	0.00000	0.00000
4.250	3.44547	0.84993	0.00029	0.00000	0.00000	0.00000
4.500	3.69544	0.83097	0.00011	0.00000	0.00000	0.00000
4.750	3.94545	0.81299	0.00004	0.00000	0.00000	0.00000
5.000	4.19545	1.00000	0.00001	0.00000	0.00000	0.00000
5.250	4.44545	1.00000	0.00000	0.00000	0.00000	0.00000
5.500	4.69545	1.00000	0.00000	0.00000	0.00000	0.00000
5.750	4.94545	1.00000	0.00000	0.00000	0.00000	0.00000
6.000	5.19545	1.00000	0.00000	0.00000	0.00000	0.00000
6.250	5.44545	1.00000	0.00000	0.00000	0.00000	0.00000

$q$	$f$	$f'$	$f''$	$f_{84q}$	$S$	$S'$
0.	0.00000	0.00000	0.76274	0.00000	0.00000	0.00000
0.025	0.00024	0.01898	0.75560	0.00000	0.00000	0.00000
0.050	0.00095	0.03778	0.74845	0.00000	0.00000	0.00000
0.075	0.00213	0.05640	0.74130	0.00000	0.00000	0.00000
0.100	0.00377	0.07484	0.73413	0.00000	0.00000	0.00000
0.125	0.00587	0.09311	0.72695	0.00000	0.00000	0.00000
0.150	0.00842	0.11119	0.71976	0.00000	0.00000	0.00000
0.175	0.01142	0.12910	0.71254	0.00000	0.00000	0.00000
0.200	0.01487	0.14682	0.70530	0.00000	0.00000	0.00000
0.225	0.01876	0.16436	0.69804	0.00000	0.00000	0.00000
0.250	0.02309	0.18172	0.69075	0.00000	0.00000	0.00000
0.275	0.02785	0.19890	0.68343	0.00000	0.00000	0.00000
0.300	0.03303	0.21589	0.67607	0.00000	0.00000	0.00000
0.325	0.03864	0.23270	0.66869	0.00000	0.00000	0.00000
0.350	0.04467	0.24933	0.66127	0.00000	0.00000	0.00000
0.500	0.08934	0.34514	0.61597	0.00000	0.00000	0.00000
0.750	0.19466	0.48930	0.53736	0.00000	0.00000	0.00000
1.000	0.33235	0.61356	0.45576	0.00000	0.00000	0.00000
1.250	0.49913	0.71721	0.37360	0.00000	0.00000	0.00000
1.500	0.68927	0.80061	0.29443	0.00000	0.00000	0.00000
1.750	0.89785	0.86499	0.22206	0.00000	0.00000	0.00000
2.000	1.12036	0.91247	0.15965	0.00000	0.00000	0.00000
2.250	1.35290	0.94581	0.10900	0.00000	0.00000	0.00000
2.500	1.59233	0.96603	0.07065	0.00000	0.00000	0.00000
2.750	1.83624	0.98206	0.04330	0.00000	0.00000	0.00000
3.000	2.08209	0.99064	0.02508	0.00000	0.00000	0.00000
3.250	2.33115	0.99517	0.01371	0.00000	0.00000	0.00000
3.500	2.58030	0.99769	0.00707	0.00000	0.00000	0.00000
3.750	2.82989	0.99895	0.00344	0.00000	0.00000	0.00000
4.000	3.07972	0.99955	0.00157	0.00000	0.00000	0.00000
4.250	3.32964	0.99982	0.00068	0.00000	0.00000	0.00000
4.500	3.57961	0.99993	0.00028	0.00000	0.00000	0.00000
4.750	3.82960	0.99997	0.00011	0.00000	0.00000	0.00000
5.000	4.07960	0.99999	0.00004	0.00000	0.00000	0.00000
5.250	4.32960	1.00000	0.00001	0.00000	0.00000	0.00000
5.500	4.57960	1.00000	0.00000	0.00000	0.00000	0.00000
5.750	4.82960	1.00000	0.00000	0.00000	0.00000	0.00000
6.000	5.07960	1.00000	0.00000	0.00000	0.00000	0.00000
6.250	5.32960	1.00000	0.00000	0.00000	0.00000	0.00000



$$S(0) = 0.0$$

$$\beta = 0.00$$

$\eta$	$f$	$f'$	$f''$	$fS_0\eta$	$S$	$S'$
0.	0.00000	0.00000	0.46960	0.00000	0.00000	0.00000
0.2	0.00939	0.09391	0.46931	0.00000	0.00000	0.00000
0.4	0.03755	0.18761	0.46725	0.00000	0.00000	0.00000
0.6	0.08439	0.28058	0.46173	0.00000	0.00000	0.00000
0.8	0.14967	0.37196	0.45119	0.00000	0.00000	0.00000
1.0	0.23299	0.46063	0.43438	0.00000	0.00000	0.00000
1.2	0.33366	0.54525	0.41097	0.00000	0.00000	0.00000
1.4	0.45072	0.62459	0.37969	0.00000	0.00000	0.00000
1.6	0.58296	0.69670	0.34249	0.00000	0.00000	0.00000
1.8	0.72887	0.76106	0.30045	0.00000	0.00000	0.00000
2.0	0.88680	0.81669	0.25567	0.00000	0.00000	0.00000
2.2	1.05495	0.86330	0.21058	0.00000	0.00000	0.00000
2.4	1.23153	0.90107	0.16736	0.00000	0.00000	0.00000
2.6	1.41482	0.93060	0.12861	0.00000	0.00000	0.00000
2.8	1.60328	0.95288	0.09511	0.00000	0.00000	0.00000
3.0	1.79557	0.96905	0.06771	0.00000	0.00000	0.00000
3.2	1.99058	0.98037	0.04637	0.00000	0.00000	0.00000
3.4	2.18747	0.98797	0.03054	0.00000	0.00000	0.00000
3.6	2.38559	0.99269	0.01933	0.00000	0.00000	0.00000
3.8	2.58450	0.99594	0.01176	0.00000	0.00000	0.00000
4.0	2.78389	0.99777	0.00687	0.00000	0.00000	0.00000
4.2	2.98354	0.99862	0.00386	0.00000	0.00000	0.00000
4.4	3.18330	0.99940	0.00208	0.00000	0.00000	0.00000
4.6	3.38330	0.99970	0.00108	0.00000	0.00000	0.00000
4.8	3.58325	0.99986	0.00054	0.00000	0.00000	0.00000
5.0	3.78323	0.99994	0.00026	0.00000	0.00000	0.00000
5.2	3.98323	0.99997	0.00012	0.00000	0.00000	0.00000
5.4	4.18322	0.99999	0.00005	0.00000	0.00000	0.00000
5.6	4.38322	1.00000	0.00002	0.00000	0.00000	0.00000
5.8	4.58322	1.00000	0.00001	0.00000	0.00000	0.00000

$$\beta = -0.04$$

$\eta$	$f$	$f'$	$f''$	$fS_0\eta$	$S$	$S'$
0.	0.00000	0.00000	0.41495	0.00000	0.00000	0.00000
0.2	0.00835	0.08378	0.42270	0.00000	0.00000	0.00000
0.4	0.03361	0.16898	0.42889	0.00000	0.00000	0.00000
0.6	0.07601	0.25512	0.43193	0.00000	0.00000	0.00000
0.8	0.13567	0.34143	0.43020	0.00000	0.00000	0.00000
1.0	0.21252	0.42679	0.42229	0.00000	0.00000	0.00000
1.2	0.30623	0.50986	0.40712	0.00000	0.00000	0.00000
1.4	0.41621	0.58912	0.38421	0.00000	0.00000	0.00000
1.6	0.54152	0.66304	0.35383	0.00000	0.00000	0.00000
1.8	0.68097	0.73022	0.31703	0.00000	0.00000	0.00000
2.0	0.83309	0.78955	0.27565	0.00000	0.00000	0.00000
2.2	0.99622	0.84034	0.23204	0.00000	0.00000	0.00000
2.4	1.16844	0.88239	0.18873	0.00000	0.00000	0.00000
2.6	1.34861	0.91601	0.14808	0.00000	0.00000	0.00000
2.8	1.53453	0.94192	0.11193	0.00000	0.00000	0.00000
3.0	1.72494	0.96116	0.08143	0.00000	0.00000	0.00000
3.2	1.91862	0.97490	0.05698	0.00000	0.00000	0.00000
3.4	2.11461	0.98433	0.03832	0.00000	0.00000	0.00000
3.6	2.31214	0.99057	0.02477	0.00000	0.00000	0.00000
3.8	2.51068	0.99452	0.01538	0.00000	0.00000	0.00000
4.0	2.70985	0.99693	0.00918	0.00000	0.00000	0.00000
4.2	2.90939	0.99834	0.00524	0.00000	0.00000	0.00000
4.4	3.10915	0.99914	0.00290	0.00000	0.00000	0.00000
4.6	3.30902	0.99957	0.00153	0.00000	0.00000	0.00000
4.8	3.50896	0.99979	0.00076	0.00000	0.00000	0.00000
5.0	3.70893	0.99990	0.00038	0.00000	0.00000	0.00000
5.2	3.90892	0.99996	0.00018	0.00000	0.00000	0.00000
5.4	4.10891	0.99998	0.00008	0.00000	0.00000	0.00000
5.6	4.30891	0.99999	0.00003	0.00000	0.00000	0.00000
5.8	4.50891	1.00000	0.00001	0.00000	0.00000	0.00000
6.0	4.70891	1.00000	0.00001	0.00000	0.00000	0.00000

$$S(0) = 0.0$$

$$\beta = -0.08$$

$$\beta = -0.12$$

$q$	$f$	$f'$	$f''$	$f^{(3)}$	$S$	$S'$
0.	0.00000	0.00000	0.35351	0.00000	0.00000	0.00000
0.2	0.00710	0.07229	0.36931	0.00000	0.00000	0.00000
0.4	0.02912	0.14764	0.38383	0.00000	0.00000	0.00000
0.6	0.06641	0.22564	0.39564	0.00000	0.00000	0.00000
0.8	0.11931	0.30561	0.40317	0.00000	0.00000	0.00000
1.0	0.18872	0.38652	0.40688	0.00000	0.00000	0.00000
1.2	0.27410	0.46708	0.39943	0.00000	0.00000	0.00000
1.4	0.37543	0.54575	0.38989	0.00000	0.00000	0.00000
1.6	0.49216	0.62088	0.36980	0.00000	0.00000	0.00000
1.8	0.62343	0.69282	0.33421	0.00000	0.00000	0.00000
2.0	0.76805	0.75413	0.29795	0.00000	0.00000	0.00000
2.2	0.92457	0.80971	0.25727	0.00000	0.00000	0.00000
2.4	1.09137	0.85491	0.21471	0.00000	0.00000	0.00000
2.6	1.26677	0.89564	0.17289	0.00000	0.00000	0.00000
2.8	1.44909	0.92627	0.13413	0.00000	0.00000	0.00000
3.0	1.63679	0.94961	0.10014	0.00000	0.00000	0.00000
3.2	1.82851	0.96671	0.07190	0.00000	0.00000	0.00000
3.4	2.02314	0.97877	0.04961	0.00000	0.00000	0.00000
3.6	2.21976	0.98693	0.03288	0.00000	0.00000	0.00000
3.8	2.41772	0.99224	0.02091	0.00000	0.00000	0.00000
4.0	2.61653	0.99556	0.01288	0.00000	0.00000	0.00000
4.2	2.81585	0.99755	0.00752	0.00000	0.00000	0.00000
4.4	3.01549	0.99870	0.00424	0.00000	0.00000	0.00000
4.6	3.21530	0.99933	0.00229	0.00000	0.00000	0.00000
4.8	3.41520	0.99967	0.00119	0.00000	0.00000	0.00000
5.0	3.61516	0.99984	0.00060	0.00000	0.00000	0.00000
5.2	3.81514	0.99993	0.00029	0.00000	0.00000	0.00000
5.4	4.01513	0.99997	0.00013	0.00000	0.00000	0.00000
5.6	4.21512	0.99999	0.00006	0.00000	0.00000	0.00000
5.8	4.41512	0.99999	0.00002	0.00000	0.00000	0.00000
6.0	4.61512	1.00000	0.00001	0.00000	0.00000	0.00000
6.2	4.81512	1.00000	0.00000	0.00000	0.00000	0.00000

$q$	$f$	$f'$	$f''$	$f^{(3)}$	$S$	$S'$
0.	0.00000	0.00000	0.28176	0.00000	0.00000	0.00000
0.2	0.00579	0.05075	0.30562	0.00000	0.00000	0.00000
0.4	0.02381	0.12219	0.32894	0.00000	0.00000	0.00000
0.6	0.05496	0.19002	0.34934	0.00000	0.00000	0.00000
0.8	0.10008	0.26169	0.36662	0.00000	0.00000	0.00000
1.0	0.15984	0.33633	0.37885	0.00000	0.00000	0.00000
1.2	0.23473	0.41279	0.38446	0.00000	0.00000	0.00000
1.4	0.32497	0.48999	0.38219	0.00000	0.00000	0.00000
1.6	0.43048	0.56897	0.37118	0.00000	0.00000	0.00000
1.8	0.55088	0.63744	0.35183	0.00000	0.00000	0.00000
2.0	0.68513	0.70493	0.32263	0.00000	0.00000	0.00000
2.2	0.83234	0.76603	0.28741	0.00000	0.00000	0.00000
2.4	0.99104	0.81999	0.24762	0.00000	0.00000	0.00000
2.6	1.15963	0.86495	0.20593	0.00000	0.00000	0.00000
2.8	1.33644	0.90201	0.16505	0.00000	0.00000	0.00000
3.0	1.51991	0.93118	0.12733	0.00000	0.00000	0.00000
3.2	1.70846	0.95327	0.09445	0.00000	0.00000	0.00000
3.4	1.90081	0.96935	0.06733	0.00000	0.00000	0.00000
3.6	2.09588	0.98059	0.04608	0.00000	0.00000	0.00000
3.8	2.29281	0.98815	0.03030	0.00000	0.00000	0.00000
4.0	2.49096	0.99302	0.01912	0.00000	0.00000	0.00000
4.2	2.68989	0.99604	0.01150	0.00000	0.00000	0.00000
4.4	2.88930	0.99784	0.00674	0.00000	0.00000	0.00000
4.6	3.08980	0.99886	0.00376	0.00000	0.00000	0.00000
4.8	3.28881	0.99942	0.00202	0.00000	0.00000	0.00000
5.0	3.48873	0.99972	0.00104	0.00000	0.00000	0.00000
5.2	3.68849	0.99987	0.00051	0.00000	0.00000	0.00000
5.4	3.88847	0.99994	0.00024	0.00000	0.00000	0.00000
5.6	4.08844	0.99997	0.00011	0.00000	0.00000	0.00000
5.8	4.28844	0.99999	0.00005	0.00000	0.00000	0.00000
6.0	4.48845	1.00000	0.00002	0.00000	0.00000	0.00000
6.2	4.68845	1.00000	0.00001	0.00000	0.00000	0.00000
6.4	4.88845	1.00000	0.00000	0.00000	0.00000	0.00000

$$S(0) = 0.0$$

$$\beta = -0.16$$

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.19070	0.00000	0.00000	0.00000
0.2	0.00403	0.04135	0.22271	0.00000	0.00000	0.00000
0.4	0.01696	0.08905	0.25410	0.00000	0.00000	0.00000
0.6	0.04006	0.14290	0.28416	0.00000	0.00000	0.00000
0.8	0.07451	0.20255	0.31183	0.00000	0.00000	0.00000
1.0	0.12143	0.26739	0.33576	0.00000	0.00000	0.00000
1.2	0.18175	0.33651	0.35442	0.00000	0.00000	0.00000
1.4	0.25623	0.40870	0.36623	0.00000	0.00000	0.00000
1.6	0.34334	0.48244	0.36977	0.00000	0.00000	0.00000
1.8	0.44920	0.55598	0.36401	0.00000	0.00000	0.00000
2.0	0.56759	0.62740	0.34659	0.00000	0.00000	0.00000
2.2	0.69989	0.69480	0.32399	0.00000	0.00000	0.00000
2.4	0.84513	0.75647	0.29160	0.00000	0.00000	0.00000
2.6	1.00201	0.81107	0.25363	0.00000	0.00000	0.00000
2.8	1.16902	0.85774	0.21280	0.00000	0.00000	0.00000
3.0	1.34455	0.89619	0.17197	0.00000	0.00000	0.00000
3.2	1.52697	0.92669	0.13360	0.00000	0.00000	0.00000
3.4	1.71475	0.94996	0.09987	0.00000	0.00000	0.00000
3.6	1.90654	0.96702	0.07166	0.00000	0.00000	0.00000
3.8	2.10122	0.97902	0.04956	0.00000	0.00000	0.00000
4.0	2.29789	0.98713	0.03263	0.00000	0.00000	0.00000
4.2	2.49588	0.99239	0.02070	0.00000	0.00000	0.00000
4.4	2.69471	0.99567	0.01260	0.00000	0.00000	0.00000
4.6	2.89406	0.99762	0.00736	0.00000	0.00000	0.00000
4.8	3.09371	0.99874	0.00413	0.00000	0.00000	0.00000
5.0	3.29352	0.99936	0.00222	0.00000	0.00000	0.00000
5.2	3.49343	0.99969	0.00115	0.00000	0.00000	0.00000
5.4	3.69339	0.99985	0.00057	0.00000	0.00000	0.00000
5.6	3.89337	0.99993	0.00027	0.00000	0.00000	0.00000
5.8	4.09336	0.99997	0.00012	0.00000	0.00000	0.00000
6.0	4.29336	0.99999	0.00005	0.00000	0.00000	0.00000
6.2	4.49335	1.00000	0.00002	0.00000	0.00000	0.00000
6.4	4.69335	1.00000	0.00001	0.00000	0.00000	0.00000

$$\beta = -0.19884(S)$$

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.2	0.00027	0.00398	0.03977	0.00000	0.00000	0.00000
0.4	0.00217	0.01591	0.07952	0.00000	0.00000	0.00000
0.6	0.00716	0.03578	0.11917	0.00000	0.00000	0.00000
0.8	0.01696	0.06355	0.15851	0.00000	0.00000	0.00000
1.0	0.03310	0.09913	0.19714	0.00000	0.00000	0.00000
1.2	0.05712	0.14232	0.23439	0.00000	0.00000	0.00000
1.4	0.09051	0.19274	0.26934	0.00000	0.00000	0.00000
1.6	0.13466	0.24982	0.30077	0.00000	0.00000	0.00000
1.8	0.19082	0.31271	0.32719	0.00000	0.00000	0.00000
2.0	0.26006	0.38025	0.34700	0.00000	0.00000	0.00000
2.2	0.34314	0.45097	0.35863	0.00000	0.00000	0.00000
2.4	0.44094	0.52307	0.36078	0.00000	0.00000	0.00000
2.6	0.55233	0.59460	0.35270	0.00000	0.00000	0.00000
2.8	0.67820	0.66347	0.33444	0.00000	0.00000	0.00000
3.0	0.81741	0.72776	0.30699	0.00000	0.00000	0.00000
3.2	0.96888	0.78578	0.27225	0.00000	0.00000	0.00000
3.4	1.13123	0.83635	0.23286	0.00000	0.00000	0.00000
3.6	1.30288	0.87882	0.19179	0.00000	0.00000	0.00000
3.8	1.48221	0.91315	0.15192	0.00000	0.00000	0.00000
4.0	1.66763	0.93982	0.11361	0.00000	0.00000	0.00000
4.2	1.85769	0.95974	0.08447	0.00000	0.00000	0.00000
4.4	2.05115	0.97401	0.05922	0.00000	0.00000	0.00000
4.6	2.24699	0.98382	0.03984	0.00000	0.00000	0.00000
4.8	2.44445	0.99029	0.02370	0.00000	0.00000	0.00000
5.0	2.64295	0.99439	0.01591	0.00000	0.00000	0.00000
5.2	2.84210	0.99680	0.00944	0.00000	0.00000	0.00000
5.4	3.04164	0.99833	0.00510	0.00000	0.00000	0.00000
5.6	3.24139	0.99914	0.00294	0.00000	0.00000	0.00000
5.8	3.44127	0.99957	0.00154	0.00000	0.00000	0.00000
6.0	3.64120	0.99980	0.00078	0.00000	0.00000	0.00000
6.2	3.84118	0.99991	0.00037	0.00000	0.00000	0.00000
6.4	4.04116	0.99994	0.00017	0.00000	0.00000	0.00000
6.6	4.24116	0.99998	0.00008	0.00000	0.00000	0.00000
6.8	4.44116	0.99999	0.00003	0.00000	0.00000	0.00000
7.0	4.64115	1.00000	0.00001	0.00000	0.00000	0.00000
7.2	4.84115	1.00000	0.00001	0.00000	0.00000	0.00000
7.4	5.04115	1.00000	0.00000	0.00000	0.00000	0.00000
7.6	5.24115	1.00000	0.00000	0.00000	0.00000	0.00000

S(0) = 0.0

$\beta = -.16(R)$

$\beta = -.12(R)$

$\eta$	f	f'	f''	f3d $\eta$	S	S'
0.	0.00000	0.00000	-0.12557	0.00000	0.00000	0.00000
0.2	-0.00230	-0.02191	-0.09359	0.00000	0.00000	0.00000
0.4	-0.00834	-0.03744	-0.06169	0.00000	0.00000	0.00000
0.6	-0.01687	-0.04460	-0.02986	0.00000	0.00000	0.00000
0.8	-0.02655	-0.04938	0.00201	0.00000	0.00000	0.00000
1.0	-0.03618	-0.04578	0.03605	0.00000	0.00000	0.00000
1.2	-0.04444	-0.03574	0.06641	0.00000	0.00000	0.00000
1.4	-0.05004	-0.01919	0.09917	0.00000	0.00000	0.00000
1.6	-0.05167	0.00195	0.13235	0.00000	0.00000	0.00000
1.8	-0.04801	0.03377	0.16584	0.00000	0.00000	0.00000
2.0	-0.03772	0.07029	0.19933	0.00000	0.00000	0.00000
2.2	-0.02145	0.11347	0.23232	0.00000	0.00000	0.00000
2.4	0.00810	0.16313	0.26401	0.00000	0.00000	0.00000
2.6	0.04671	0.21892	0.29336	0.00000	0.00000	0.00000
2.8	0.09401	0.28023	0.31904	0.00000	0.00000	0.00000
3.0	0.15061	0.34619	0.33955	0.00000	0.00000	0.00000
3.2	0.21475	0.41561	0.35331	0.00000	0.00000	0.00000
3.4	0.28499	0.48697	0.35809	0.00000	0.00000	0.00000
3.6	0.35955	0.55854	0.35522	0.00000	0.00000	0.00000
3.8	0.43829	0.62841	0.34107	0.00000	0.00000	0.00000
4.0	0.51067	0.69467	0.31925	0.00000	0.00000	0.00000
4.2	0.57580	0.75558	0.28865	0.00000	0.00000	0.00000
4.4	0.63244	0.80974	0.25219	0.00000	0.00000	0.00000
4.6	1.14919	0.85624	0.21253	0.00000	0.00000	0.00000
4.8	1.32442	0.89473	0.17250	0.00000	0.00000	0.00000
5.0	1.50655	0.92539	0.13469	0.00000	0.00000	0.00000
5.2	1.69409	0.94888	0.10107	0.00000	0.00000	0.00000
5.4	1.88569	0.96618	0.07284	0.00000	0.00000	0.00000
5.6	2.08023	0.97840	0.05039	0.00000	0.00000	0.00000
5.8	2.27879	0.98670	0.03346	0.00000	0.00000	0.00000
6.0	2.47471	0.99211	0.02132	0.00000	0.00000	0.00000
6.2	2.67350	0.99549	0.01304	0.00000	0.00000	0.00000
6.4	2.87202	0.99751	0.00765	0.00000	0.00000	0.00000
6.6	3.07245	0.99868	0.00431	0.00000	0.00000	0.00000
6.8	3.27226	0.99933	0.00233	0.00000	0.00000	0.00000
7.0	3.47216	0.99967	0.00121	0.00000	0.00000	0.00000
7.2	3.67211	0.99984	0.00060	0.00000	0.00000	0.00000
7.4	3.87209	0.99993	0.00029	0.00000	0.00000	0.00000
7.6	4.07208	0.99997	0.00013	0.00000	0.00000	0.00000
7.8	4.27208	0.99999	0.00006	0.00000	0.00000	0.00000
8.0	4.47208	0.99999	0.00002	0.00000	0.00000	0.00000
8.2	4.67207	1.00000	0.00001	0.00000	0.00000	0.00000
8.4	4.87207	1.00000	0.00000	0.00000	0.00000	0.00000
8.6	5.07207	1.00000	0.00000	0.00000	0.00000	0.00000
8.8	5.27207	1.00000	0.00000	0.00000	0.00000	0.00000

$\eta$	f	f'	f''	f3d $\eta$	S	S'
0.	0.00000	0.00000	-0.14294	0.00000	0.00000	0.00000
0.2	-0.00270	-0.02619	-0.11896	0.00000	0.00000	0.00000
0.4	-0.01016	-0.04159	-0.09513	0.00000	0.00000	0.00000
0.6	-0.02142	-0.04625	-0.07146	0.00000	0.00000	0.00000
0.8	-0.03554	-0.04619	-0.04791	0.00000	0.00000	0.00000
1.0	-0.05158	-0.04341	-0.02437	0.00000	0.00000	0.00000
1.2	-0.06859	-0.03852	-0.00069	0.00000	0.00000	0.00000
1.4	-0.08563	-0.03167	0.02332	0.00000	0.00000	0.00000
1.6	-0.10174	-0.02656	0.04784	0.00000	0.00000	0.00000
1.8	-0.11593	-0.02449	0.07304	0.00000	0.00000	0.00000
2.0	-0.12719	-0.04729	0.09906	0.00000	0.00000	0.00000
2.2	-0.13449	-0.02400	0.12500	0.00000	0.00000	0.00000
2.4	-0.13675	0.00316	0.15370	0.00000	0.00000	0.00000
2.6	-0.13285	0.03676	0.18232	0.00000	0.00000	0.00000
2.8	-0.12166	0.07612	0.21127	0.00000	0.00000	0.00000
3.0	-0.10202	0.12126	0.24011	0.00000	0.00000	0.00000
3.2	-0.07277	0.17210	0.26806	0.00000	0.00000	0.00000
3.4	-0.03201	0.22836	0.29410	0.00000	0.00000	0.00000
3.6	0.01890	0.28953	0.31696	0.00000	0.00000	0.00000
3.8	0.08327	0.35483	0.33510	0.00000	0.00000	0.00000
4.0	0.16104	0.42319	0.34725	0.00000	0.00000	0.00000
4.2	0.25204	0.49323	0.35179	0.00000	0.00000	0.00000
4.4	0.35833	0.56334	0.34776	0.00000	0.00000	0.00000
4.6	0.47708	0.63173	0.33468	0.00000	0.00000	0.00000
4.8	0.61079	0.69862	0.31207	0.00000	0.00000	0.00000
5.0	0.75619	0.75637	0.28347	0.00000	0.00000	0.00000
5.2	0.91291	0.80963	0.24842	0.00000	0.00000	0.00000
5.4	1.07955	0.85552	0.21017	0.00000	0.00000	0.00000
5.6	1.25460	0.89367	0.17141	0.00000	0.00000	0.00000
5.8	1.43691	0.92422	0.13457	0.00000	0.00000	0.00000
6.0	1.62382	0.94776	0.10161	0.00000	0.00000	0.00000
6.2	1.81521	0.96320	0.07373	0.00000	0.00000	0.00000
6.4	2.00956	0.97152	0.05139	0.00000	0.00000	0.00000
6.6	2.20599	0.98611	0.03439	0.00000	0.00000	0.00000
6.8	2.40382	0.99169	0.02210	0.00000	0.00000	0.00000
7.0	2.60253	0.99521	0.01363	0.00000	0.00000	0.00000
7.2	2.80181	0.99734	0.00807	0.00000	0.00000	0.00000
7.4	3.00141	0.99858	0.00459	0.00000	0.00000	0.00000
7.6	3.20120	0.99927	0.00250	0.00000	0.00000	0.00000
7.8	3.40110	0.99964	0.00131	0.00000	0.00000	0.00000
8.0	3.60104	0.99983	0.00064	0.00000	0.00000	0.00000
8.2	3.80102	0.99992	0.00032	0.00000	0.00000	0.00000
8.4	4.00101	0.99996	0.00015	0.00000	0.00000	0.00000
8.6	4.20100	0.99998	0.00007	0.00000	0.00000	0.00000
8.8	4.40100	0.99999	0.00003	0.00000	0.00000	0.00000
9.0	4.60100	1.00000	0.00001	0.00000	0.00000	0.00000
9.2	4.80100	1.00000	0.00000	0.00000	0.00000	0.00000
9.4	5.00100	1.00000	0.00000	0.00000	0.00000	0.00000
9.6	5.20100	1.00000	0.00000	0.00000	0.00000	0.00000

$$S(O)=OQ$$

$$\beta = -.08(R)$$

$$\beta = -.04(R)$$

q	f	f'	f''	fS <sub>q</sub>	S	S'
C.	0.00000	-0.00000	-0.13223	0.00000	0.00000	0.00000
0.2	-0.00254	-0.02405	-0.11625	0.00000	0.00000	0.00000
0.4	-0.00973	-0.04651	-0.10040	0.00000	0.00000	0.00000
0.6	-0.02093	-0.06902	-0.08472	0.00000	0.00000	0.00000
0.8	-0.03553	-0.09041	-0.06923	0.00000	0.00000	0.00000
1.0	-0.05289	-0.09272	-0.05389	0.00000	0.00000	0.00000
1.2	-0.07241	-0.10197	-0.03862	0.00000	0.00000	0.00000
1.4	-0.09347	-0.10817	-0.02330	0.00000	0.00000	0.00000
1.6	-0.11547	-0.11128	-0.00782	0.00000	0.00000	0.00000
1.8	-0.13778	-0.11127	0.00799	0.00000	0.00000	0.00000
2.0	-0.15977	-0.10805	0.02420	0.00000	0.00000	0.00000
2.2	-0.18078	-0.10151	0.04123	0.00000	0.00000	0.00000
2.4	-0.20014	-0.09151	0.05899	0.00000	0.00000	0.00000
2.6	-0.21714	-0.07785	0.07773	0.00000	0.00000	0.00000
2.8	-0.23102	-0.06034	0.09794	0.00000	0.00000	0.00000
3.0	-0.24100	-0.03874	0.11866	0.00000	0.00000	0.00000
3.2	-0.24623	-0.01279	0.14098	0.00000	0.00000	0.00000
3.4	-0.24581	0.01774	0.16450	0.00000	0.00000	0.00000
3.6	-0.23881	0.05300	0.18906	0.00000	0.00000	0.00000
3.8	-0.22425	0.09341	0.21434	0.00000	0.00000	0.00000
4.0	-0.20111	0.13883	0.23980	0.00000	0.00000	0.00000
4.2	-0.16838	0.18929	0.26472	0.00000	0.00000	0.00000
4.4	-0.12507	0.24461	0.28812	0.00000	0.00000	0.00000
4.6	-0.07824	0.30436	0.30879	0.00000	0.00000	0.00000
4.8	-0.03037	0.36786	0.32535	0.00000	0.00000	0.00000
5.0	0.07709	0.43413	0.33638	0.00000	0.00000	0.00000
5.2	0.17048	0.50195	0.34094	0.00000	0.00000	0.00000
5.4	0.27787	0.56982	0.33880	0.00000	0.00000	0.00000
5.6	0.39851	0.63811	0.32464	0.00000	0.00000	0.00000
5.8	0.53210	0.69914	0.30430	0.00000	0.00000	0.00000
6.0	0.67784	0.75734	0.27671	0.00000	0.00000	0.00000
6.2	0.83463	0.80945	0.24340	0.00000	0.00000	0.00000
6.4	1.00115	0.85457	0.20723	0.00000	0.00000	0.00000
6.6	1.17596	0.89229	0.17007	0.00000	0.00000	0.00000
6.8	1.35758	0.92278	0.13447	0.00000	0.00000	0.00000
7.0	1.54459	0.94631	0.10233	0.00000	0.00000	0.00000
7.2	1.73570	0.96395	0.07489	0.00000	0.00000	0.00000
7.4	1.92983	0.97661	0.05267	0.00000	0.00000	0.00000
7.6	2.12609	0.98534	0.03559	0.00000	0.00000	0.00000
7.8	2.32378	0.99116	0.02310	0.00000	0.00000	0.00000
8.0	2.52241	0.99485	0.01440	0.00000	0.00000	0.00000
8.2	2.72162	0.99711	0.00862	0.00000	0.00000	0.00000
8.4	2.92119	0.99844	0.00495	0.00000	0.00000	0.00000
8.6	3.12096	0.99919	0.00273	0.00000	0.00000	0.00000
8.8	3.32084	0.99959	0.00145	0.00000	0.00000	0.00000
9.0	3.52078	0.99988	0.00074	0.00000	0.00000	0.00000
9.2	3.72078	0.99991	0.00036	0.00000	0.00000	0.00000
9.4	3.92074	0.99996	0.00017	0.00000	0.00000	0.00000
9.6	4.12074	0.99998	0.00008	0.00000	0.00000	0.00000
9.8	4.32074	0.99999	0.00003	0.00000	0.00000	0.00000
10.0	4.52073	1.00000	0.00001	0.00000	0.00000	0.00000
10.2	4.72073	1.00000	0.00001	0.00000	0.00000	0.00000

q	f	f'	f''	fS <sub>q</sub>	S	S'
0.	0.00000	0.00000	-0.09664	0.00000	0.00000	0.00000
0.2	-0.00188	-0.01853	-0.08865	0.00000	0.00000	0.00000
0.4	-0.00731	-0.03546	-0.08073	0.00000	0.00000	0.00000
0.6	-0.01598	-0.05083	-0.07292	0.00000	0.00000	0.00000
0.8	-0.02753	-0.06444	-0.06524	0.00000	0.00000	0.00000
1.0	-0.04171	-0.07693	-0.05770	0.00000	0.00000	0.00000
1.2	-0.05821	-0.08773	-0.05029	0.00000	0.00000	0.00000
1.4	-0.07671	-0.09705	-0.04298	0.00000	0.00000	0.00000
1.6	-0.09693	-0.10493	-0.03575	0.00000	0.00000	0.00000
1.8	-0.11858	-0.11135	-0.02853	0.00000	0.00000	0.00000
2.0	-0.14138	-0.11634	-0.02128	0.00000	0.00000	0.00000
2.2	-0.16502	-0.11986	-0.01393	0.00000	0.00000	0.00000
2.4	-0.18922	-0.12189	-0.00640	0.00000	0.00000	0.00000
2.6	-0.21368	-0.12240	0.00138	0.00000	0.00000	0.00000
2.8	-0.23807	-0.12132	0.00951	0.00000	0.00000	0.00000
3.0	-0.26209	-0.11857	0.01609	0.00000	0.00000	0.00000
3.2	-0.28538	-0.11405	0.02222	0.00000	0.00000	0.00000
3.4	-0.30759	-0.10764	0.02703	0.00000	0.00000	0.00000
3.6	-0.32839	-0.09918	0.03063	0.00000	0.00000	0.00000
3.8	-0.34711	-0.08852	0.03317	0.00000	0.00000	0.00000
4.0	-0.36355	-0.07545	0.03476	0.00000	0.00000	0.00000
4.2	-0.37711	-0.05974	0.03555	0.00000	0.00000	0.00000
4.4	-0.38725	-0.04114	0.03555	0.00000	0.00000	0.00000
4.6	-0.39336	-0.01930	0.03480	0.00000	0.00000	0.00000
4.8	-0.39478	0.00581	0.03358	0.00000	0.00000	0.00000
5.0	-0.39079	0.03474	0.03145	0.00000	0.00000	0.00000
5.2	-0.38061	0.06768	0.17515	0.00000	0.00000	0.00000
5.4	-0.36343	0.10488	0.19695	0.00000	0.00000	0.00000
5.6	-0.33836	0.14451	0.21945	0.00000	0.00000	0.00000
5.8	-0.30452	0.19267	0.24200	0.00000	0.00000	0.00000
6.0	-0.26100	0.24330	0.26404	0.00000	0.00000	0.00000
6.2	-0.20892	0.29817	0.28432	0.00000	0.00000	0.00000
6.4	-0.14148	0.35683	0.30172	0.00000	0.00000	0.00000
6.6	-0.06398	0.41850	0.31490	0.00000	0.00000	0.00000
6.8	0.02609	0.48242	0.32255	0.00000	0.00000	0.00000
7.0	0.12905	0.54715	0.32347	0.00000	0.00000	0.00000
7.2	0.24492	0.61131	0.31687	0.00000	0.00000	0.00000
7.4	0.37343	0.67337	0.30247	0.00000	0.00000	0.00000
7.6	0.51402	0.73190	0.28049	0.00000	0.00000	0.00000
7.8	0.66582	0.78523	0.25268	0.00000	0.00000	0.00000
8.0	0.82771	0.83250	0.22021	0.00000	0.00000	0.00000
8.2	0.99840	0.87310	0.17545	0.00000	0.00000	0.00000
8.4	1.17651	0.90676	0.15069	0.00000	0.00000	0.00000
8.6	1.36065	0.93358	0.11888	0.00000	0.00000	0.00000
8.8	1.54953	0.95420	0.08095	0.00000	0.00000	0.00000
9.0	1.74197	0.96847	0.04451	0.00000	0.00000	0.00000
9.2	1.93702	0.97633	0.04497	0.00000	0.00000	0.00000
9.4	2.13388	0.97777	0.03814	0.00000	0.00000	0.00000
9.6	2.33196	0.97266	0.01940	0.00000	0.00000	0.00000
9.8	2.53083	0.95575	0.01200	0.00000	0.00000	0.00000
10.0	2.73018	0.92763	0.00713	0.00000	0.00000	0.00000
10.2	2.92983	0.88873	0.00407	0.00000	0.00000	0.00000
10.4	3.12964	0.84034	0.00273	0.00000	0.00000	0.00000
10.6	3.32954	0.79467	0.00117	0.00000	0.00000	0.00000
10.8	3.52940	0.75084	0.00059	0.00000	0.00000	0.00000
11.0	3.72947	0.70993	0.00029	0.00000	0.00000	0.00000
11.2	3.92946	0.67197	0.00013	0.00000	0.00000	0.00000
11.4	4.12946	0.63699	0.00006	0.00000	0.00000	0.00000
11.6	4.32946	0.60499	0.00003	0.00000	0.00000	0.00000
11.8	4.52946	0.57499	0.00001	0.00000	0.00000	0.00000
12.0	4.72946	0.54699	0.00000	0.00000	0.00000	0.00000

S(0) = -2

$\beta = 20.00$

$\beta = 10.00$

$\eta$	$f$	$f'$	$f''$	$fS_4\eta$	$S$	$S'$
0.	0.00000	0.00000	4.48424	0.00000	-0.20000	0.13749
0.025	0.00136	0.10711	4.08534	-0.00492	-0.19654	0.13749
0.050	0.00527	0.20434	3.69511	-0.00985	-0.19312	0.13748
0.075	0.01152	0.29201	3.32140	-0.01441	-0.18969	0.13745
0.100	0.01990	0.37059	2.96954	-0.01931	-0.18629	0.13740
0.125	0.02996	0.44069	2.64284	-0.02393	-0.18292	0.13732
0.150	0.04177	0.50294	2.34204	-0.02847	-0.17958	0.13719
0.175	0.05504	0.55807	2.07029	-0.03290	-0.17628	0.13703
0.200	0.06962	0.60678	1.82438	-0.03725	-0.17299	0.13681
0.225	0.08533	0.64950	1.60410	-0.04152	-0.16972	0.13655
0.250	0.10205	0.68710	1.40794	-0.04571	-0.16647	0.13623
0.275	0.11965	0.72008	1.23412	-0.04981	-0.16321	0.13585
0.300	0.13802	0.74898	1.08075	-0.05382	-0.15992	0.13542
0.325	0.15707	0.77428	0.94592	-0.05775	-0.15659	0.13492
0.350	0.17671	0.79642	0.82775	-0.06160	-0.15321	0.13434
0.500	0.30343	0.88215	0.37766	-0.08293	-0.13234	0.12963
0.750	0.53219	0.93783	0.12649	-0.11200	-0.10142	0.11600
1.000	0.76975	0.96910	0.04440	-0.13394	-0.07434	0.09927
1.250	1.01153	0.97326	0.04335	-0.14665	-0.05190	0.07944
1.500	1.25636	0.98248	0.03997	-0.16037	-0.03499	0.05955
1.750	1.50254	0.98890	0.02154	-0.16733	-0.02107	0.04240
2.000	1.75037	0.99241	0.01424	-0.17163	-0.01311	0.02823
2.250	1.99911	0.99627	0.00880	-0.17415	-0.00745	0.01767
2.500	2.24841	0.99799	0.00521	-0.17554	-0.00400	0.01030
2.750	2.49805	0.99898	0.00287	-0.17627	-0.00204	0.00574
3.000	2.74787	0.99951	0.00149	-0.17643	-0.00090	0.00290
3.250	2.99778	0.99978	0.00073	-0.17680	-0.00044	0.00145
3.500	3.24774	0.99991	0.00033	-0.17680	-0.00029	0.00067
3.750	3.49773	0.99994	0.00014	-0.17691	-0.00000	0.00029
4.000	3.74772	0.99999	0.00006	-0.17692	-0.00003	0.00012
4.250	3.99772	0.99999	0.00002	-0.17693	-0.00001	0.00004
4.500	4.24772	1.00000	0.00001	-0.17693	0.00000	0.00002
4.750	4.49772	1.00000	0.00000	-0.17693	0.00000	0.00001
5.000	4.74772	1.00000	0.00000	-0.17693	0.00000	0.00000
5.250	4.99772	1.00000	0.00000	-0.17693	0.00000	0.00000
5.500	5.24772	1.00000	0.00000	-0.17693	0.00000	0.00000
5.750	5.49772	1.00000	0.00000	-0.17693	0.00000	0.00000
6.000	5.74772	1.00000	0.00000	-0.17693	0.00000	0.00000
6.250	5.99772	1.00000	0.00000	-0.17693	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_4\eta$	$S$	$S'$
0.	0.00000	0.00000	1.28641	0.00000	-0.20000	0.13250
0.025	0.00090	0.07764	1.00049	-0.00496	-0.19649	0.13249
0.050	0.00384	0.15635	0.68066	-0.00993	-0.19330	0.13249
0.075	0.00846	0.21613	0.41481	-0.01483	-0.19006	0.13247
0.100	0.01471	0.26114	0.24200	-0.01974	-0.18675	0.13241
0.125	0.02248	0.31954	0.14631	-0.02396	-0.18344	0.13237
0.150	0.03165	0.39352	0.07401	-0.02851	-0.18013	0.13228
0.175	0.04212	0.44331	0.19170	-0.03297	-0.17683	0.13216
0.200	0.05378	0.46914	0.75676	-0.03735	-0.17353	0.13200
0.225	0.06654	0.53123	1.61239	-0.04165	-0.17023	0.13180
0.250	0.08031	0.56984	1.47759	-0.04596	-0.16694	0.13156
0.275	0.09501	0.60519	1.35222	-0.04990	-0.16365	0.13127
0.300	0.11055	0.63753	1.23662	-0.05405	-0.16037	0.13094
0.325	0.12684	0.66787	1.12807	-0.05801	-0.15710	0.13055
0.350	0.14388	0.69403	1.02976	-0.06190	-0.15385	0.13011
0.500	0.25769	0.81241	0.50627	-0.08353	-0.13459	0.12627
0.750	0.47659	0.90837	0.23665	-0.11333	-0.10420	0.11529
1.000	0.70739	0.94879	0.10700	-0.13595	-0.07735	0.09947
1.250	0.94733	0.96872	0.05877	-0.15237	-0.05478	0.08009
1.500	1.19108	0.96834	0.03663	-0.16373	-0.03694	0.06192
1.750	1.43716	0.96780	0.02403	-0.17122	-0.02360	0.04499
2.000	1.68477	0.96269	0.01562	-0.17591	-0.01440	0.03010
2.250	1.93334	0.95562	0.00976	-0.17804	-0.00830	0.01730
2.500	2.18250	0.94773	0.00579	-0.18029	-0.00453	0.01144
2.750	2.43216	0.93883	0.00324	-0.18160	-0.00234	0.00643
3.000	2.68195	0.92943	0.00170	-0.18196	-0.00114	0.00340
3.250	2.93185	0.91974	0.00084	-0.18178	-0.00052	0.00169
3.500	3.18181	0.90980	0.00030	-0.18179	-0.00023	0.00079
3.750	3.43179	0.89955	0.00017	-0.18182	-0.00005	0.00034
4.000	3.68178	0.88898	0.00007	-0.18184	-0.00004	0.00014
4.250	3.93178	0.87809	0.00003	-0.18185	-0.00001	0.00005
4.500	4.18177	0.86681	0.00001	-0.18185	0.00000	0.00002
4.750	4.43177	0.85500	0.00000	-0.18185	0.00000	0.00001
5.000	4.68177	0.84260	0.00000	-0.18185	0.00000	0.00000
5.250	4.93177	0.83000	0.00000	-0.18185	0.00000	0.00000
5.500	5.18177	0.81700	0.00000	-0.18185	0.00000	0.00000
5.750	5.43177	0.80360	0.00000	-0.18185	0.00000	0.00000
6.000	5.68177	0.78980	0.00000	-0.18185	0.00000	0.00000

$$S(0) = -2$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_0$	$S$	$S'$
0.	0.00000	0.00000	1.51346	0.00000	-1.20000	0.11830
0.025	0.03047	0.03734	1.47340	-0.00496	-0.19704	0.11830
0.050	0.06186	0.07367	1.43330	-0.00995	-0.19409	0.11829
0.075	0.09314	0.10900	1.39325	-0.01467	-0.19113	0.11829
0.100	0.00710	0.14333	1.35334	-0.01941	-0.18817	0.11827
0.125	0.01110	0.17667	1.31365	-0.02408	-0.18521	0.11824
0.150	0.01613	0.20902	1.27426	-0.02867	-0.18226	0.11820
0.175	0.02175	0.24039	1.23524	-0.03319	-0.17930	0.11815
0.200	0.02814	0.27078	1.19665	-0.03763	-0.17635	0.11807
0.225	0.03526	0.30022	1.15854	-0.04201	-0.17340	0.11798
0.250	0.04314	0.32872	1.12098	-0.04630	-0.17045	0.11786
0.275	0.05170	0.35628	1.08399	-0.05051	-0.16751	0.11772
0.300	0.06095	0.38292	1.04763	-0.05468	-0.16457	0.11756
0.325	0.07084	0.40866	1.01193	-0.05876	-0.16163	0.11737
0.350	0.08137	0.43352	0.97692	-0.06276	-0.15870	0.11714
0.500	0.15664	0.56514	0.78260	-0.08526	-0.14127	0.11510
0.750	0.31946	0.72660	0.52232	-0.11703	-0.11322	0.10854
1.000	0.51532	0.83253	0.33648	-0.14205	-0.08734	0.09784
1.250	0.73252	0.89984	0.21058	-0.16097	-0.06459	0.08374
1.500	0.96310	0.94147	0.12854	-0.17466	-0.04563	0.06776
1.750	1.20148	0.96661	0.07666	-0.18412	-0.03072	0.05170
2.000	1.44956	0.98145	0.04465	-0.19034	-0.01966	0.03714
2.250	1.69209	0.98999	0.02534	-0.19423	-0.01194	0.02509
2.500	1.94024	0.99477	0.01396	-0.19653	-0.00687	0.01593
2.750	2.18929	0.99737	0.00743	-0.19782	-0.00374	0.00951
3.000	2.43882	0.99873	0.00381	-0.19851	-0.00193	0.00533
3.250	2.68860	0.99941	0.00187	-0.19885	-0.00094	0.00281
3.500	2.93850	0.99974	0.00087	-0.19902	-0.00043	0.00139
3.750	3.18844	0.99989	0.00039	-0.19904	-0.00019	0.00065
4.000	3.43844	0.99994	0.00016	-0.19912	-0.00008	0.00028
4.250	3.68843	0.99998	0.00007	-0.19913	-0.00003	0.00012
4.500	3.93843	0.99999	0.00002	-0.19914	-0.00001	0.00004
4.750	4.18843	1.00000	0.00001	-0.19914	0.00000	0.00002
5.000	4.43843	1.00000	0.00000	-0.19914	0.00000	0.00001
5.250	4.68843	1.00000	0.00000	-0.19914	0.00000	0.00000
5.500	4.93843	1.00000	0.00000	-0.19914	0.00000	0.00000
5.750	5.18843	1.00000	0.00000	-0.19914	0.00000	0.00000
6.000	5.43843	1.00000	0.00000	-0.19914	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_0$	$S$	$S'$
0.	0.00000	0.00000	1.12410	0.00000	-0.20000	0.11195
0.025	0.00035	0.02785	1.10407	-0.00497	-0.19720	0.11195
0.050	0.00139	0.05520	1.08399	-0.00984	-0.19440	0.11194
0.075	0.00311	0.08205	1.06387	-0.01469	-0.19160	0.11194
0.100	0.00549	0.10840	1.04376	-0.01944	-0.18881	0.11192
0.125	0.00852	0.13424	1.02362	-0.02413	-0.18601	0.11191
0.150	0.01219	0.15958	1.00351	-0.02874	-0.18321	0.11189
0.175	0.01650	0.18441	0.98345	-0.03329	-0.18041	0.11184
0.200	0.02141	0.20875	0.96343	-0.03776	-0.17762	0.11178
0.225	0.02693	0.23259	0.94346	-0.04217	-0.17483	0.11172
0.250	0.03304	0.25593	0.92361	-0.04650	-0.17203	0.11163
0.275	0.03972	0.27877	0.90383	-0.05077	-0.16924	0.11153
0.300	0.04697	0.30112	0.88417	-0.05496	-0.16646	0.11141
0.325	0.05477	0.32298	0.86462	-0.05909	-0.16367	0.11127
0.350	0.06312	0.34435	0.84520	-0.06315	-0.16089	0.11111
0.500	0.12385	0.46257	0.73206	-0.08604	-0.14433	0.10958
0.750	0.26051	0.62360	0.56010	-0.11874	-0.11749	0.10453
1.000	0.43232	0.74474	0.41353	-0.14431	-0.09236	0.09592
1.250	0.63012	0.83266	0.29434	-0.16514	-0.06981	0.08403
1.500	0.84645	0.89413	0.20170	-0.18011	-0.05054	0.06989
1.750	1.07551	0.93544	0.13283	-0.19071	-0.03493	0.05497
2.000	1.31297	0.96221	0.08392	-0.19788	-0.02299	0.04079
2.250	1.55577	0.97876	0.05076	-0.20243	-0.01438	0.02850
2.500	1.80180	0.98857	0.02934	-0.20530	-0.00853	0.01873
2.750	2.04970	0.99412	0.01618	-0.20692	-0.00479	0.01158
3.000	2.29864	0.99711	0.00849	-0.20762	-0.00255	0.00672
3.250	2.54814	0.99865	0.00424	-0.20828	-0.00128	0.00367
3.500	2.79790	0.99940	0.00201	-0.20890	-0.00061	0.00188
3.750	3.04780	0.99975	0.00090	-0.20941	-0.00027	0.00091
4.000	3.29774	0.99990	0.00038	-0.20985	-0.00012	0.00041
4.250	3.54774	0.99996	0.00015	-0.20987	-0.00003	0.00017
4.500	3.79774	0.99999	0.00004	-0.20986	-0.00002	0.00007
4.750	4.04774	1.00000	0.00002	-0.20986	-0.00001	0.00003
5.000	4.29774	1.00000	0.00001	-0.20986	0.00000	0.00001
5.250	4.54774	1.00000	0.00000	-0.20986	0.00000	0.00000
5.500	4.79774	1.00000	0.00000	-0.20986	0.00000	0.00000
5.750	5.04774	1.00000	0.00000	-0.20986	0.00000	0.00000
6.000	5.29774	1.00000	0.00000	-0.20986	0.00000	0.00000
6.250	5.54774	1.00000	0.00000	-0.20986	0.00000	0.00000

$$S(0) = -2$$

 $\beta = 0.50$ 
 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	0.86228	0.00000	-0.20000	0.10623
0.025	0.00027	0.02143	0.85227	-0.00497	-0.19734	0.10623
0.050	0.00107	0.04261	0.84222	-0.00987	-0.19469	0.10623
0.075	0.00240	0.06354	0.83215	-0.01470	-0.19203	0.10622
0.100	0.00424	0.08422	0.82202	-0.01947	-0.18938	0.10621
0.125	0.00641	0.10464	0.81187	-0.02417	-0.18672	0.10620
0.150	0.00997	0.12481	0.80169	-0.02880	-0.18407	0.10618
0.175	0.01284	0.14473	0.79148	-0.03337	-0.18141	0.10615
0.200	0.01617	0.16439	0.78124	-0.03788	-0.17876	0.10611
0.225	0.02194	0.18379	0.77097	-0.04231	-0.17611	0.10606
0.250	0.02590	0.20293	0.76068	-0.04668	-0.17346	0.10600
0.275	0.03121	0.22182	0.75036	-0.05098	-0.17081	0.10592
0.300	0.03699	0.24045	0.74001	-0.05522	-0.16816	0.10583
0.325	0.04323	0.25882	0.72964	-0.05939	-0.16552	0.10573
0.350	0.04992	0.27693	0.71924	-0.06350	-0.16288	0.10560
0.500	0.09932	0.38012	0.65654	-0.08674	-0.14711	0.10445
0.750	0.21378	0.53115	0.55183	-0.12029	-0.12143	0.10052
1.000	0.36273	0.65625	0.44960	-0.14757	-0.09710	0.09359
1.250	0.53982	0.75646	0.35349	-0.16902	-0.07489	0.08365
1.500	0.73904	0.83380	0.26708	-0.18525	-0.05540	0.07132
1.750	0.95505	0.89105	0.19322	-0.19703	-0.03934	0.05773
2.000	1.18319	0.93158	0.13341	-0.20521	-0.02661	0.04420
2.250	1.41974	0.95893	0.08767	-0.21061	-0.01713	0.03193
2.500	1.66184	0.97649	0.05473	-0.21401	-0.01048	0.02172
2.750	1.90742	0.98718	0.03239	-0.21604	-0.00607	0.01390
3.000	2.15506	0.99336	0.01815	-0.21719	-0.00333	0.00637
3.250	2.40386	0.99673	0.00962	-0.21780	-0.00173	0.00473
3.500	2.65329	0.99847	0.00481	-0.21811	-0.00085	0.00252
3.750	2.90303	0.99933	0.00228	-0.21824	-0.00039	0.00124
4.000	3.15291	0.99972	0.00102	-0.21833	-0.00017	0.00059
4.250	3.40287	0.99989	0.00043	-0.21836	-0.00007	0.00026
4.500	3.65285	0.99994	0.00017	-0.21837	-0.00003	0.00011
4.750	3.90284	0.99999	0.00006	-0.21837	-0.00001	0.00004
5.000	4.15284	1.00000	0.00002	-0.21837	0.00000	0.00002
5.250	4.40284	1.00000	0.00001	-0.21837	0.00000	0.00001
5.500	4.65284	1.00000	0.00000	-0.21837	0.00000	0.00000
5.750	4.90284	1.00000	0.00000	-0.21837	0.00000	0.00000
6.000	5.15284	1.00000	0.00000	-0.21837	0.00000	0.00000
6.250	5.40284	1.00000	0.00000	-0.21837	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	0.72053	0.00000	-0.20000	0.10243
0.025	0.00022	0.01794	0.71481	-0.00497	-0.19744	0.10243
0.050	0.00090	0.03574	0.70906	-0.00987	-0.19468	0.10243
0.075	0.00201	0.05339	0.70329	-0.01471	-0.19212	0.10242
0.100	0.00356	0.07090	0.69750	-0.01949	-0.18976	0.10241
0.125	0.00555	0.08827	0.69167	-0.02420	-0.18720	0.10240
0.150	0.00798	0.10549	0.68580	-0.02885	-0.18464	0.10239
0.175	0.01083	0.12256	0.67990	-0.03343	-0.18208	0.10236
0.200	0.01410	0.13948	0.67396	-0.03793	-0.17952	0.10233
0.225	0.01780	0.15626	0.66798	-0.04241	-0.17696	0.10229
0.250	0.02192	0.17280	0.66196	-0.04680	-0.17441	0.10224
0.275	0.02644	0.18935	0.65589	-0.05113	-0.17185	0.10218
0.300	0.03138	0.20580	0.64977	-0.05539	-0.16930	0.10210
0.325	0.03673	0.22184	0.64361	-0.05959	-0.16674	0.10202
0.350	0.04247	0.23766	0.63739	-0.06373	-0.16420	0.10192
0.500	0.08518	0.33061	0.59896	-0.08722	-0.14897	0.10096
0.750	0.18585	0.47189	0.53839	-0.12133	-0.12400	0.09747
1.000	0.31964	0.59538	0.45483	-0.14936	-0.10046	0.09175
1.250	0.48197	0.70087	0.38048	-0.17166	-0.07845	0.08395
1.500	0.66808	0.78568	0.30480	-0.18879	-0.05903	0.07116
1.750	0.87377	0.85286	0.23375	-0.20143	-0.04260	0.05937
2.000	1.09311	0.90324	0.17093	-0.21036	-0.02930	0.04644
2.250	1.32369	0.93922	0.11879	-0.21630	-0.01931	0.03434
2.500	1.56175	0.96361	0.07627	-0.22025	-0.01206	0.02395
2.750	1.80477	0.97927	0.04079	-0.22261	-0.00715	0.01572
3.000	2.05088	0.98679	0.02074	-0.22397	-0.00402	0.00971
3.250	2.29882	0.99425	0.01597	-0.22472	-0.00214	0.00564
3.500	2.54780	0.99720	0.00837	-0.22511	-0.00107	0.00300
3.750	2.79731	0.99871	0.00414	-0.22530	-0.00051	0.00150
4.000	3.04709	0.99944	0.00193	-0.22539	-0.00023	0.00076
4.250	3.29700	0.99977	0.00064	-0.22543	-0.00010	0.00034
4.500	3.54696	0.99991	0.00035	-0.22544	-0.00004	0.00015
4.750	3.79694	0.99997	0.00014	-0.22545	-0.00001	0.00006
5.000	4.04694	0.99999	0.00005	-0.22545	-0.00001	0.00002
5.250	4.29694	1.00000	0.00002	-0.22545	0.00000	0.00001
5.500	4.54694	1.00000	0.00001	-0.22545	0.00000	0.00000
5.750	4.79694	1.00000	0.00000	-0.22545	0.00000	0.00000
6.000	5.04694	1.00000	0.00000	-0.22545	0.00000	0.00000
6.250	5.29694	1.00000	0.00000	-0.22545	0.00000	0.00000



$$S(0) = -2$$

 $\beta = 0.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.0	0.00000	0.00000	0.46960	0.00000	-0.20000	0.99392
0.2	0.00939	0.09391	0.46931	-0.03812	-0.18122	0.09386
0.4	0.03755	0.18761	0.46725	-0.07249	-0.16244	0.09345
0.6	0.08439	0.28056	0.46171	-0.10312	-0.14388	0.09235
0.8	0.14967	0.37196	0.45119	-0.13007	-0.12561	0.09024
1.0	0.23299	0.46063	0.43438	-0.15340	-0.10787	0.30688
1.2	0.33366	0.54525	0.41057	-0.17327	-0.09095	0.08211
1.4	0.45072	0.62439	0.37969	-0.18984	-0.07512	0.07594
1.6	0.58296	0.69670	0.34241	-0.20361	-0.06066	0.06850
1.8	0.72887	0.76106	0.30045	-0.21421	-0.04779	0.06009
2.0	0.88680	0.81669	0.25567	-0.22264	-0.03666	0.05113
2.2	1.05495	0.86330	0.21058	-0.22901	-0.02734	0.04212
2.4	1.23153	0.90107	0.16756	-0.23369	-0.01979	0.03351
2.6	1.41482	0.93060	0.12861	-0.23704	-0.01348	0.02572
2.8	1.60328	0.95288	0.09311	-0.23934	-0.00842	0.01902
3.0	1.79557	0.96805	0.06771	-0.24089	-0.00419	0.01354
3.2	1.99050	0.98337	0.04637	-0.24180	-0.00393	0.00927
3.4	2.18747	0.98797	0.03054	-0.24251	-0.00241	0.00611
3.6	2.38559	0.99269	0.01931	-0.24280	-0.00142	0.00387
3.8	2.58450	0.99594	0.01176	-0.24310	-0.00081	0.00235
4.0	2.78389	0.99777	0.00681	-0.24322	-0.00045	0.00137
4.2	2.98356	0.99882	0.00386	-0.24329	-0.00024	0.00077
4.4	3.18330	0.99940	0.00208	-0.24332	-0.00012	0.00042
4.6	3.38330	0.99970	0.00108	-0.24334	-0.00006	0.00022
4.8	3.58325	0.99986	0.00054	-0.24335	-0.00003	0.00011
5.0	3.78323	0.99994	0.00026	-0.24335	-0.00001	0.00005
5.2	3.98323	0.99997	0.00012	-0.24335	-0.00001	0.00002
5.4	4.18322	0.99999	0.00005	-0.24334	0.00000	0.00001
5.6	4.38322	1.00000	0.00002	-0.24334	0.00000	0.00000
5.8	4.58322	1.00000	0.00001	-0.24334	0.00000	0.00000

 $\beta = -0.04$ 

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.0	0.00000	0.00000	0.42335	0.00000	-0.20000	0.09202
0.2	0.00951	0.08530	0.42956	-0.03016	-0.18160	0.09197
0.4	0.03620	0.17173	0.43432	-0.07264	-0.16323	0.09160
0.6	0.07725	0.25883	0.43599	-0.10346	-0.14500	0.09061
0.8	0.13772	0.34581	0.43294	-0.13066	-0.12705	0.08871
1.0	0.21549	0.43159	0.42377	-0.15431	-0.10959	0.08566
1.2	0.31019	0.51484	0.40742	-0.17455	-0.09287	0.08129
1.4	0.42116	0.59405	0.38346	-0.19153	-0.07716	0.07558
1.6	0.54744	0.66773	0.35218	-0.20550	-0.06272	0.36862
1.8	0.68779	0.73451	0.31471	-0.21672	-0.04978	0.06066
2.0	0.84071	0.79332	0.27289	-0.22552	-0.03850	0.05207
2.2	1.00454	0.84353	0.22909	-0.23224	-0.02897	0.04331
2.4	1.17794	0.88499	0.18382	-0.23722	-0.02116	0.03482
2.6	1.35798	0.91805	0.14540	-0.24061	-0.01499	0.02703
2.8	1.54425	0.94346	0.10960	-0.24332	-0.01029	0.02022
3.0	1.73493	0.96228	0.07952	-0.24501	-0.00683	0.01457
3.2	1.92880	0.97568	0.05549	-0.24611	-0.00438	0.01010
3.4	2.12491	0.98484	0.03722	-0.24681	-0.00271	0.00673
3.6	2.32253	0.98990	0.02460	-0.24724	-0.00162	0.30432
3.8	2.52113	0.99473	0.01484	-0.24749	-0.00094	0.00246
4.0	2.72033	0.99704	0.00884	-0.24763	-0.00052	0.00157
4.2	2.91989	0.99841	0.00506	-0.24771	-0.00028	0.00090
4.4	3.11965	0.99918	0.00278	-0.24775	-0.00014	0.00049
4.6	3.31953	0.99959	0.00146	-0.24777	-0.00007	0.00024
4.8	3.51948	0.99980	0.00074	-0.24778	-0.00003	0.30013
5.0	3.71945	0.99991	0.00036	-0.24778	-0.00002	0.00006
5.2	3.91944	0.99996	0.00017	-0.24779	-0.00001	0.00003
5.4	4.11943	0.99998	0.00008	-0.24779	0.00000	0.00001
5.6	4.31943	0.99999	0.00003	-0.24779	0.00000	0.00001
5.8	4.51943	1.00000	0.00001	-0.24779	0.00000	0.00000
6.0	4.71943	1.00000	0.00001	-0.24779	0.00000	0.00000

$$S(0) = -2$$

$$\beta = -.12$$

$$\beta = -20$$

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	0.31289	0.00000	-0.20000	0.00000
0.2	0.00639	0.00490	0.31212	-0.03026	-0.18262	0.08687
0.4	0.02605	0.13280	0.30667	-0.07305	-0.16527	0.08661
0.6	0.05974	0.27064	0.30722	-0.10438	-0.14801	0.08589
0.8	0.10811	0.27946	0.30026	-0.13227	-0.13076	0.08448
1.0	0.17167	0.35640	0.30821	-0.15678	-0.11428	0.08217
1.2	0.25074	0.43430	0.30954	-0.17802	-0.09816	0.07879
1.4	0.34536	0.51170	0.30303	-0.19610	-0.08284	0.07425
1.6	0.45527	0.58694	0.30796	-0.21122	-0.06854	0.06854
1.8	0.57987	0.65831	0.30434	-0.22360	-0.05548	0.06183
2.0	0.71823	0.72416	0.31306	-0.23351	-0.04386	0.05431
2.2	0.86908	0.78313	0.27582	-0.24125	-0.03379	0.04635
2.4	1.03095	0.83429	0.23498	-0.24713	-0.02532	0.03834
2.6	1.20223	0.87706	0.19320	-0.25148	-0.01843	0.03067
2.8	1.38123	0.91164	0.15107	-0.25460	-0.01301	0.02369
3.0	1.56637	0.93895	0.11672	-0.25677	-0.00889	0.01764
3.2	1.75620	0.95868	0.08556	-0.25823	-0.00588	0.01266
3.4	1.94967	0.97317	0.06029	-0.25918	-0.00376	0.00874
3.6	2.14517	0.98318	0.04080	-0.25978	-0.00232	0.00580
3.8	2.34252	0.98984	0.02651	-0.26015	-0.00138	0.00370
4.0	2.54094	0.99408	0.01654	-0.26036	-0.00079	0.00227
4.2	2.74004	0.99667	0.00991	-0.26048	-0.00044	0.00134
4.4	2.93994	0.99820	0.00570	-0.26059	-0.00024	0.00074
4.6	3.13927	0.99904	0.00314	-0.26064	-0.00012	0.00041
4.8	3.33814	0.99953	0.00167	-0.26060	-0.00004	0.00022
5.0	3.53907	0.99977	0.00085	-0.26061	-0.00003	0.00011
5.2	3.73904	0.99989	0.00041	-0.26061	-0.00001	0.00005
5.4	3.93904	0.99995	0.00019	-0.26061	-0.00001	0.00002
5.6	4.13902	0.99998	0.00009	-0.26061	0.00000	0.00001
5.8	4.33901	0.99999	0.00004	-0.26061	0.00000	0.00000
6.0	4.53901	1.00000	0.00002	-0.26061	0.00000	0.00000
6.2	4.73901	1.00000	0.00001	-0.26061	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	0.14282	0.00000	-0.20000	0.07675
0.2	0.00307	0.03173	0.17509	-0.03847	-0.18465	0.07673
0.4	0.01315	0.07003	0.20761	-0.07384	-0.16931	0.07662
0.6	0.03152	0.11481	0.23982	-0.10419	-0.15402	0.07629
0.8	0.05949	0.16550	0.27088	-0.13547	-0.13882	0.07561
1.0	0.09829	0.22731	0.29964	-0.16173	-0.12381	0.07444
1.2	0.14906	0.28791	0.32471	-0.18502	-0.10909	0.07264
1.4	0.21279	0.35194	0.34448	-0.20540	-0.09480	0.07007
1.6	0.29029	0.42265	0.35732	-0.22298	-0.08111	0.06665
1.8	0.38205	0.49490	0.36176	-0.23789	-0.06820	0.06233
2.0	0.48825	0.56692	0.35674	-0.25032	-0.05644	0.05715
2.2	0.60868	0.63694	0.34189	-0.26046	-0.04539	0.05122
2.4	0.74276	0.70305	0.31774	-0.26854	-0.03577	0.04476
2.6	0.88953	0.76351	0.28572	-0.27487	-0.02751	0.03803
2.8	1.04770	0.81694	0.24811	-0.27965	-0.02057	0.03133
3.0	1.21579	0.86257	0.20768	-0.28319	-0.01495	0.02499
3.2	1.39218	0.90004	0.16733	-0.28571	-0.01054	0.01924
3.4	1.57528	0.92967	0.12961	-0.28747	-0.00719	0.01431
3.6	1.76358	0.95219	0.09644	-0.28865	-0.00475	0.01025
3.8	1.95575	0.96863	0.06888	-0.28942	-0.00303	0.00707
4.0	2.15070	0.98014	0.04722	-0.28990	-0.00187	0.00469
4.2	2.34754	0.98768	0.03105	-0.29020	-0.00111	0.00299
4.4	2.54567	0.99207	0.01959	-0.29037	-0.00064	0.00183
4.6	2.74458	0.99596	0.01185	-0.29044	-0.00035	0.00108
4.8	2.94397	0.99900	0.00688	-0.29052	-0.00019	0.00061
5.0	3.14365	0.99984	0.00383	-0.29055	-0.00010	0.00033
5.2	3.34340	0.99942	0.00205	-0.29056	-0.00005	0.00017
5.4	3.54339	0.99972	0.00105	-0.29057	-0.00002	0.00009
5.6	3.74335	0.99987	0.00052	-0.29057	-0.00001	0.00004
5.8	3.94333	0.99994	0.00024	-0.29057	0.00000	0.00002
6.0	4.14333	0.99997	0.00011	-0.29057	0.00000	0.00001
6.2	4.34332	0.99999	0.00005	-0.29057	0.00000	0.00000
6.4	4.54332	1.00000	0.00002	-0.29057	0.00000	0.00000
6.6	4.74332	1.00000	0.00001	-0.29057	0.00000	0.00000

$$S(0) = -2$$

$$\beta = -.22115(S)$$

$$\beta = -.20(R)$$

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	-0.20000	0.06408
0.2	0.00024	0.00356	-0.03072	-0.18718	0.06408	0.06408
0.4	0.00199	0.01430	0.07189	-0.17437	0.06407	0.06407
0.6	0.00644	0.03234	0.10859	-0.16047	0.06402	0.06402
0.8	0.01533	0.05776	0.14560	-0.14877	0.06398	0.06398
1.0	0.03004	0.09058	0.18255	-0.16798	-0.13602	0.06360
1.2	0.05205	0.13074	0.21887	-0.19391	-0.12334	0.06309
1.4	0.08201	0.17803	0.25370	-0.21732	-0.11080	0.06275
1.6	0.12371	0.23204	0.28689	-0.23825	-0.09847	0.06099
1.8	0.17604	0.29211	0.31402	-0.25673	-0.08644	0.05920
2.0	0.24090	0.35727	0.33648	-0.27205	-0.07483	0.05640
2.2	0.31920	0.42622	0.35160	-0.28470	-0.06377	0.05372
2.4	0.41153	0.49733	0.35798	-0.29840	-0.05339	0.04994
2.6	0.51815	0.56871	0.35430	-0.30811	-0.04383	0.04552
2.8	0.63890	0.63836	0.34064	-0.31600	-0.03522	0.04056
3.0	0.77324	0.70425	0.31693	-0.32226	-0.02763	0.03522
3.2	0.92023	0.76459	0.28523	-0.32712	-0.02114	0.02974
3.4	1.07861	0.81795	0.24771	-0.33079	-0.01573	0.02436
3.6	1.24609	0.86347	0.20775	-0.33349	-0.01137	0.01931
3.8	1.42345	0.90086	0.16661	-0.33541	-0.00797	0.01478
4.0	1.60670	0.93038	0.12902	-0.33673	-0.00541	0.01092
4.2	1.79513	0.95277	0.09501	-0.33762	-0.00350	0.00777
4.4	1.98741	0.96908	0.06628	-0.33819	-0.00226	0.00532
4.6	2.18243	0.98048	0.04248	-0.33855	-0.00139	0.00351
4.8	2.37935	0.98812	0.02301	-0.33877	-0.00084	0.00222
5.0	2.57750	0.99304	0.011925	-0.33889	-0.00047	0.00135
5.2	2.77644	0.99607	0.01161	-0.33896	-0.00026	0.00079
5.4	2.97585	0.99786	0.00672	-0.33900	-0.00014	0.00045
5.6	3.17533	0.99888	0.00373	-0.33902	-0.00007	0.00024
5.8	3.37537	0.99944	0.00199	-0.33903	-0.00003	0.00013
6.0	3.57529	0.99973	0.00101	-0.33904	-0.00002	0.00006
6.2	3.77525	0.99987	0.00050	-0.33904	-0.00001	0.00003
6.4	3.97523	0.99994	0.00023	-0.33904	0.00000	0.00001
6.6	4.17522	0.99998	0.00011	-0.33904	0.00000	0.00001
6.8	4.37522	0.99999	0.00005	-0.33904	0.00000	0.00000
7.0	4.57522	1.00000	0.00002	-0.33904	0.00000	0.00000
7.2	4.77522	1.00000	0.00001	-0.33904	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f/Sd_\eta$	$S$	$S'$
0.	0.00000	0.00000	-0.08638	0.00000	-0.20000	0.05119
0.2	-0.00151	-0.01406	-0.05418	-0.03098	-0.18976	0.05120
0.4	-0.00519	-0.02165	-0.02160	-0.07590	-0.17952	0.05123
0.6	-0.00974	-0.02268	0.01140	-0.11078	-0.16927	0.05130
0.8	-0.01382	-0.01706	0.04488	-0.14361	-0.15900	0.05143
1.0	-0.01611	-0.00469	0.07891	-0.17438	-0.14869	0.05158
1.2	-0.01524	0.01454	0.11348	-0.20369	-0.13836	0.05175
1.4	-0.00983	0.04073	0.14845	-0.22972	-0.12800	0.05188
1.6	0.00152	0.07393	0.18356	-0.25428	-0.11761	0.05193
1.8	0.02021	0.11413	0.21829	-0.27677	-0.10723	0.05183
2.0	0.04763	0.16117	0.25187	-0.29718	-0.09690	0.05148
2.2	0.08512	0.21473	0.28326	-0.31553	-0.08666	0.05091
2.4	0.13392	0.27424	0.31117	-0.33186	-0.07660	0.04992
2.6	0.19515	0.33884	0.33419	-0.34619	-0.06661	0.04812
2.8	0.26972	0.40736	0.34998	-0.35861	-0.05719	0.04595
3.0	0.35826	0.47828	0.35781	-0.36918	-0.04847	0.04316
3.2	0.46108	0.54985	0.35622	-0.37804	-0.04017	0.03978
3.4	0.57811	0.62010	0.34664	-0.38530	-0.03260	0.03586
3.6	0.70890	0.68706	0.32340	-0.39113	-0.02585	0.03153
3.8	0.85259	0.74890	0.29368	-0.39570	-0.02000	0.02698
4.0	1.00802	0.80611	0.25760	-0.39919	-0.01506	0.02240
4.2	1.17473	0.85169	0.21705	-0.40178	-0.01102	0.01802
4.4	1.34815	0.89120	0.17337	-0.40365	-0.00783	0.01400
4.6	1.52968	0.92278	0.13884	-0.40496	-0.00539	0.01050
4.8	1.71678	0.94702	0.10443	-0.40585	-0.00359	0.00759
5.0	1.90807	0.96491	0.07540	-0.40643	-0.00231	0.00528
5.2	2.10239	0.97758	0.05224	-0.40680	-0.00144	0.00354
5.4	2.29883	0.98619	0.03473	-0.40701	-0.00086	0.00229
5.6	2.49667	0.99180	0.02214	-0.40716	-0.00050	0.00141
5.8	2.69541	0.99531	0.01355	-0.40724	-0.00028	0.00084
6.0	2.89470	0.99742	0.00795	-0.40728	-0.00015	0.00048
6.2	3.09431	0.99863	0.00448	-0.40730	-0.00008	0.00026
6.4	3.29411	0.99930	0.00242	-0.40731	-0.00004	0.00014
6.6	3.49401	0.99966	0.00125	-0.40732	-0.00002	0.00007
6.8	3.69396	0.99984	0.00062	-0.40732	-0.00001	0.00003
7.0	3.89394	0.99993	0.00030	-0.40732	0.00000	0.00002
7.2	4.09393	0.99997	0.00014	-0.40732	0.00000	0.00001
7.4	4.29393	0.99999	0.00006	-0.40732	0.00000	0.00000
7.6	4.49393	0.99999	0.00003	-0.40732	0.00000	0.00000
7.8	4.69392	1.00000	0.00001	-0.40732	0.00000	0.00000
8.0	4.89392	1.00000	0.00000	-0.40732	0.00000	0.00000



$$S(0) = -4$$

 $\beta = 20.00$ 

$q$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	3.75264	0.00000	-0.40000	0.26531	
0.025	0.00114	0.00007	3.45253	-0.00992	-0.39337	0.26531	
0.050	0.00444	0.12266	3.15633	-0.01967	-0.38673	0.26529	
0.075	0.00971	0.24796	2.87000	-0.02929	-0.38010	0.26525	
0.100	0.01676	0.31620	2.59765	-0.03867	-0.37347	0.26516	
0.125	0.02547	0.37799	2.34204	-0.04793	-0.36685	0.26502	
0.150	0.03563	0.43353	2.10477	-0.05702	-0.36022	0.26482	
0.175	0.04710	0.48330	1.88430	-0.06594	-0.35360	0.26455	
0.200	0.05975	0.52802	1.68751	-0.07470	-0.34700	0.26419	
0.225	0.07346	0.56792	1.50712	-0.08329	-0.34040	0.26375	
0.250	0.08811	0.60353	1.34450	-0.09172	-0.33381	0.26322	
0.275	0.10361	0.63529	1.19887	-0.09990	-0.32724	0.26259	
0.300	0.11989	0.66360	1.06979	-0.10800	-0.32068	0.26186	
0.325	0.13676	0.68804	0.95300	-0.11601	-0.31414	0.26102	
0.350	0.15427	0.71136	0.85050	-0.12379	-0.30763	0.26007	
0.500	0.26873	0.88468	0.44520	-0.16703	-0.26917	0.25200	
0.750	0.48036	0.87034	0.19661	-0.22665	-0.20876	0.22956	
1.000	0.70511	0.91664	0.12236	-0.27190	-0.15516	0.19790	
1.250	0.93770	0.94267	0.08072	-0.30496	-0.11020	0.16125	
1.500	1.17500	0.96179	0.06510	-0.32706	-0.07459	0.12302	
1.750	1.41815	0.97562	0.06114	-0.34381	-0.04802	0.08954	
2.000	1.66333	0.98519	0.03182	-0.35253	-0.02934	0.06092	
2.250	1.91047	0.99145	0.01970	-0.35821	-0.01780	0.03897	
2.500	2.15886	0.99532	0.01170	-0.36142	-0.00932	0.02343	
2.750	2.40800	0.99750	0.00644	-0.36313	-0.00483	0.01324	
3.000	2.65756	0.99881	0.00352	-0.36400	-0.00237	0.00703	
3.250	2.90736	0.99945	0.00175	-0.36442	-0.00110	0.00351	
3.500	3.15726	0.99976	0.00082	-0.36460	-0.00048	0.00164	
3.750	3.40722	0.99990	0.00036	-0.36468	-0.00020	0.00072	
4.000	3.65721	0.99996	0.00015	-0.36471	-0.00009	0.00030	
4.250	3.90720	0.99999	0.00006	-0.36473	-0.00003	0.00012	
4.500	4.15720	1.00000	0.00002	-0.36473	-0.00001	0.00004	
4.750	4.40720	1.00000	0.00001	-0.36473	0.00000	0.00001	
5.000	4.65720	1.00000	0.00000	-0.36473	0.00000	0.00000	
5.250	4.90720	1.00000	0.00000	-0.36473	0.00000	0.00000	
5.500	5.15720	1.00000	0.00000	-0.36473	0.00000	0.00000	
5.750	5.40720	1.00000	0.00000	-0.36473	0.00000	0.00000	
6.000	5.65720	1.00000	0.00000	-0.36473	0.00000	0.00000	
6.250	5.90720	1.00000	0.00000	-0.36473	0.00000	0.00000	

 $\beta = 10.00$ 

$q$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	2.71619	0.00000	-0.40000	0.25623	
0.025	0.00081	0.00003	2.56574	-0.00992	-0.39359	0.25622	
0.050	0.00327	0.12829	2.41567	-0.01969	-0.38719	0.25621	
0.075	0.00722	0.18683	2.26767	-0.02928	-0.38070	0.25610	
0.100	0.01250	0.24170	2.12311	-0.03902	-0.37430	0.25612	
0.125	0.01927	0.29302	1.98306	-0.04900	-0.36790	0.25602	
0.150	0.02720	0.34090	1.84835	-0.05912	-0.36150	0.25597	
0.175	0.03629	0.38549	1.71961	-0.06940	-0.35519	0.25596	
0.200	0.04645	0.42693	1.59724	-0.07980	-0.34880	0.25590	
0.225	0.05761	0.46540	1.48149	-0.09032	-0.34242	0.25587	
0.250	0.06970	0.50106	1.37250	-0.09200	-0.33604	0.25586	
0.275	0.08264	0.53400	1.27025	-0.10012	-0.32968	0.25581	
0.300	0.09636	0.56441	1.17467	-0.10640	-0.32334	0.25576	
0.325	0.11084	0.59257	1.08560	-0.11049	-0.31700	0.25570	
0.350	0.12601	0.61867	1.00263	-0.12413	-0.31069	0.25521	
0.500	0.22853	0.73057	0.62270	-0.16812	-0.27330	0.24965	
0.750	0.42849	0.84774	0.29841	-0.22094	-0.21400	0.22641	
1.000	0.64006	0.90335	0.16542	-0.27066	-0.16087	0.19796	
1.250	0.87033	0.93635	0.10554	-0.31804	-0.11560	0.16360	
1.500	1.11533	0.95627	0.07235	-0.36421	-0.07922	0.12753	
1.750	1.35690	0.97340	0.04996	-0.40939	-0.05165	0.09363	
2.000	1.60163	0.98373	0.03350	-0.46069	-0.03190	0.06469	
2.250	1.84848	0.98952	0.02143	-0.50692	-0.01870	0.04203	
2.500	2.09668	0.99475	0.01297	-0.54847	-0.01044	0.02561	
2.750	2.34571	0.99924	0.00741	-0.58542	-0.00549	0.01473	
3.000	2.59521	0.99863	0.00399	-0.61842	-0.00273	0.00794	
3.250	2.84497	0.99936	0.00202	-0.64790	-0.00120	0.00402	
3.500	3.09486	0.99972	0.00096	-0.67412	-0.00057	0.00192	
3.750	3.34481	0.99980	0.00043	-0.69721	-0.00024	0.00086	
4.000	3.59479	0.99995	0.00010	-0.71725	-0.00009	0.00036	
4.250	3.84478	0.99996	0.00007	-0.73427	-0.00003	0.00014	
4.500	4.09478	0.99999	0.00003	-0.74727	-0.00001	0.00005	
4.750	4.34478	1.00000	0.00001	-0.75727	0.00000	0.00002	
5.000	4.59478	1.00000	0.00000	-0.76427	0.00000	0.00001	
5.250	4.84478	1.00000	0.00000	-0.76727	0.00000	0.00000	
5.500	5.09478	1.00000	0.00000	-0.76727	0.00000	0.00000	
5.750	5.34478	1.00000	0.00000	-0.76427	0.00000	0.00000	
6.000	5.59478	1.00000	0.00000	-0.76427	0.00000	0.00000	

$$S(O) = -.4$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.0000	0.0000	1.3333	0.0000	-0.4000	0.23063
0.025	0.0041	0.0082	1.3032	-0.0093	-0.3942	0.23063
0.050	0.0084	0.0164	1.2728	-0.0187	-0.3884	0.23062
0.075	0.0126	0.0246	1.2424	-0.0283	-0.3827	0.23061
0.100	0.0169	0.0328	1.2118	-0.0380	-0.3769	0.23058
0.125	0.0212	0.0410	1.1813	-0.0478	-0.3711	0.23053
0.150	0.0254	0.0492	1.1509	-0.0576	-0.3654	0.23046
0.175	0.0297	0.0574	1.1205	-0.0674	-0.3596	0.23036
0.200	0.0340	0.0656	1.0901	-0.0773	-0.3538	0.23024
0.225	0.0383	0.0738	1.0600	-0.0871	-0.3481	0.23007
0.250	0.0426	0.0820	1.0302	-0.0970	-0.3423	0.22987
0.275	0.0469	0.0902	1.0007	-0.1068	-0.3365	0.22963
0.300	0.0512	0.0984	0.9724	-0.1166	-0.3307	0.22934
0.325	0.0555	0.1066	0.9443	-0.1264	-0.3249	0.22900
0.350	0.0598	0.1148	0.9165	-0.1362	-0.3191	0.22861
0.400	0.0712	0.1384	0.7563	-0.1725	-0.2854	0.22502
0.450	0.0826	0.1620	0.5343	-0.2357	-0.2304	0.21332
1.000	0.4765	0.7860	0.3662	-0.2860	-0.1794	0.19388
1.250	0.6840	0.9519	0.2437	-0.3295	-0.1340	0.16777
1.500	0.9071	0.9181	0.1671	-0.3543	-0.0958	0.13754
1.750	1.1405	0.9867	0.1044	-0.3743	-0.0653	0.10650
2.000	1.3875	0.9691	0.0656	-0.3875	-0.0424	0.07772
2.250	1.6466	0.9264	0.0410	-0.3961	-0.0264	0.05339
2.500	1.8713	0.9042	0.0236	-0.4012	-0.0152	0.03449
2.750	2.1199	0.8944	0.0137	-0.4047	-0.0084	0.02094
3.000	2.3687	0.8975	0.0072	-0.4053	-0.0047	0.01195
3.250	2.6182	0.8987	0.0037	-0.4052	-0.0021	0.00641
3.500	2.8680	0.8994	0.0018	-0.4051	-0.0010	0.00323
3.750	3.1179	0.8997	0.0008	-0.4050	-0.0004	0.00153
4.000	3.3678	0.8999	0.0003	-0.4051	-0.0001	0.00068
4.250	3.6178	0.8999	0.0001	-0.4051	-0.0000	0.00028
4.500	3.8678	0.8999	0.0000	-0.4052	-0.0000	0.00011
4.750	4.1178	1.0000	0.0000	-0.4071	-0.0001	0.00004
5.000	4.3678	1.0000	0.0001	-0.4071	0.0000	0.00001
5.250	4.6178	1.0000	0.0000	-0.4071	0.0000	0.00000
5.500	4.8678	1.0000	0.0000	-0.4071	0.0000	0.00000
5.750	5.1178	1.0000	0.0000	-0.4071	0.0000	0.00000
6.000	5.3678	1.0000	0.0000	-0.4071	0.0000	0.00000
6.250	5.6178	1.0000	0.0000	-0.4071	0.0000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.0000	0.0000	1.0121	0.0000	-0.4000	0.21927
0.025	0.0031	0.0062	0.9713	-0.0093	-0.3942	0.21927
0.050	0.0062	0.0124	0.9319	-0.0187	-0.3884	0.21927
0.075	0.0093	0.0186	0.8942	-0.0283	-0.3827	0.21926
0.100	0.0124	0.0248	0.8581	-0.0380	-0.3769	0.21924
0.125	0.0155	0.0310	0.8236	-0.0478	-0.3711	0.21920
0.150	0.0186	0.0372	0.7907	-0.0576	-0.3654	0.21915
0.175	0.0217	0.0434	0.7594	-0.0674	-0.3596	0.21930
0.200	0.0248	0.0496	0.7297	-0.0773	-0.3538	0.21899
0.225	0.0279	0.0558	0.7016	-0.0871	-0.3481	0.21887
0.250	0.0310	0.0620	0.6750	-0.0970	-0.3423	0.21872
0.275	0.0341	0.0682	0.6499	-0.1068	-0.3365	0.21854
0.300	0.0372	0.0744	0.6263	-0.1166	-0.3307	0.21832
0.325	0.0403	0.0806	0.6041	-0.1264	-0.3249	0.21807
0.350	0.0434	0.0868	0.5833	-0.1362	-0.3191	0.21770
0.400	0.0548	0.1104	0.4289	-0.1725	-0.2854	0.21504
0.450	0.0662	0.1340	0.5825	-0.2357	-0.2304	0.20587
1.000	0.4039	0.7015	0.4281	-0.2919	-0.1863	0.19084
1.250	0.5932	0.8020	0.3178	-0.3319	-0.1437	0.16785
1.500	0.8028	0.6675	0.2278	-0.3633	-0.1049	0.14182
1.750	1.0262	0.9179	0.1567	-0.3867	-0.0733	0.11222
2.000	1.2607	0.9461	0.1032	-0.4019	-0.0460	0.08433
2.250	1.5000	0.9750	0.0652	-0.4143	-0.0300	0.05973
2.500	1.7448	0.9834	0.0397	-0.4179	-0.0185	0.03981
2.750	1.9917	0.9915	0.0229	-0.4218	-0.0105	0.02496
3.000	2.2406	0.9998	0.0125	-0.4238	-0.0058	0.01478
3.250	2.4935	0.9978	0.0054	-0.4248	-0.0029	0.00814
3.500	2.7387	0.9969	0.0024	-0.4249	-0.0013	0.00424
3.750	2.9887	0.9956	0.0011	-0.4248	-0.0006	0.00207
4.000	3.2387	0.9948	0.0007	-0.4244	-0.0002	0.00095
4.250	3.4887	0.9993	0.0020	-0.4249	-0.0011	0.00041
4.500	3.7388	0.9997	0.0011	-0.4250	-0.0004	0.00017
4.750	3.9887	0.9999	0.0004	-0.4250	-0.0001	0.00006
5.000	4.2387	1.0000	0.0001	-0.4250	-0.0000	0.00002
5.250	4.4887	1.0000	0.0000	-0.4250	0.0000	0.00001
5.500	4.7387	1.0000	0.0000	-0.4250	0.0000	0.00000
5.750	4.9887	1.0000	0.0000	-0.4250	0.0000	0.00000
6.000	5.2387	1.0000	0.0000	-0.4250	0.0000	0.00000
6.250	5.4887	1.0000	0.0000	-0.4250	0.0000	0.00000

$$S(0) = -0.4$$

 $\beta = 0.50$ 
 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.79519	0.00000	-0.40000	0.20913
0.025	0.00025	0.01979	0.78766	-0.00991	-0.39477	0.20913
0.050	0.00099	0.03938	0.78006	-0.01974	-0.38954	0.20913
0.075	0.00222	0.05879	0.77240	-0.02941	-0.38432	0.20912
0.100	0.00493	0.07800	0.76467	-0.03895	-0.37909	0.20911
0.125	0.00811	0.09702	0.75688	-0.04837	-0.37386	0.20908
0.150	0.01177	0.11585	0.74902	-0.05765	-0.36863	0.20904
0.175	0.01590	0.13447	0.74110	-0.06680	-0.36341	0.20899
0.200	0.02050	0.15290	0.73312	-0.07582	-0.35818	0.20892
0.225	0.02555	0.17113	0.72507	-0.08471	-0.35296	0.20883
0.250	0.03105	0.18915	0.71697	-0.09347	-0.34774	0.20871
0.275	0.03700	0.20699	0.70880	-0.10209	-0.34253	0.20857
0.300	0.04340	0.22459	0.70057	-0.11059	-0.33731	0.20841
0.325	0.05023	0.24200	0.69229	-0.11894	-0.33211	0.20821
0.350	0.05750	0.25921	0.68395	-0.12720	-0.32690	0.20799
0.500	0.09288	0.35794	0.63280	-0.17390	-0.29595	0.20586
0.750	0.20124	0.50519	0.54431	-0.24149	-0.24518	0.19859
1.000	0.34361	0.63000	0.45420	-0.29670	-0.19703	0.18563
1.250	0.51437	0.73245	0.36604	-0.34034	-0.15286	0.16684
1.500	0.70805	0.81350	0.28367	-0.37357	-0.11401	0.14326
1.750	0.91950	0.87506	0.21059	-0.39787	-0.08146	0.11693
2.000	1.14418	0.91978	0.14925	-0.41486	-0.05557	0.09036
2.250	1.37824	0.95076	0.10049	-0.42619	-0.03610	0.06594
2.500	1.61867	0.97116	0.06451	-0.43336	-0.02228	0.04534
2.750	1.86319	0.98392	0.03918	-0.43771	-0.01304	0.02934
3.000	2.11020	0.99147	0.02252	-0.44019	-0.00723	0.01786
3.250	2.35865	0.99571	0.01224	-0.44152	-0.00379	0.01021
3.500	2.60789	0.99795	0.00628	-0.44221	-0.00188	0.00549
3.750	2.85753	0.99907	0.00339	-0.44254	-0.00088	0.00277
4.000	3.10730	0.99960	0.00139	-0.44269	-0.00039	0.00132
4.250	3.35731	0.99984	0.00060	-0.44275	-0.00016	0.00059
4.500	3.60729	0.99994	0.00024	-0.44278	-0.00006	0.00025
4.750	3.85728	0.99998	0.00009	-0.44279	-0.00002	0.00010
5.000	4.10727	0.99999	0.00003	-0.44279	-0.00001	0.00004
5.250	4.35727	1.00000	0.00001	-0.44280	0.00000	0.00001
5.500	4.60727	1.00000	0.00000	-0.44280	0.00000	0.00000
5.750	4.85727	1.00000	0.00000	-0.44280	0.00000	0.00000
6.000	5.10727	1.00000	0.00000	-0.44280	0.00000	0.00000
6.250	5.35727	1.00000	0.00000	-0.44280	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.67745	0.00000	-0.40000	0.20246
0.025	0.00021	0.01688	0.67315	-0.00994	-0.39494	0.20246
0.050	0.00084	0.03366	0.66880	-0.01975	-0.38988	0.20245
0.075	0.00189	0.05032	0.66442	-0.02943	-0.38482	0.20245
0.100	0.00336	0.06688	0.65999	-0.03899	-0.37976	0.20243
0.125	0.00524	0.08332	0.65551	-0.04842	-0.37469	0.20241
0.150	0.00752	0.09965	0.65098	-0.05772	-0.36963	0.20238
0.175	0.01022	0.11587	0.64640	-0.06690	-0.36458	0.20233
0.200	0.01332	0.13197	0.64176	-0.07595	-0.35952	0.20227
0.225	0.01682	0.14796	0.63707	-0.08488	-0.35446	0.20220
0.250	0.02071	0.16382	0.63232	-0.09367	-0.34941	0.20210
0.275	0.02501	0.17957	0.62750	-0.10235	-0.34436	0.20199
0.300	0.02969	0.19520	0.62261	-0.11089	-0.33931	0.20185
0.325	0.03476	0.21070	0.61769	-0.11931	-0.33426	0.20169
0.350	0.04022	0.22608	0.61268	-0.12761	-0.32922	0.20150
0.500	0.08091	0.31565	0.58116	-0.17473	-0.29912	0.19971
0.750	0.17740	0.45380	0.52275	-0.24332	-0.24987	0.19250
1.000	0.30652	0.57645	0.45743	-0.29984	-0.20279	0.18226
1.250	0.46420	0.68209	0.38714	-0.34500	-0.15919	0.16841
1.500	0.64608	0.76988	0.31521	-0.37984	-0.12038	0.14422
1.750	0.84766	0.83990	0.24573	-0.40568	-0.08735	0.11970
2.000	1.06464	0.89328	0.18268	-0.42404	-0.06041	0.09428
2.250	1.29308	0.93203	0.12907	-0.43650	-0.04009	0.07023
2.500	1.52965	0.95874	0.08644	-0.44456	-0.02523	0.04935
2.750	1.77168	0.97617	0.05476	-0.44951	-0.01506	0.03267
3.000	2.01718	0.98493	0.03277	-0.45239	-0.00853	0.02035
3.250	2.26477	0.99320	0.01851	-0.45398	-0.00457	0.01191
3.500	2.51355	0.99845	0.00985	-0.45482	-0.00231	0.00646
3.750	2.76246	0.99944	0.00494	-0.45523	-0.00111	0.00339
4.000	3.01249	0.99991	0.00233	-0.45542	-0.00050	0.00165
4.250	3.26258	0.99971	0.00104	-0.45550	-0.00021	0.00075
4.500	3.51253	0.99989	0.00043	-0.45554	-0.00009	0.00032
4.750	3.76251	0.99996	0.00017	-0.45555	-0.00003	0.00013
5.000	4.01250	0.99999	0.00008	-0.45556	-0.00001	0.00005
5.250	4.26250	1.00000	0.00002	-0.45556	0.00000	0.00002
5.500	4.51250	1.00000	0.00001	-0.45556	0.00000	0.00001
5.750	4.76250	1.00000	0.00000	-0.45556	0.00000	0.00000
6.000	5.01250	1.00000	0.00000	-0.45556	0.00000	0.00000
6.250	5.26250	1.00000	0.00000	-0.45556	0.00000	0.00000

$$S(0) = -.4$$

 $\beta = 0.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_0\eta$	$S$	$S'$
0.	0.00000	0.00000	0.46960	0.00000	-0.40000	0.18784
0.2	0.00939	0.09191	0.46931	-0.07824	-0.36244	0.18772
0.4	0.03755	0.18761	0.46725	-0.14498	-0.32496	0.18690
0.6	0.08439	0.28058	0.46173	-0.20625	-0.28777	0.18449
0.8	0.14967	0.37196	0.45119	-0.26013	-0.25121	0.18048
1.0	0.23299	0.46063	0.43488	-0.30680	-0.21575	0.17375
1.2	0.33366	0.54525	0.41057	-0.34654	-0.18190	0.16423
1.4	0.45072	0.62439	0.37969	-0.37971	-0.15025	0.15188
1.6	0.58296	0.69670	0.34249	-0.40682	-0.12132	0.13699
1.8	0.72887	0.76106	0.30045	-0.42845	-0.09558	0.12016
2.0	0.88880	0.81669	0.25567	-0.44528	-0.07332	0.10227
2.2	1.05495	0.86330	0.21058	-0.45802	-0.05468	0.08423
2.4	1.23153	0.90107	0.16756	-0.46739	-0.03957	0.06702
2.6	1.41482	0.93060	0.12861	-0.47407	-0.02776	0.05145
2.8	1.60328	0.95288	0.09511	-0.47869	-0.01885	0.03805
3.0	1.79557	0.96905	0.06771	-0.48177	-0.01236	0.02708
3.2	1.99058	0.98037	0.04637	-0.48377	-0.00785	0.01855
3.4	2.18747	0.98797	0.03054	-0.48501	-0.00481	0.01221
3.6	2.38559	0.99289	0.01933	-0.48576	-0.00284	0.00773
3.8	2.58450	0.99594	0.01177	-0.48620	-0.00162	0.00470
4.0	2.78389	0.99777	0.00687	-0.48645	-0.00089	0.00275
4.2	2.98356	0.99882	0.00386	-0.48658	-0.00047	0.00154
4.4	3.18338	0.99940	0.00208	-0.48665	-0.00024	0.00083
4.6	3.38330	0.99970	0.00108	-0.48668	-0.00012	0.00043
4.8	3.58325	0.99986	0.00054	-0.48670	-0.00006	0.00022
5.0	3.78323	0.99994	0.00026	-0.48671	-0.00003	0.00010
5.2	3.98323	0.99997	0.00012	-0.48671	-0.00001	0.00005
5.4	4.18322	0.99999	0.00005	-0.48671	0.00000	0.00002
5.6	4.38322	1.00000	0.00002	-0.48671	0.00000	0.00001
5.8	4.58322	1.00000	0.00001	-0.48671	0.00000	0.00000

 $\beta = -.08$ 

$\eta$	$f$	$f'$	$f''$	$fS_0\eta$	$S$	$S'$
0.	0.00000	0.00000	0.38985	0.00000	-0.40000	0.18096
0.2	0.00786	0.07874	0.39950	-0.07838	-0.36381	0.18086
0.4	0.03170	0.15974	0.40823	-0.14553	-0.32749	0.18020
0.6	0.07186	0.24204	0.41447	-0.20747	-0.29181	0.17859
0.8	0.12850	0.32525	0.41657	-0.26229	-0.25645	0.17490
1.0	0.20195	0.40831	0.41297	-0.31811	-0.22200	0.16926
1.2	0.29181	0.48997	0.40241	-0.35110	-0.18891	0.16115
1.4	0.39775	0.56876	0.38412	-0.38580	-0.15771	0.15045
1.6	0.51902	0.64310	0.35881	-0.41442	-0.12890	0.13750
1.8	0.65459	0.71149	0.32462	-0.43755	-0.10292	0.12213
2.0	0.80313	0.77265	0.28210	-0.45580	-0.08014	0.10558
2.2	0.96311	0.82570	0.24485	-0.46903	-0.06073	0.08850
2.4	1.13265	0.87872	0.20119	-0.48837	-0.04471	0.07178
2.6	1.31863	0.93029	0.16001	-0.49793	-0.03194	0.05623
2.8	1.49484	0.98448	0.12268	-0.49329	-0.02210	0.04240
3.0	1.66396	0.95568	0.09040	-0.49694	-0.01400	0.03001
3.2	1.87472	0.97183	0.06411	-0.49935	-0.00950	0.02165
3.4	2.07206	0.98172	0.04369	-0.50080	-0.00599	0.01499
3.6	2.26917	0.98687	0.02861	-0.50183	-0.00362	0.00945
3.8	2.46744	0.99346	0.01800	-0.50239	-0.00211	0.00580
4.0	2.66644	0.99630	0.01007	-0.50271	-0.00118	0.00352
4.2	2.86580	0.99790	0.00631	-0.50280	-0.00064	0.00203
4.4	3.06550	0.99894	0.00352	-0.50278	-0.00033	0.00112
4.6	3.26543	0.99946	0.00188	-0.50263	-0.00017	0.00059
4.8	3.46535	0.99974	0.00097	-0.50236	-0.00008	0.00030
5.0	3.66531	0.99988	0.00046	-0.50207	-0.00004	0.00015
5.2	3.86529	0.99994	0.00023	-0.50207	-0.00002	0.00007
5.4	4.06529	0.99998	0.00010	-0.50208	-0.00001	0.00003
5.6	4.26528	0.99999	0.00005	-0.50208	0.00000	0.00001
5.8	4.46528	1.00000	0.00002	-0.50208	0.00000	0.00000
6.0	4.66528	1.00000	0.00001	-0.50208	0.00000	0.00000



$$S(0) = -4$$

$$\beta = -.16$$

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.28730	0.00000	-0.40000	0.17069	
0.2	0.20388	0.05945	0.30709	-0.07659	-0.36587	0.17062	
0.4	0.02404	0.12204	0.32677	-0.14635	-0.33178	0.17015	
0.6	0.05527	0.19008	0.34530	-0.20931	-0.29786	0.16884	
0.8	0.10031	0.26079	0.36124	-0.26552	-0.26432	0.16678	
1.0	0.15978	0.33430	0.37299	-0.31908	-0.23146	0.16205	
1.2	0.23415	0.40960	0.37891	-0.35817	-0.19964	0.15583	
1.4	0.32365	0.48537	0.37755	-0.38504	-0.16928	0.14741	
1.6	0.42822	0.56006	0.36786	-0.42601	-0.14082	0.13677	
1.8	0.54748	0.63194	0.34945	-0.45152	-0.11471	0.12408	
2.0	0.68070	0.69920	0.32273	-0.47207	-0.09130	0.10977	
2.2	0.82879	0.76054	0.28902	-0.48824	-0.07087	0.09443	
2.4	0.98443	0.81456	0.25039	-0.50063	-0.05355	0.07880	
2.6	1.15208	0.86056	0.20943	-0.50987	-0.03932	0.06365	
2.8	1.32811	0.89936	0.16684	-0.51655	-0.02801	0.04967	
3.0	1.51090	0.92828	0.13101	-0.52125	-0.01934	0.03740	
3.2	1.69895	0.95107	0.09775	-0.52444	-0.01292	0.02713	
3.4	1.89092	0.96776	0.07007	-0.52634	-0.00834	0.01895	
3.6	2.08572	0.97949	0.04824	-0.52787	-0.00521	0.01273	
3.8	2.28246	0.98742	0.03169	-0.52869	-0.00314	0.00823	
4.0	2.48050	0.99254	0.02023	-0.52917	-0.00182	0.00511	
4.2	2.67936	0.99576	0.01255	-0.52945	-0.00102	0.00305	
4.4	2.87872	0.99767	0.00720	-0.52960	-0.00055	0.00175	
4.6	3.07837	0.99877	0.00404	-0.52969	-0.00029	0.00096	
4.8	3.27819	0.99937	0.00218	-0.52973	-0.00014	0.00051	
5.0	3.47810	0.99969	0.00112	-0.52975	-0.00007	0.00024	
5.2	3.67804	0.99986	0.00056	-0.52976	-0.00003	0.00013	
5.4	3.87804	0.99993	0.00027	-0.52976	-0.00001	0.00006	
5.6	4.07803	0.99997	0.00012	-0.52976	-0.00001	0.00003	
5.8	4.27803	0.99999	0.00005	-0.52976	0.00000	0.00001	
6.0	4.47803	1.00000	0.00002	-0.52976	0.00000	0.00000	
6.2	4.67803	1.00000	0.00001	-0.52976	0.00000	0.00000	

$$\beta = -.20$$

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.21842	0.00000	-0.40000	0.16258	
0.2	0.00453	0.04612	0.24297	-0.07675	-0.36749	0.16253	
0.4	0.01678	0.09723	0.26813	-0.14700	-0.33501	0.16218	
0.6	0.04374	0.15336	0.29305	-0.21076	-0.30264	0.16119	
0.8	0.08045	0.21435	0.31649	-0.26608	-0.27040	0.15924	
1.0	0.12979	0.27977	0.33702	-0.31903	-0.23905	0.15594	
1.2	0.19260	0.34886	0.35304	-0.36375	-0.20832	0.15105	
1.4	0.26951	0.42057	0.36288	-0.40244	-0.17876	0.14426	
1.6	0.36091	0.49350	0.36502	-0.43536	-0.15075	0.13540	
1.8	0.46689	0.56599	0.35837	-0.46287	-0.12478	0.12474	
2.0	0.58736	0.63623	0.34240	-0.48548	-0.10097	0.11229	
2.2	0.72110	0.70239	0.31776	-0.50344	-0.07987	0.09854	
2.4	0.86773	0.76283	0.28555	-0.51753	-0.06160	0.08408	
2.6	1.02577	0.81625	0.24799	-0.52822	-0.04624	0.06959	
2.8	1.19371	0.86185	0.20774	-0.53622	-0.03372	0.05575	
3.0	1.36997	0.89936	0.16759	-0.54193	-0.02386	0.04315	
3.2	1.55293	0.92906	0.13003	-0.54592	-0.01635	0.03221	
3.4	1.74112	0.95167	0.09695	-0.54861	-0.01084	0.02318	
3.6	1.93320	0.96821	0.06901	-0.55036	-0.00695	0.01605	
3.8	2.12807	0.97982	0.04770	-0.55147	-0.00431	0.01069	
4.0	2.32487	0.98765	0.03145	-0.55215	-0.00257	0.00665	
4.2	2.52295	0.99272	0.01990	-0.55254	-0.00140	0.00422	
4.4	2.72184	0.99586	0.01208	-0.55277	-0.00083	0.00250	
4.6	2.92121	0.99774	0.00704	-0.55289	-0.00044	0.00142	
4.8	3.12080	0.99881	0.00393	-0.55296	-0.00023	0.00078	
5.0	3.32070	0.99940	0.00211	-0.55299	-0.00011	0.00041	
5.2	3.52062	0.99971	0.00109	-0.55301	-0.00005	0.00021	
5.4	3.72058	0.99986	0.00054	-0.55301	-0.00003	0.00010	
5.6	3.92056	0.99994	0.00025	-0.55302	-0.00001	0.00005	
5.8	4.12055	0.99997	0.00012	-0.55302	0.00000	0.00002	
6.0	4.32054	0.99999	0.00005	-0.55302	0.00000	0.00001	
6.2	4.52054	1.00000	0.00002	-0.55302	0.00000	0.00000	
6.4	4.72054	1.00000	0.00001	-0.55302	0.00000	0.00000	

$S(0) = -.4$

$\beta = -.24756(S)$

$\beta = -20(R)$

q	f	f'	f''	$f_{3q}$	S	S'
0.	0.00000	0.00000	0.00000	0.00000	-0.40000	0.12500
0.2	0.00020	0.00301	0.03033	-0.07750	-0.37498	0.12500
0.4	0.00167	0.01271	0.06100	-0.14999	-0.34996	0.12500
0.6	0.00551	0.02704	0.09651	-0.21748	-0.32496	0.12499
0.8	0.01320	0.05013	0.12037	-0.27990	-0.29990	0.12477
1.0	0.02607	0.07024	0.14200	-0.33740	-0.27507	0.12429
1.2	0.04330	0.11590	0.19764	-0.39001	-0.25020	0.12342
1.4	0.07200	0.15027	0.23193	-0.43761	-0.22573	0.12199
1.6	0.10911	0.20707	0.26471	-0.48033	-0.20154	0.11982
1.8	0.15621	0.26396	0.29647	-0.51826	-0.17787	0.11670
2.0	0.21507	0.32554	0.32025	-0.55150	-0.15493	0.11247
2.2	0.28673	0.39160	0.33973	-0.58020	-0.13297	0.10699
2.4	0.37195	0.46091	0.35142	-0.60470	-0.11223	0.10019
2.6	0.47119	0.53161	0.35392	-0.62520	-0.09290	0.09211
2.8	0.58450	0.60101	0.34630	-0.64210	-0.07546	0.08290
3.0	0.71175	0.66949	0.32076	-0.65560	-0.05907	0.07204
3.2	0.85206	0.73270	0.30197	-0.66610	-0.04435	0.06231
3.4	1.00642	0.79079	0.27800	-0.67420	-0.03145	0.05176
3.6	1.18740	0.83954	0.24910	-0.68030	-0.02062	0.04166
3.8	1.39070	0.88131	0.19950	-0.68460	-0.01221	0.03243
4.0	1.61047	0.91506	0.14024	-0.68771	-0.001257	0.02437
4.2	1.85222	0.94125	0.11342	-0.68970	-0.00030	0.01765
4.4	2.10952	0.96077	0.08211	-0.69115	-0.00042	0.01232
4.6	2.38016	0.97473	0.05700	-0.69201	-0.00030	0.00827
4.8	2.65912	0.98491	0.03804	-0.69234	-0.00023	0.00534
5.0	2.95206	0.99061	0.02499	-0.69260	-0.00016	0.00331
5.2	3.25122	0.99459	0.01542	-0.69280	-0.00006	0.00190
5.4	3.55604	0.99700	0.00913	-0.69314	-0.00006	0.00113
5.6	3.87095	0.99840	0.00510	-0.69319	-0.000019	0.00062
5.8	4.19711	0.99910	0.00282	-0.69322	-0.000009	0.00033
6.0	4.53450	0.99959	0.00147	-0.69323	-0.000003	0.00017
6.2	4.87954	0.99981	0.00074	-0.69324	-0.000002	0.00008
6.4	5.23751	0.99991	0.00036	-0.69324	-0.000001	0.00004
6.6	5.60950	0.99996	0.00016	-0.69324	0.000000	0.00002
6.8	6.00000	0.99998	0.00007	-0.69324	0.000000	0.00001
7.0	6.40000	0.99999	0.00003	-0.69324	0.000000	0.00000
7.2	6.80000	1.00000	0.00001	-0.69324	0.000000	0.00000
7.4	7.20000	1.00000	0.00000	-0.69324	0.000000	0.00000

q	f	f'	f''	$f_{3q}$	S	S'
0.	0.00000	0.00000	-0.10000	0.00000	-0.40000	0.00707
0.2	-0.00100	-0.01707	-0.07012	-0.07025	-0.30240	0.00703
0.4	-0.00674	-0.03040	-0.05114	-0.15299	-0.36494	0.00770
0.6	-0.01367	-0.03000	-0.02551	-0.22422	-0.34739	0.00700
0.8	-0.02162	-0.04050	0.00004	-0.29194	-0.32979	0.00019
1.0	-0.02954	-0.03769	0.02002	-0.35613	-0.31211	0.00064
1.2	-0.03633	-0.02929	0.05613	-0.41570	-0.29432	0.00023
1.4	-0.04007	-0.01517	0.09524	-0.47300	-0.27641	0.00092
1.6	-0.04200	0.00400	0.11530	-0.52733	-0.25033	0.00060
1.8	-0.03051	0.03105	0.14640	-0.57710	-0.24014	0.00142
2.0	-0.02916	0.06351	0.17024	-0.62330	-0.22170	0.00205
2.2	-0.01260	0.10230	0.21020	-0.66500	-0.20333	0.00245
2.4	0.01221	0.14760	0.24103	-0.70271	-0.18640	0.00247
2.6	0.04677	0.19004	0.27222	-0.73003	-0.16630	0.00194
2.8	0.08221	0.23431	0.29000	-0.74727	-0.14011	0.00040
3.0	0.14004	0.31074	0.32352	-0.75000	-0.11017	0.00094
3.2	0.21000	0.30334	0.34145	-0.62337	-0.11270	0.00034
3.4	0.30007	0.49403	0.35207	-0.04424	-0.00011	0.00101
3.6	0.40200	0.52550	0.35401	-0.06100	-0.00004	0.00550
3.8	0.51617	0.59570	0.34643	-0.07650	-0.00090	0.00001
4.0	0.64015	0.66351	0.32919	-0.08037	-0.00203	0.00141
4.2	0.77020	0.72600	0.30310	-0.07770	-0.00163	0.00330
4.4	0.93051	0.78427	0.26003	-0.06906	-0.00163	0.00403
4.6	1.09251	0.83450	0.23163	-0.01094	-0.00347	0.00671
4.8	1.26370	0.87600	0.19100	-0.01455	-0.01601	0.00900
5.0	1.44273	0.91132	0.15204	-0.01740	-0.01102	0.00213
5.2	1.62700	0.93023	0.11600	-0.01037	-0.00709	0.01620
5.4	1.81757	0.95044	0.08001	-0.02007	-0.00523	0.01154
5.6	2.01000	0.97301	0.04000	-0.02151	-0.00331	0.00707
5.8	2.20440	0.99310	0.01100	-0.02204	-0.00202	0.00510
6.0	2.40102	0.99900	0.02670	-0.02235	-0.00110	0.00325
6.2	2.60224	0.99400	0.01604	-0.02254	-0.00060	0.00107
6.4	2.80133	0.99667	0.00995	-0.02204	-0.00037	0.00115
6.6	3.00003	0.99821	0.00571	-0.02200	-0.00020	0.00064
6.8	3.20057	0.99907	0.00316	-0.02272	-0.00010	0.00035
7.0	3.40044	0.99933	0.00160	-0.02274	-0.00005	0.00010
7.2	3.60037	0.99970	0.00004	-0.02274	-0.00002	0.00000
7.4	3.80034	0.99990	0.00001	-0.02275	-0.00001	0.00000
7.6	4.00032	0.99995	0.00010	-0.02275	0.00000	0.00002
7.8	4.20032	0.99990	0.00009	-0.02275	0.00000	0.00001
8.0	4.40032	0.99990	0.00004	-0.02275	0.00000	0.00000
8.2	4.60031	1.00000	0.00002	-0.02275	0.00000	0.00000
8.4	4.80031	1.00000	0.00001	-0.02275	0.00000	0.00000

S(0) = -4

$\beta = -.16(R)$

$\beta = -.08(R)$

$\eta$	$f$	$f'$	$f''$	$f/3d_\eta$	$S$	$S'$
0.	0.0000	0.0000	-0.1196	0.0000	-0.4000	0.0471
0.2	-0.0226	-0.0220	-0.1002	-0.0706	-0.3857	0.0471
0.4	-0.0454	-0.0405	-0.0805	-0.1344	-0.3714	0.0470
0.6	-0.0680	-0.0542	-0.0605	-0.2279	-0.3569	0.0470
0.8	-0.0906	-0.0642	-0.0401	-0.2950	-0.3418	0.0470
1.0	-0.0434	-0.0704	-0.0194	-0.3630	-0.3259	0.0462
1.2	-0.0577	-0.0720	0.0019	-0.4313	-0.3109	0.0459
1.4	-0.0720	-0.0694	0.0234	-0.4992	-0.2952	0.0459
1.6	-0.0852	-0.0629	0.0460	-0.5553	-0.2796	0.0459
1.8	-0.0964	-0.0565	0.0702	-0.6102	-0.2765	0.0722
2.0	-0.1051	-0.0482	0.0952	-0.6641	-0.2626	0.0730
2.2	-0.1091	-0.0122	0.1219	-0.7150	-0.2471	0.0729
2.4	-0.1075	0.0140	0.1492	-0.7630	-0.2314	0.0707
2.6	-0.1031	0.0474	0.1771	-0.8078	-0.2158	0.0704
2.8	-0.0964	0.0806	0.2044	-0.8495	-0.2000	0.0619
3.0	-0.0888	0.1105	0.2345	-0.8881	-0.1843	0.0614
3.2	-0.0797	0.1399	0.2674	-0.9232	-0.1679	0.0623
3.4	-0.0694	0.2343	0.2923	-0.9520	-0.1512	0.0620
3.6	-0.0563	0.2908	0.3132	-0.9630	-0.1349	0.0622
3.8	-0.1221	0.3657	0.3230	-1.0010	-0.1186	0.0607
4.0	0.2007	0.4202	0.3444	-1.0310	-0.1026	0.0702
4.2	0.2936	0.4904	0.3490	-1.0529	-0.0874	0.0745
4.4	0.4020	0.5677	0.3462	-1.0661	-0.0729	0.0696
4.6	0.5201	0.6397	0.3315	-1.0795	-0.0566	0.0638
4.8	0.6341	0.7044	0.3110	-1.0927	-0.0476	0.0547
5.0	0.8004	0.7500	0.2816	-1.0974	-0.0371	0.0467
5.2	0.9573	0.8127	0.2452	-1.0929	-0.0221	0.0409
5.4	1.1256	0.8527	0.2081	-1.1013	-0.0201	0.0321
5.6	1.3062	0.8600	0.1620	-1.1137	-0.0149	0.0266
5.8	1.4879	0.8212	0.1248	-1.1161	-0.0103	0.0197
6.0	1.6706	0.7492	0.0967	-1.1178	-0.0063	0.0149
6.2	1.8225	0.6634	0.0720	-1.1191	-0.0040	0.0101
6.4	2.0461	0.5704	0.0490	-1.1193	-0.0026	0.0063
6.6	2.2538	0.4669	0.0337	-1.1201	-0.0017	0.0044
6.8	2.4512	0.3927	0.0212	-1.1204	-0.0010	0.0027
7.0	2.6507	0.3445	0.0136	-1.1200	-0.0004	0.0017
7.2	2.8493	0.3174	0.0076	-1.1200	-0.0001	0.0006
7.4	3.0481	0.3006	0.0034	-1.1203	-0.0001	0.0003
7.6	3.2481	0.2931	0.0023	-1.1205	-0.0000	0.0002
7.8	3.4482	0.2956	0.0013	-1.1205	-0.0000	0.0001
8.0	3.6487	0.2994	0.0001	-1.1207	-0.0000	0.0000
8.2	3.8485	0.2993	0.0000	-1.1207	-0.0000	0.0000
8.4	4.0484	0.2997	0.0001	-1.1207	0.0000	0.0000
8.6	4.2483	0.2999	0.0000	-1.1207	0.0000	0.0000
8.8	4.4483	0.2999	0.0000	-1.1207	0.0000	0.0000
9.0	4.6483	1.0000	0.0000	-1.1207	0.0000	0.0000
9.2	4.8483	1.0000	0.0000	-1.1207	0.0000	0.0000

$\eta$	$f$	$f'$	$f''$	$f/3d_\eta$	$S$	$S'$
0.	0.0000	0.0000	-0.1042	0.0000	-0.4000	0.0302
0.2	-0.0202	-0.0199	-0.0943	-0.0700	-0.3834	0.0302
0.4	-0.0403	-0.0378	-0.0849	-0.1370	-0.3670	0.0302
0.6	-0.0610	-0.0530	-0.0753	-0.2046	-0.3504	0.0302
0.8	-0.0825	-0.0680	-0.0658	-0.2722	-0.3337	0.0304
1.0	-0.0441	-0.0821	-0.0561	-0.3406	-0.3165	0.0307
1.2	-0.0612	-0.0953	-0.0463	-0.4077	-0.2991	0.0310
1.4	-0.0801	-0.0994	-0.0373	-0.4752	-0.2817	0.0314
1.6	-0.1006	-0.1045	-0.0275	-0.5424	-0.2640	0.0319
1.8	-0.1225	-0.1103	-0.0180	-0.6095	-0.2464	0.0326
2.0	-0.1445	-0.1124	-0.0080	-0.6761	-0.2287	0.0335
2.2	-0.1671	-0.1132	0.0023	-0.7424	-0.2107	0.0341
2.4	-0.1896	-0.1166	0.0120	-0.8081	-0.1920	0.0347
2.6	-0.2116	-0.1070	0.0244	-0.8731	-0.1723	0.0349
2.8	-0.2329	-0.1015	0.0383	-0.9373	-0.1516	0.0345
3.0	-0.2521	-0.0931	0.0490	-1.0007	-0.1299	0.0411
3.2	-0.2694	-0.0812	0.0601	-1.1186	-0.1064	0.0430
3.4	-0.2847	-0.0672	0.0710	-1.1793	-0.0811	0.0457
3.6	-0.2969	-0.0492	0.0826	-1.2313	-0.0540	0.0491
3.8	-0.3045	-0.0290	0.1130	-1.2826	-0.0249	0.0512
4.0	-0.3070	-0.0040	0.1325	-1.3373	-0.2346	0.0540
4.2	-0.3050	0.0242	0.1511	-1.3866	-0.2414	0.0525
4.4	-0.2979	0.0573	0.1700	-1.4305	-0.2301	0.0510
4.6	-0.2822	0.0900	0.1952	-1.4701	-0.2140	0.0499
4.8	-0.2594	0.1172	0.2232	-1.5276	-0.2052	0.0495
5.0	-0.2273	0.1437	0.2474	-1.5681	-0.1907	0.0472
5.2	-0.1854	0.2361	0.2703	-1.5966	-0.1745	0.0450
5.4	-0.1326	0.2922	0.2912	-1.6304	-0.1594	0.0426
5.6	-0.0810	0.3260	0.3091	-1.6683	-0.1461	0.0407
5.8	0.0063	0.4155	0.3230	-1.6874	-0.1276	0.0396
6.0	0.0934	0.4014	0.3303	-1.7117	-0.1115	0.0452
6.2	0.2012	0.3470	0.3368	-1.7321	-0.0959	0.0470
6.4	0.3173	0.1315	0.3220	-1.7476	-0.0807	0.0431
6.6	0.4435	0.6729	0.3071	-1.7644	-0.0663	0.0470
6.8	0.5871	0.7350	0.2860	-1.7764	-0.0530	0.0412
7.0	0.7401	0.7895	0.2597	-1.7865	-0.0419	0.0366
7.2	0.9029	0.8370	0.2194	-1.7947	-0.0326	0.0454
7.4	1.0744	0.8771	0.1891	-1.7996	-0.0257	0.0373
7.6	1.2532	0.9130	0.1627	-1.8016	-0.0170	0.0292
7.8	1.4301	0.9367	0.1151	-1.8000	-0.0100	0.0226
8.0	1.6277	0.9570	0.0599	-1.8000	-0.0016	0.0166
8.2	1.8264	0.9719	0.0176	-1.8001	-0.0054	0.0110
8.4	2.0153	0.9815	0.0422	-1.8162	-0.0037	0.0084
8.6	2.2129	0.9876	0.0226	-1.8101	-0.0026	0.0052
8.8	2.4118	0.9933	0.0100	-1.8113	-0.0012	0.0032
9.0	2.6101	0.9961	0.0101	-1.8111	-0.0000	0.0020
9.2	2.8057	0.9970	0.0064	-1.8112	-0.0000	0.0017
9.4	3.0026	0.9980	0.0035	-1.8117	-0.0000	0.0005
9.6	3.2000	0.9983	0.0017	-1.8116	-0.0000	0.0003
9.8	3.4001	0.9972	0.0010	-1.8112	-0.0000	0.0001
10.0	3.6007	0.9967	0.0001	-1.8112	-0.0000	0.0000
10.2	3.8005	0.9954	0.0002	-1.8112	-0.0001	0.0000
10.4	4.0004	0.9937	0.0001	-1.8112	0.0000	0.0000
10.6	4.2004	0.9909	0.0000	-1.8112	0.0000	0.0001
10.8	4.4004	1.0000	0.0000	-1.8112	0.0000	0.0000
11.0	4.6004	1.0000	0.0000	-1.8112	0.0000	0.0000
11.2	4.8004	1.0000	0.0000	-1.8112	0.0000	0.0000

$$S(0) = -.6$$

 $\beta = 20.00$ 
 $\beta = 10.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	2.97574	0.00000	-0.60000	0.38133
0.025	0.00091	0.07108	2.77421	-0.01488	-0.59047	0.38133
0.050	0.00355	0.13871	2.57269	-0.02952	-0.58093	0.38131
0.075	0.00760	0.20055	2.37505	-0.04393	-0.57140	0.38128
0.100	0.01354	0.25752	2.18423	-0.05809	-0.56187	0.38116
0.125	0.02044	0.30983	2.00235	-0.07202	-0.55234	0.38099
0.150	0.02809	0.35773	1.83088	-0.08571	-0.54282	0.38076
0.175	0.03649	0.40147	1.67070	-0.09914	-0.53331	0.38044
0.200	0.04563	0.44134	1.52223	-0.11238	-0.52380	0.38002
0.225	0.05553	0.47760	1.38553	-0.12555	-0.51431	0.37950
0.250	0.07209	0.51073	1.26041	-0.13869	-0.50483	0.37897
0.275	0.08404	0.54079	1.14645	-0.15090	-0.49534	0.37842
0.300	0.09991	0.56814	1.04310	-0.16284	-0.48582	0.37774
0.325	0.11443	0.59303	0.94972	-0.17440	-0.47630	0.37694
0.350	0.12954	0.61570	0.86561	-0.18569	-0.46671	0.37599
0.500	0.23010	0.71644	0.51649	-0.25254	-0.41152	0.36518
0.750	0.42211	0.80977	0.27462	-0.34429	-0.32348	0.33675
1.000	0.63202	0.86595	0.18605	-0.41504	-0.24425	0.29526
1.250	0.85381	0.90637	0.13961	-0.46738	-0.17856	0.24521
1.500	1.08437	0.93669	0.10414	-0.50441	-0.12184	0.19292
1.750	1.32148	0.95095	0.07489	-0.52930	-0.08007	0.14254
2.000	1.56330	0.95460	0.05125	-0.54542	-0.05000	0.09939
2.250	1.80835	0.94803	0.03322	-0.55519	-0.02962	0.06522
2.500	2.05590	0.93164	0.02034	-0.56084	-0.01662	0.04024
2.750	2.30395	0.90557	0.01174	-0.56393	-0.00882	0.02333
3.000	2.55315	0.89978	0.00638	-0.56553	-0.00443	0.01271
3.250	2.80275	0.90895	0.00326	-0.56672	-0.00210	0.00691
3.500	3.05257	0.90993	0.00157	-0.56748	-0.00094	0.00313
3.750	3.30249	0.90980	0.00071	-0.56784	-0.00040	0.00141
4.000	3.55246	0.90992	0.00030	-0.56790	-0.00016	0.00060
4.250	3.80245	0.90997	0.00012	-0.56793	-0.00006	0.00024
4.500	4.05244	0.90999	0.00004	-0.56794	-0.00002	0.00009
4.750	4.30244	1.00000	0.00002	-0.56794	-0.00001	0.00003
5.000	4.55244	1.00000	0.00001	-0.56794	0.00000	0.00001
5.250	4.80244	1.00000	0.00000	-0.56794	0.00000	0.00000
5.500	5.05244	1.00000	0.00000	-0.56794	0.00000	0.00000
5.750	5.30244	1.00000	0.00000	-0.56794	0.00000	0.00000
6.000	5.55244	1.00000	0.00000	-0.56794	0.00000	0.00000
6.250	5.80244	1.00000	0.00000	-0.56794	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	2.19794	0.00000	-0.60000	0.36942
0.025	0.00048	0.03349	2.09704	-0.01488	-0.59074	0.36942
0.050	0.00164	0.10404	1.99513	-0.02954	-0.58153	0.36940
0.075	0.00350	0.15345	1.89239	-0.04394	-0.57229	0.36936
0.100	0.01031	0.19952	1.78979	-0.05815	-0.56306	0.36929
0.125	0.01905	0.24310	1.68714	-0.07211	-0.55383	0.36917
0.150	0.02245	0.28425	1.58450	-0.08584	-0.54460	0.36899
0.175	0.03005	0.32304	1.50220	-0.09934	-0.53538	0.36875
0.200	0.03850	0.35954	1.41962	-0.11261	-0.52617	0.36844
0.225	0.04800	0.39386	1.33627	-0.12565	-0.51696	0.36804
0.250	0.05826	0.42609	1.24873	-0.13844	-0.50777	0.36755
0.275	0.06929	0.45633	1.17131	-0.15104	-0.49850	0.36697
0.300	0.08106	0.48469	1.09800	-0.16339	-0.48922	0.36620
0.325	0.09351	0.51127	1.02902	-0.17551	-0.48027	0.36540
0.350	0.10661	0.53617	0.96408	-0.18740	-0.47144	0.36457
0.500	0.19660	0.65592	0.65405	-0.25400	-0.41701	0.35645
0.750	0.37741	0.77862	0.36437	-0.34733	-0.33067	0.33108
1.000	0.58177	0.85672	0.22869	-0.41909	-0.25211	0.29090
1.250	0.80076	0.89622	0.15775	-0.47627	-0.18016	0.24709
1.500	1.02973	0.93171	0.11289	-0.51389	-0.12049	0.19722
1.750	1.26502	0.95564	0.08006	-0.53957	-0.08042	0.14889
2.000	1.50695	0.97237	0.05484	-0.55677	-0.05390	0.10469
2.250	1.75154	0.98358	0.03502	-0.56738	-0.03237	0.06967
2.500	1.99840	0.99072	0.02216	-0.57359	-0.01839	0.04360
2.750	2.24647	0.99583	0.01295	-0.57784	-0.00989	0.02569
3.000	2.49576	0.99748	0.00713	-0.57884	-0.00509	0.01418
3.250	2.74531	0.99879	0.00369	-0.57974	-0.00242	0.00736
3.500	2.99510	0.99945	0.00180	-0.58016	-0.00110	0.00359
3.750	3.24501	0.99977	0.00082	-0.58034	-0.00047	0.00165
4.000	3.49497	0.99991	0.00035	-0.58042	-0.00019	0.00071
4.250	3.74496	0.99996	0.00014	-0.58045	-0.00007	0.00029
4.500	3.99495	0.99999	0.00005	-0.58044	-0.00003	0.00011
4.750	4.24495	1.00000	0.00002	-0.58044	-0.00001	0.00004
5.000	4.49495	1.00000	0.00001	-0.58047	0.00000	0.00001
5.250	4.74495	1.00000	0.00000	-0.58047	0.00000	0.00000
5.500	4.99495	1.00000	0.00000	-0.58047	0.00000	0.00000
5.750	5.24495	1.00000	0.00000	-0.58047	0.00000	0.00000
6.000	5.49495	1.00000	0.00000	-0.58047	0.00000	0.00000
6.250	5.74495	1.00000	0.00000	-0.58047	0.00000	0.00000

S(0) = -0.6

$\beta = 2.00$

$\beta = 1.00$

q	f	f'	f''	fS <sub>q</sub>	S	S'
0.	0.00000	0.00000	1.14560	0.00000	-0.60000	0.33600
0.025	0.00036	0.00036	1.12540	-0.01409	-0.59160	0.33607
0.050	0.00142	0.00142	1.10484	-0.02950	-0.58320	0.33607
0.075	0.00310	0.00310	1.08390	-0.04609	-0.57479	0.33605
0.100	0.00559	0.11044	1.06264	-0.06432	-0.56639	0.33601
0.125	0.00860	0.13677	1.04155	-0.07237	-0.55799	0.33595
0.150	0.01243	0.16294	1.02010	-0.08022	-0.54960	0.33586
0.175	0.01681	0.18777	0.99854	-0.08985	-0.54120	0.33574
0.200	0.02161	0.21247	0.97692	-0.11320	-0.53281	0.33550
0.225	0.02743	0.23662	0.95520	-0.12649	-0.52442	0.33537
0.250	0.03364	0.26023	0.93366	-0.13950	-0.51604	0.33512
0.275	0.04043	0.28330	0.91210	-0.15230	-0.50767	0.33481
0.300	0.04780	0.30584	0.89062	-0.16488	-0.49930	0.33444
0.325	0.05572	0.32781	0.86926	-0.17724	-0.49095	0.33401
0.350	0.06418	0.34930	0.84805	-0.18943	-0.48260	0.33351
0.500	0.12565	0.46716	0.72516	-0.25000	-0.43209	0.32087
0.750	0.26314	0.62513	0.54300	-0.35610	-0.35237	0.31352
1.000	0.43400	0.74205	0.39729	-0.43470	-0.27782	0.28751
1.250	0.63146	0.82654	0.28381	-0.49532	-0.20944	0.25174
1.500	0.84601	0.88629	0.19837	-0.54624	-0.15171	0.20939
1.750	1.07307	0.92759	0.13531	-0.57209	-0.10495	0.16674
2.000	1.30868	0.95339	0.08965	-0.59363	-0.06915	0.12234
2.250	1.54996	0.97353	0.05730	-0.60750	-0.04330	0.08539
2.500	1.79400	0.98493	0.03520	-0.61597	-0.02573	0.05465
2.750	2.04205	0.99179	0.02073	-0.62000	-0.01440	0.03400
3.000	2.29654	0.99574	0.01160	-0.62350	-0.00771	0.02020
3.250	2.55977	0.99790	0.00616	-0.62600	-0.00380	0.01110
3.500	2.78946	0.99902	0.00309	-0.62767	-0.00189	0.00570
3.750	3.03023	0.99954	0.00147	-0.62890	-0.00083	0.00275
4.000	3.28916	0.99982	0.00066	-0.62973	-0.00035	0.00125
4.250	3.53913	0.99993	0.00028	-0.63010	-0.00014	0.00053
4.500	3.78912	0.99997	0.00011	-0.63021	-0.00009	0.00021
4.750	4.03911	0.99999	0.00004	-0.63022	-0.00002	0.00000
5.000	4.28911	1.00000	0.00001	-0.63022	-0.00001	0.00000
5.250	4.53911	1.00000	0.00000	-0.63022	0.00000	0.00001
5.500	4.78911	1.00000	0.00000	-0.63023	0.00000	0.00000
5.750	5.03911	1.00000	0.00000	-0.63023	0.00000	0.00000
6.000	5.28911	1.00000	0.00000	-0.63023	0.00000	0.00000
6.250	5.53911	1.00000	0.00000	-0.63023	0.00000	0.00000

q	f	f'	f''	fS <sub>q</sub>	S	S'
0.	0.00000	0.00000	0.09627	0.00000	-0.60000	0.32140
0.025	0.00020	0.02220	0.08617	-0.01409	-0.59197	0.32140
0.050	0.00111	0.04431	0.07800	-0.02950	-0.58393	0.32130
0.075	0.00249	0.06667	0.06542	-0.04610	-0.57560	0.32130
0.100	0.00441	0.08750	0.05479	-0.06432	-0.56704	0.32135
0.125	0.00687	0.10601	0.04481	-0.07237	-0.55903	0.32130
0.150	0.00985	0.12270	0.03309	-0.08022	-0.55100	0.32124
0.175	0.01336	0.15047	0.02204	-0.08890	-0.54377	0.32115
0.200	0.01737	0.17800	0.01087	-0.11357	-0.53574	0.32102
0.225	0.02190	0.19101	0.79950	-0.12607	-0.52772	0.32084
0.250	0.02692	0.21004	0.70020	-0.13950	-0.51970	0.32067
0.275	0.03244	0.23042	0.77674	-0.15230	-0.51160	0.32043
0.300	0.03844	0.24909	0.76519	-0.16554	-0.50360	0.32015
0.325	0.04492	0.26660	0.75377	-0.17893	-0.49560	0.31982
0.350	0.05107	0.28737	0.74109	-0.19033	-0.48760	0.31943
0.500	0.10306	0.39335	0.67104	-0.25000	-0.44601	0.31500
0.750	0.22113	0.54635	0.55352	-0.30610	-0.36242	0.30350
1.000	0.37304	0.67063	0.44216	-0.44146	-0.28000	0.28197
1.250	0.55423	0.76832	0.34150	-0.50520	-0.22222	0.25110
1.500	0.75604	0.84252	0.25440	-0.55329	-0.16409	0.21331
1.750	0.97303	0.89681	0.18247	-0.58000	-0.11507	0.17100
2.000	1.20310	0.93501	0.12552	-0.61209	-0.07000	0.13070
2.250	1.44030	0.96075	0.08260	-0.62701	-0.03000	0.09412
2.500	1.68271	0.97732	0.05100	-0.63702	-0.00000	0.06371
2.750	1.92943	0.98750	0.03000	-0.64370	-0.01750	0.04057
3.000	2.17611	0.99363	0.01757	-0.64701	-0.00000	0.02420
3.250	2.42402	0.99672	0.00905	-0.64870	-0.00000	0.01300
3.500	2.67434	0.99805	0.00400	-0.64967	-0.00000	0.00722
3.750	2.92460	0.99900	0.00231	-0.65000	-0.00112	0.00397
4.000	3.17396	0.99970	0.00105	-0.65000	-0.00000	0.00167
4.250	3.42301	0.99980	0.00045	-0.65000	-0.00000	0.00077
4.500	3.67300	0.99995	0.00010	-0.65000	-0.00000	0.00030
4.750	3.92300	0.99999	0.00007	-0.65001	-0.00001	0.00012
5.000	4.17300	0.99999	0.00002	-0.65001	-0.00001	0.00004
5.250	4.42300	1.00000	0.00001	-0.65001	0.00000	0.00001
5.500	4.67300	1.00000	0.00000	-0.65002	0.00000	0.00000
5.750	4.92300	1.00000	0.00000	-0.65002	0.00000	0.00000
6.000	5.17300	1.00000	0.00000	-0.65002	0.00000	0.00000
6.250	5.42300	1.00000	0.00000	-0.65002	0.00000	0.00000

$$S(0) = -.6$$

 $\beta = 0.50$ 
 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.72610	0.00000	-0.60000	0.30639	
0.025	0.00023	0.01007	0.72116	-0.01490	-0.59229	0.30039	
0.050	0.00090	0.03606	0.71590	-0.02961	-0.58450	0.30039	
0.075	0.00203	0.05308	0.71075	-0.04413	-0.57687	0.30037	
0.100	0.00360	0.07150	0.70541	-0.05866	-0.56916	0.30035	
0.125	0.00561	0.08916	0.69990	-0.07259	-0.56145	0.30032	
0.150	0.00805	0.10630	0.69445	-0.08653	-0.55375	0.30027	
0.175	0.01094	0.12300	0.68803	-0.10020	-0.54604	0.30019	
0.200	0.01425	0.14033	0.68111	-0.11303	-0.53834	0.30010	
0.225	0.01799	0.15804	0.67390	-0.12719	-0.53064	0.30007	
0.250	0.02215	0.17490	0.67139	-0.14036	-0.52294	0.30002	
0.275	0.02673	0.19161	0.66939	-0.15334	-0.51525	0.30003	
0.300	0.03173	0.20816	0.66930	-0.16613	-0.50756	0.30011	
0.325	0.03714	0.22457	0.65312	-0.17872	-0.49980	0.30014	
0.350	0.04295	0.24082	0.64605	-0.19112	-0.49220	0.30003	
0.500	0.06621	0.33493	0.60739	-0.26151	-0.44637	0.30393	
0.750	0.10019	0.47793	0.53549	-0.36369	-0.37140	0.29300	
1.000	0.13261	0.68219	0.45796	-0.44754	-0.30000	0.27500	
1.250	0.40764	0.70672	0.37831	-0.51420	-0.23426	0.24940	
1.500	0.67532	0.70150	0.30055	-0.56530	-0.17500	0.21575	
1.750	0.80182	0.65749	0.22871	-0.60295	-0.12676	0.17765	
2.000	1.10266	0.60663	0.16611	-0.62959	-0.08724	0.13066	
2.250	1.33394	0.54151	0.11405	-0.64736	-0.05721	0.10227	
2.500	1.57247	0.46504	0.07537	-0.65801	-0.03566	0.07113	
2.750	1.81576	0.38011	0.04606	-0.66578	-0.02110	0.04657	
3.000	2.06203	0.28924	0.02756	-0.66980	-0.01182	0.02866	
3.250	2.31095	0.19448	0.01532	-0.67200	-0.00627	0.01661	
3.500	2.55987	0.09731	0.00803	-0.67313	-0.00316	0.00904	
3.750	2.80860	0.00076	0.00397	-0.67369	-0.00149	0.00442	
4.000	3.05636	0.00000	0.00185	-0.67395	-0.00066	0.00222	
4.250	3.30329	0.00000	0.00081	-0.67406	-0.00020	0.00100	
4.500	3.55026	0.00000	0.00034	-0.67410	-0.00011	0.00042	
4.750	3.80024	0.00000	0.00013	-0.67412	-0.00004	0.00017	
5.000	4.05024	0.00000	0.00005	-0.67413	-0.00001	0.00006	
5.250	4.30024	1.00000	0.00002	-0.67413	0.00000	0.00002	
5.500	4.55024	1.00000	0.00001	-0.67413	0.00000	0.00001	
5.750	4.80024	1.00000	0.00000	-0.67413	0.00000	0.00000	
6.000	5.05024	1.00000	0.00000	-0.67413	0.00000	0.00000	
6.250	5.30024	1.00000	0.00000	-0.67413	0.00000	0.00000	

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	0.63340	0.00000	-0.60000	0.29991
0.025	0.00020	0.01306	0.63051	-0.01491	-0.59256	0.29991
0.050	0.00079	0.03153	0.62757	-0.02963	-0.58509	0.29990
0.075	0.00177	0.04710	0.62457	-0.04416	-0.57751	0.29989
0.100	0.00315	0.06275	0.62151	-0.05869	-0.57001	0.29987
0.125	0.00491	0.07825	0.61839	-0.07266	-0.56251	0.29984
0.150	0.00706	0.09367	0.61520	-0.08663	-0.55502	0.29980
0.175	0.00950	0.10901	0.61194	-0.10061	-0.54752	0.29974
0.200	0.01251	0.12427	0.60861	-0.11460	-0.54003	0.29964
0.225	0.01591	0.13944	0.60521	-0.12741	-0.53254	0.29955
0.250	0.01940	0.15453	0.60173	-0.14063	-0.52505	0.29942
0.275	0.02333	0.16953	0.59810	-0.15366	-0.51757	0.29926
0.300	0.02756	0.18444	0.59434	-0.16651	-0.51000	0.29906
0.325	0.03275	0.19925	0.59043	-0.17917	-0.50242	0.29884
0.350	0.03792	0.21390	0.58638	-0.19164	-0.49515	0.29857
0.500	0.07653	0.30023	0.56240	-0.26256	-0.45053	0.29067
0.750	0.16069	0.41503	0.51637	-0.36601	-0.37747	0.20733
1.000	0.29295	0.55600	0.45749	-0.45159	-0.31047	0.27140
1.250	0.44576	0.66318	0.39333	-0.52016	-0.24243	0.24750
1.500	0.62315	0.75311	0.32565	-0.57394	-0.18426	0.21673
1.750	0.82090	0.82602	0.25082	-0.61290	-0.13647	0.18160
2.000	1.03470	0.88291	0.19004	-0.64195	-0.09300	0.14957
2.250	1.26002	0.92417	0.13906	-0.66072	-0.06259	0.10770
2.500	1.49504	0.95335	0.09524	-0.67031	-0.03964	0.07020
2.750	1.73677	0.97270	0.06120	-0.67119	-0.02306	0.03999
3.000	1.98150	0.98402	0.03725	-0.66972	-0.01361	0.02204
3.250	2.22877	0.98800	0.02120	-0.66627	-0.00725	0.01093
3.500	2.47732	0.99001	0.01154	-0.66061	-0.00375	0.00531
3.750	2.72662	0.99011	0.00507	-0.65280	-0.00181	0.00246
4.000	2.97629	0.99916	0.00201	-0.64299	-0.00082	0.00100
4.250	3.22615	0.99904	0.00127	-0.63073	-0.00025	0.00024
4.500	3.47600	0.99906	0.00064	-0.60070	-0.00014	0.00004
4.750	3.72607	0.99995	0.00021	-0.60002	-0.00005	0.00002
5.000	3.97606	0.99990	0.00000	-0.60000	-0.00002	0.00000
5.250	4.22606	0.99999	0.00003	-0.60003	-0.00001	0.00003
5.500	4.47606	1.00000	0.00001	-0.60003	0.00000	0.00001
5.750	4.72606	1.00000	0.00000	-0.60003	0.00000	0.00000
6.000	4.97606	1.00000	0.00000	-0.60003	0.00000	0.00000
6.250	5.22606	1.00000	0.00000	-0.60003	0.00000	0.00000

$$S(0) = -.6$$

 $\beta = 0.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_0$	$S$	$S'$
0.	0.00000	0.00000	0.44960	0.00000	-0.60000	0.26176
0.2	0.00939	0.09391	0.44931	-0.11437	-0.54366	0.26158
0.4	0.03755	0.18761	0.44725	-0.21747	-0.48744	0.26035
0.6	0.08439	0.28058	0.44173	-0.30937	-0.43165	0.27704
0.8	0.14967	0.37196	0.45119	-0.39020	-0.37602	0.27071
1.0	0.23299	0.46063	0.43438	-0.46021	-0.32362	0.26063
1.2	0.33366	0.54525	0.41057	-0.51981	-0.27255	0.24634
1.4	0.45072	0.62439	0.37969	-0.56957	-0.22537	0.22702
1.6	0.58296	0.69670	0.34249	-0.61023	-0.18198	0.20549
1.8	0.72887	0.76106	0.30045	-0.64268	-0.14337	0.18027
2.0	0.88880	0.81669	0.25567	-0.66792	-0.10998	0.15340
2.2	1.05495	0.86330	0.21058	-0.68703	-0.08202	0.12635
2.4	1.21153	0.90107	0.16750	-0.70100	-0.05936	0.10054
2.6	1.41482	0.93060	0.12661	-0.71111	-0.04164	0.07717
2.8	1.60320	0.95288	0.09511	-0.71803	-0.02827	0.05707
3.0	1.79557	0.96905	0.06771	-0.72264	-0.01857	0.04063
3.2	1.99050	0.98037	0.04637	-0.72565	-0.01178	0.02782
3.4	2.18747	0.98797	0.03054	-0.72752	-0.00722	0.01832
3.6	2.38559	0.99289	0.01933	-0.72865	-0.00427	0.01160
3.8	2.58450	0.99594	0.01174	-0.72930	-0.00243	0.00706
4.0	2.78309	0.99777	0.00687	-0.72967	-0.00134	0.00412
4.2	2.98156	0.99882	0.00364	-0.72987	-0.00071	0.00232
4.4	3.18338	0.99940	0.00200	-0.72997	-0.00036	0.00125
4.6	3.38330	0.99970	0.00100	-0.72992	-0.00018	0.00065
4.8	3.58325	0.99984	0.00054	-0.72985	-0.00008	0.00032
5.0	3.78323	0.99994	0.00026	-0.72984	-0.00004	0.00015
5.2	3.98323	0.99997	0.00012	-0.72986	-0.00002	0.00007
5.4	4.18322	0.99999	0.00005	-0.72987	-0.00001	0.00003
5.6	4.38322	1.00000	0.00002	-0.72987	0.00000	0.00001
5.8	4.58322	1.00000	0.00001	-0.72987	0.00000	0.00001

 $\beta = -.08$ 

$\eta$	$f$	$f'$	$f''$	$fS_0$	$S$	$S'$
0.	0.00000	0.00000	0.40748	0.00000	-0.60000	0.27354
0.2	0.00819	0.08215	0.41405	-0.11453	-0.54530	0.27340
0.4	0.03295	0.16557	0.41991	-0.21813	-0.49070	0.27235
0.6	0.07449	0.24906	0.42337	-0.31803	-0.43648	0.26951
0.8	0.13295	0.33465	0.42278	-0.39277	-0.38307	0.26406
1.0	0.20830	0.41069	0.41657	-0.46616	-0.33100	0.25527
1.2	0.30030	0.50082	0.40353	-0.52534	-0.28122	0.24268
1.4	0.40041	0.57960	0.38295	-0.57686	-0.23427	0.22613
1.6	0.53181	0.65350	0.35406	-0.61930	-0.19101	0.20509
1.8	0.66939	0.72110	0.32011	-0.65394	-0.15212	0.18263
2.0	0.81975	0.78121	0.28031	-0.68067	-0.11809	0.15739
2.2	0.98152	0.83303	0.23770	-0.70112	-0.08921	0.13147
2.4	1.15239	0.87627	0.19479	-0.71650	-0.06546	0.10623
2.6	1.33127	0.91109	0.15399	-0.72763	-0.04659	0.08267
2.8	1.51631	0.93814	0.11729	-0.73543	-0.03212	0.06234
3.0	1.70607	0.95837	0.08597	-0.74073	-0.02143	0.04517
3.2	1.89920	0.97293	0.06060	-0.74420	-0.01382	0.03150
3.4	2.09494	0.98380	0.04106	-0.74641	-0.00861	0.02113
3.6	2.29226	0.99070	0.02673	-0.74777	-0.00518	0.01363
3.8	2.49064	0.99398	0.01672	-0.74857	-0.00300	0.00845
4.0	2.68974	0.99661	0.01004	-0.74902	-0.00168	0.00503
4.2	2.88923	0.99814	0.00579	-0.74927	-0.00091	0.00288
4.4	3.08894	0.99904	0.00321	-0.74941	-0.00047	0.00158
4.6	3.28802	0.99951	0.00171	-0.74948	-0.00024	0.00084
4.8	3.48675	0.99976	0.00097	-0.74951	-0.00011	0.00043
5.0	3.68572	0.99989	0.00043	-0.74952	-0.00005	0.00021
5.2	3.88470	0.99995	0.00020	-0.74953	-0.00002	0.00010
5.4	4.08369	0.99998	0.00009	-0.74954	-0.00001	0.00004
5.6	4.28269	0.99999	0.00004	-0.74954	0.00000	0.00002
5.8	4.48169	1.00000	0.00002	-0.74954	0.00000	0.00001
6.0	4.68069	1.00000	0.00001	-0.74954	0.00000	0.00000

$$S(0) = -6$$

$$\beta = -16$$

$$\beta = -24$$

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.32996	0.00000	-0.60000	0.26100
0.2	0.00649	0.06732	0.34340	-0.11476	-0.54761	0.26186
0.4	0.02711	0.13739	0.35726	-0.21905	-0.49530	0.26104
0.6	0.06182	0.21015	0.37011	-0.31290	-0.44329	0.25979
0.8	0.11133	0.28526	0.38035	-0.39641	-0.39193	0.25641
1.0	0.17604	0.36201	0.38832	-0.46975	-0.34171	0.24727
1.2	0.25610	0.43939	0.39339	-0.53321	-0.29324	0.23607
1.4	0.35175	0.51609	0.39722	-0.58720	-0.24720	0.22296
1.6	0.46246	0.59054	0.39980	-0.63230	-0.20429	0.20957
1.8	0.58771	0.66113	0.39990	-0.66917	-0.16517	0.19512
2.0	0.72655	0.72629	0.39870	-0.69865	-0.13039	0.16236
2.2	0.87777	0.78666	0.39613	-0.72164	-0.10031	0.13052
2.4	1.03990	0.83330	0.39230	-0.73910	-0.07507	0.11420
2.6	1.21134	0.87775	0.38740	-0.75199	-0.05456	0.09110
2.8	1.39045	0.91707	0.38162	-0.76122	-0.03845	0.07031
3.0	1.57566	0.95000	0.37503	-0.76763	-0.02624	0.05227
3.2	1.76532	0.96681	0.36765	-0.77194	-0.01733	0.03763
3.4	1.95882	0.97325	0.36004	-0.77473	-0.01106	0.02579
3.6	2.15433	0.96923	0.35264	-0.77649	-0.00682	0.01709
3.8	2.35180	0.96496	0.34564	-0.77754	-0.00405	0.01009
4.0	2.55031	0.96049	0.33910	-0.77810	-0.00233	0.00647
4.2	2.74941	0.95664	0.33309	-0.77834	-0.00129	0.00393
4.4	2.94901	0.95320	0.32760	-0.77833	-0.00069	0.00222
4.6	3.14865	0.95006	0.32264	-0.77803	-0.00035	0.00121
4.8	3.34851	0.94723	0.31817	-0.77754	-0.00017	0.00063
5.0	3.54844	0.94477	0.31405	-0.77690	-0.00000	0.00032
5.2	3.74841	0.94269	0.31021	-0.77613	-0.00004	0.00015
5.4	3.94840	0.94095	0.30669	-0.77522	-0.00002	0.00007
5.6	4.14839	0.93952	0.30349	-0.77417	-0.00001	0.00003
5.8	4.34839	0.93840	0.30054	-0.77302	0.00000	0.00001
6.0	4.54839	1.00000	0.00002	-0.77092	0.00000	0.00001
6.2	4.74839	1.00000	0.00001	-0.77092	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.21750	0.00000	-0.60000	0.26100
0.2	0.00640	0.06591	0.23705	-0.11516	-0.55163	0.26178
0.4	0.01049	0.09325	0.25975	-0.22006	-0.50332	0.26126
0.6	0.04200	0.14966	0.28240	-0.31650	-0.45519	0.25983
0.8	0.07957	0.20018	0.30463	-0.40276	-0.40748	0.25690
1.0	0.12664	0.27119	0.32563	-0.47954	-0.36032	0.25222
1.2	0.18730	0.35790	0.34195	-0.54705	-0.31475	0.24510
1.4	0.26182	0.46762	0.35365	-0.60596	-0.27066	0.23526
1.6	0.35046	0.47006	0.35046	-0.65548	-0.22804	0.22253
1.8	0.45341	0.55044	0.35004	-0.69728	-0.18666	0.16693
2.0	0.57054	0.62037	0.34262	-0.73165	-0.14624	0.16677
2.2	0.70134	0.68091	0.32126	-0.75925	-0.12247	0.14065
2.4	0.84406	0.74034	0.29192	-0.78009	-0.09685	0.12790
2.6	1.00024	0.80327	0.25647	-0.79744	-0.07153	0.10594
2.8	1.16577	0.85069	0.21741	-0.80970	-0.05242	0.08932
3.0	1.33990	0.89418	0.17752	-0.81660	-0.03720	0.06642
3.2	1.52131	0.92182	0.13942	-0.82423	-0.02570	0.04990
3.4	1.70823	0.94421	0.10522	-0.83217	-0.01714	0.03613
3.6	1.89937	0.96426	0.07624	-0.83995	-0.01106	0.02510
3.8	2.09350	0.97709	0.05302	-0.84372	-0.00609	0.01690
4.0	2.29094	0.98294	0.03517	-0.84400	-0.00414	0.01090
4.2	2.48772	0.99154	0.02264	-0.84264	-0.00241	0.00676
4.4	2.68462	0.99516	0.01390	-0.83981	-0.00135	0.00403
4.6	2.88169	0.99732	0.00819	-0.83601	-0.00073	0.00231
4.8	3.07829	0.99850	0.00463	-0.83162	-0.00030	0.00127
5.0	3.27500	0.99927	0.00251	-0.82610	-0.00010	0.00067
5.2	3.47490	0.99964	0.00131	-0.81949	-0.00009	0.00034
5.4	3.67493	0.99983	0.00065	-0.81223	-0.00004	0.00017
5.6	3.87490	0.99992	0.00031	-0.80422	-0.00002	0.00008
5.8	4.07490	0.99997	0.00014	-0.81422	-0.00001	0.00004
6.0	4.27490	0.99999	0.00000	-0.81422	0.00000	0.00002
6.2	4.47490	0.99999	0.00003	-0.81423	0.00000	0.00001
6.4	4.67490	1.00000	0.00001	-0.81423	0.00000	0.00000
6.6	4.87490	1.00000	0.00000	-0.81423	0.00000	0.00000



$$S(0) = -.6$$

$$\beta = -.27780(S)$$

$$\beta = -.24(R)$$

$\eta$	$f$	$f'$	$f''$	$f_{3\sigma_\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	-0.60000	0.18074
0.2	0.00015	0.00229	0.02323	-0.11639	-0.56305	0.18074
0.4	0.00124	0.00942	0.04044	-0.22554	-0.52771	0.18072
0.6	0.00427	0.02100	0.07366	-0.32747	-0.49157	0.18063
0.8	0.01034	0.03901	0.10473	-0.42217	-0.45544	0.18037
1.0	0.02060	0.06381	0.13947	-0.50000	-0.41944	0.17993
1.2	0.03420	0.09409	0.16732	-0.56000	-0.38356	0.17933
1.4	0.05066	0.13007	0.20031	-0.60310	-0.34795	0.17716
1.6	0.06906	0.17421	0.23905	-0.72910	-0.31276	0.17459
1.8	0.12070	0.22901	0.26460	-0.78829	-0.27819	0.17086
2.0	0.17007	0.27900	0.29554	-0.84000	-0.24451	0.16571
2.2	0.24109	0.34114	0.31823	-0.88613	-0.21202	0.15902
2.4	0.31302	0.40677	0.33600	-0.92541	-0.18106	0.15034
2.6	0.40400	0.47530	0.34775	-0.95860	-0.15200	0.13994
2.8	0.50006	0.54529	0.34941	-0.98630	-0.12520	0.12779
3.0	0.62206	0.61447	0.34104	-1.00000	-0.10000	0.11419
3.2	0.73167	0.68100	0.32266	-1.02694	-0.07760	0.09953
3.4	0.82945	0.74293	0.29527	-1.04997	-0.06119	0.08446
3.6	1.04042	0.79854	0.26063	-1.05182	-0.04500	0.06956
3.8	1.21311	0.84697	0.22202	-1.05949	-0.03331	0.05549
4.0	1.30660	0.88735	0.18181	-1.06513	-0.02351	0.04279
4.2	1.56732	0.91970	0.14306	-1.06905	-0.01600	0.03185
4.4	1.79410	0.94403	0.10007	-1.07169	-0.01004	0.02205
4.6	1.94502	0.96337	0.07832	-1.07342	-0.00607	0.01579
4.8	2.13900	0.97655	0.06444	-1.07450	-0.00421	0.01040
5.0	2.33536	0.98553	0.05620	-1.07510	-0.00251	0.00671
5.2	2.53310	0.99146	0.05210	-1.07559	-0.00145	0.00412
5.4	2.73170	0.99508	0.04820	-1.07577	-0.00090	0.00244
5.6	2.93103	0.99720	0.00034	-1.07590	-0.00043	0.00138
5.8	3.13062	0.99854	0.00070	-1.07595	-0.00022	0.00075
6.0	3.33042	0.99927	0.00254	-1.07590	-0.00011	0.00040
6.2	3.53032	0.99964	0.00132	-1.07600	-0.00005	0.00020
6.4	3.73027	0.99983	0.00065	-1.07600	-0.00002	0.00010
6.6	3.93024	0.99992	0.00031	-1.07601	-0.00001	0.00004
6.8	4.13022	0.99997	0.00014	-1.07601	0.00000	0.00002
7.0	4.33023	0.99999	0.00000	-1.07601	0.00000	0.00001
7.2	4.53022	0.99999	0.00000	-1.07601	0.00000	0.00000
7.4	4.73022	1.00000	0.00001	-1.07601	0.00000	0.00000
7.6	4.93022	1.00000	0.00000	-1.07601	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f_{3\sigma_\eta}$	$S$	$S'$
0.	0.00000	0.00000	-0.07020	0.00000	-0.60000	0.14154
0.2	-0.00127	-0.01209	-0.05050	-0.11717	-0.57169	0.14155
0.4	-0.00450	-0.02006	-0.02910	-0.22068	-0.54337	0.14163
0.6	-0.00901	-0.02367	-0.00663	-0.30432	-0.51503	0.14102
0.8	-0.01372	-0.02262	0.01732	-0.43460	-0.48664	0.14215
1.0	-0.01773	-0.01664	0.04272	-0.52917	-0.45910	0.14260
1.2	-0.02003	-0.00943	0.06062	-0.61796	-0.42959	0.14314
1.4	-0.01953	0.01131	0.09002	-0.70090	-0.40000	0.14372
1.6	-0.01512	0.03307	0.12704	-0.77030	-0.37211	0.14423
1.8	-0.00550	0.06252	0.15007	-0.80903	-0.34323	0.14454
2.0	0.01031	0.09747	0.16071	-0.91550	-0.31431	0.14449
2.2	0.03304	0.13002	0.22275	-0.97956	-0.28541	0.14307
2.4	0.06427	0.16053	0.25409	-1.02970	-0.25602	0.14246
2.6	0.10005	0.24034	0.20350	-1.07031	-0.22655	0.14081
2.8	0.16277	0.29974	0.30974	-1.12125	-0.20000	0.13829
3.0	0.22907	0.36390	0.33002	-1.15073	-0.17614	0.13100
3.2	0.30057	0.43164	0.34542	-1.19000	-0.16056	0.12425
3.4	0.40107	0.50152	0.35167	-1.21026	-0.14559	0.11975
3.6	0.50020	0.57170	0.34050	-1.24092	-0.16230	0.10570
3.8	0.63044	0.64026	0.33546	-1.25936	-0.00236	0.09043
4.0	0.76507	0.70925	0.31295	-1.27462	-0.06471	0.08207
4.2	0.91210	0.76400	0.26234	-1.20541	-0.09956	0.06941
4.4	1.07057	0.81779	0.24500	-1.29402	-0.03093	0.05093
4.6	1.23070	0.86303	0.20629	-1.30034	-0.02673	0.04520
4.8	1.41525	0.90020	0.16052	-1.30406	-0.01077	0.03467
5.0	1.60030	0.92000	0.12010	-1.30700	-0.01276	0.02565
5.2	1.78670	0.92226	0.08223	-1.31007	-0.00040	0.01870
5.4	1.97000	0.90067	0.04070	-1.31147	-0.00334	0.01255
5.6	2.17304	0.90016	0.04717	-1.31220	-0.00320	0.00800
5.8	2.37070	0.88700	0.03102	-1.31270	-0.00195	0.00526
6.0	2.56002	0.90200	0.01957	-1.31300	-0.00111	0.00321
6.2	2.76773	0.90507	0.01104	-1.31326	-0.00061	0.00180
6.4	2.96713	0.90701	0.00607	-1.31335	-0.00033	0.00106
6.6	3.16040	0.90600	0.00302	-1.31340	-0.00017	0.00057
6.8	3.36663	0.90042	0.00204	-1.31342	-0.00000	0.00030
7.0	3.56655	0.90072	0.00105	-1.31343	-0.00004	0.00015
7.2	3.76051	0.90007	0.00051	-1.31344	-0.00002	0.00007
7.4	3.96640	0.90004	0.00024	-1.31344	-0.00001	0.00003
7.6	4.16649	0.90007	0.00011	-1.31344	0.00000	0.00001
7.8	4.36640	0.90000	0.00005	-1.31344	0.00000	0.00001
8.0	4.56640	1.00000	0.00002	-1.31344	0.00000	0.00000
8.2	4.76640	1.00000	0.00001	-1.31344	0.00000	0.00000
8.4	4.96640	1.00000	0.00000	-1.31344	0.00000	0.00000
8.6	5.16640	1.00000	0.00000	-1.31344	0.00000	0.00000
8.8	5.36640	1.00000	0.00000	-1.31344	0.00000	0.00000

S(O) = -6

$\beta = -.16(R)$

$\beta = -.08(R)$

$\eta$	f	f'	f''	fSd <sub>η</sub>	S	S'
0.	0.00000	0.00000	-0.10531	0.00000	-0.60000	0.00521
0.2	-0.00202	-0.01977	-0.09226	-0.11830	-0.58296	0.00522
0.4	-0.00773	-0.03607	-0.07879	-0.23318	-0.56591	0.00530
0.6	-0.01659	-0.05124	-0.06481	-0.34466	-0.54883	0.00551
0.8	-0.02803	-0.06477	-0.05046	-0.45271	-0.53169	0.00588
1.0	-0.04150	-0.07139	-0.03564	-0.55733	-0.51446	0.00640
1.2	-0.05639	-0.07699	-0.02027	-0.65808	-0.49708	0.00713
1.4	-0.07209	-0.07945	-0.00425	-0.75615	-0.47951	0.00806
1.6	-0.08795	-0.07864	0.01256	-0.85027	-0.46166	0.00909
1.8	-0.10331	-0.07437	0.03030	-0.94000	-0.44353	0.01012
2.0	-0.11746	-0.06644	0.04912	-1.02766	-0.42501	0.01167
2.2	-0.12963	-0.05464	0.06917	-1.11077	-0.40605	0.01302
2.4	-0.13903	-0.03869	0.09057	-1.19004	-0.38658	0.01406
2.6	-0.14481	-0.01832	0.11339	-1.26537	-0.36658	0.01490
2.8	-0.14689	0.00676	0.13764	-1.33664	-0.34590	0.01549
3.0	-0.14177	0.03683	0.16323	-1.40372	-0.32470	0.01575
3.2	-0.13096	0.07213	0.18992	-1.46651	-0.30297	0.01554
3.4	-0.11256	0.11284	0.21720	-1.52487	-0.28070	0.01488
3.6	-0.08546	0.15501	0.24447	-1.57870	-0.25760	0.01356
3.8	-0.04958	0.21065	0.27119	-1.62792	-0.23400	0.01174
4.0	-0.00000	0.26730	0.29667	-1.67245	-0.21000	0.01174
4.2	0.05000	0.32600	0.31672	-1.71227	-0.18739	0.01109
4.4	0.10000	0.38174	0.33200	-1.74742	-0.16416	0.01101
4.6	0.21635	0.46130	0.34238	-1.77798	-0.14154	0.01102
4.8	0.31550	0.53017	0.34410	-1.80410	-0.11900	0.01029
5.0	0.42030	0.59643	0.33709	-1.82602	-0.09954	0.00977
5.2	0.53672	0.66440	0.32111	-1.84403	-0.08000	0.00863
5.4	0.66307	0.72632	0.29676	-1.85850	-0.06417	0.00724
5.6	0.80487	0.78264	0.26549	-1.86984	-0.04963	0.00570
5.8	1.00647	0.83220	0.22947	-1.87850	-0.03735	0.00357
6.0	1.17725	0.87429	0.19129	-1.88493	-0.02730	0.00483
6.2	1.35568	0.90874	0.15357	-1.88956	-0.01935	0.00461
6.4	1.54026	0.93590	0.11659	-1.89279	-0.01329	0.00260
6.6	1.72960	0.95468	0.08002	-1.89498	-0.00883	0.01879
6.8	1.92248	0.97146	0.06275	-1.89641	-0.00567	0.01304
7.0	2.11788	0.98194	0.04295	-1.89732	-0.00352	0.00871
7.2	2.31502	0.98808	0.02822	-1.89767	-0.00211	0.00559
7.4	2.51331	0.99352	0.01760	-1.89820	-0.00122	0.00345
7.6	2.71232	0.99633	0.01077	-1.89888	-0.00060	0.00205
7.8	2.91176	0.99800	0.00626	-1.89966	-0.00036	0.00117
8.0	3.11147	0.99895	0.00349	-1.89953	-0.00019	0.00064
8.2	3.31131	0.99947	0.00187	-1.89954	-0.00009	0.00034
8.4	3.51124	0.99974	0.00090	-1.89959	-0.00005	0.00017
8.6	3.71120	0.99988	0.00047	-1.89959	-0.00002	0.00008
8.8	3.91119	0.99995	0.00022	-1.89959	-0.00001	0.00004
9.0	4.11118	0.99998	0.00010	-1.89959	0.00000	0.00002
9.2	4.31117	0.99999	0.00004	-1.89959	0.00000	0.00001
9.4	4.51117	1.00000	0.00002	-1.89959	0.00000	0.00000
9.6	4.71117	1.00000	0.00001	-1.89959	0.00000	0.00000

$\eta$	f	f'	f''	fSd <sub>η</sub>	S	S'
0.	0.00000	0.00000	-0.08533	0.00000	-0.60000	0.00531
0.2	-0.00164	-0.01642	-0.07000	-0.11920	-0.58294	0.00531
0.4	-0.00648	-0.03155	-0.05238	-0.23710	-0.56591	0.00534
0.6	-0.01420	-0.04537	-0.03504	-0.35064	-0.54883	0.00541
0.8	-0.02455	-0.05790	-0.01935	-0.46000	-0.53169	0.00555
1.0	-0.03727	-0.06912	-0.00520	-0.56532	-0.51446	0.00571
1.2	-0.05211	-0.07900	0.00835	-0.66652	-0.49708	0.00600
1.4	-0.06800	-0.08765	0.02084	-0.76327	-0.47951	0.00652
1.6	-0.08400	-0.09497	0.03229	-0.85657	-0.46166	0.00710
1.8	-0.10070	-0.10094	0.04264	-1.02230	-0.44353	0.00782
2.0	-0.12738	-0.10562	0.05106	-1.12067	-0.42501	0.00872
2.2	-0.16005	-0.10889	0.05742	-1.23342	-0.40605	0.00980
2.4	-0.17084	-0.11075	0.06061	-1.33657	-0.38658	0.01000
2.6	-0.19305	-0.11111	0.06021	-1.43000	-0.36658	0.01026
2.8	-0.21518	-0.10991	0.05700	-1.53700	-0.34590	0.01049
3.0	-0.23690	-0.10705	0.05169	-1.63591	-0.32470	0.01044
3.2	-0.25700	-0.10239	0.04290	-1.73000	-0.30297	0.01000
3.4	-0.27773	-0.09580	0.03000	-1.82629	-0.28070	0.01010
3.6	-0.29600	-0.08711	0.01400	-1.91645	-0.25760	0.00953
3.8	-0.31242	-0.07611	0.00100	-2.00000	-0.23400	0.00979
4.0	-0.32634	-0.06259	0.01633	-2.08667	-0.21000	0.01070
4.2	-0.33720	-0.04630	0.03000	-2.16129	-0.18739	0.01060
4.4	-0.34445	-0.02795	0.04000	-2.23379	-0.16416	0.01000
4.6	-0.34773	-0.00425	0.05234	-2.30440	-0.14154	0.00970
4.8	-0.34611	0.02209	0.06134	-2.37267	-0.11900	0.00912
5.0	-0.33873	0.05220	0.06109	-2.43960	-0.09954	0.00847
5.2	-0.32407	0.08692	0.05665	-2.50555	-0.08000	0.00720
5.4	-0.30366	0.12592	0.04844	-2.57070	-0.06417	0.00570
5.6	-0.27420	0.16953	0.22973	-2.63500	-0.50106	0.00400
5.8	-0.23594	0.21779	0.25201	-2.70012	-0.27952	0.01060
6.0	-0.19070	0.27050	0.27473	-2.76579	-0.25694	0.01510
6.2	-0.12703	0.32753	0.29435	-2.83204	-0.23552	0.01000
6.4	-0.05553	0.38007	0.31032	-2.89715	-0.20949	0.01200
6.6	0.02030	0.43133	0.32125	-2.96620	-0.18520	0.01245
6.8	0.12511	0.51615	0.32502	-3.03124	-0.16106	0.01063
7.0	0.23405	0.58116	0.32299	-3.09100	-0.13751	0.01562
7.2	0.35740	0.64401	0.31219	-3.14632	-0.11509	0.01001
7.4	0.49250	0.70551	0.29352	-3.20721	-0.09414	0.00996
7.6	0.63920	0.76175	0.26782	-3.26410	-0.07519	0.00928
7.8	0.79600	0.81227	0.23667	-3.31740	-0.05851	0.00735
8.0	0.96306	0.85619	0.20216	-3.36767	-0.04429	0.00487
8.2	1.13890	0.89307	0.16665	-3.41531	-0.03250	0.00257
8.4	1.32002	0.92294	0.13230	-3.46044	-0.02320	0.01111
8.6	1.50764	0.94623	0.10124	-3.50340	-0.01601	0.00990
8.8	1.69972	0.96373	0.07447	-3.54370	-0.01070	0.00249
9.0	1.89200	0.97634	0.05266	-3.58112	-0.00690	0.01570
9.2	2.08401	0.98512	0.03578	-3.61622	-0.00430	0.01055
9.4	2.28606	0.99090	0.02335	-3.64900	-0.00250	0.00681
9.6	2.48725	0.99471	0.01464	-3.67940	-0.00150	0.00423
9.8	2.68445	0.99701	0.00801	-3.70753	-0.00094	0.00252
10.0	2.88400	0.99830	0.00510	-3.73345	-0.00045	0.00144
10.2	3.08376	0.99913	0.00293	-3.75727	-0.00024	0.00079
10.4	3.28363	0.99957	0.00151	-3.77900	-0.00012	0.00042
10.6	3.48357	0.99979	0.00077	-3.79877	-0.00006	0.00021
10.8	3.68354	0.99990	0.00030	-3.81650	-0.00003	0.00010
11.0	3.88353	0.99994	0.00015	-3.83227	-0.00001	0.00005
11.2	4.08352	0.99998	0.00008	-3.84600	-0.00001	0.00002
11.4	4.28352	0.99999	0.00004	-3.85777	-0.00000	0.00001
11.6	4.48352	1.00000	0.00001	-3.86750	0.00000	0.00000
11.8	4.68352	1.00000	0.00001	-3.87527	0.00000	0.00000
12.0	4.88352	1.00000	0.00000	-3.88100	0.00000	0.00000
12.2	5.08352	1.00000	0.00000	-3.88477	0.00000	0.00000
12.4	5.28352	1.00000	0.00000	-3.88650	0.00000	0.00000
12.6	5.48352	1.00000	0.00000	-3.88727	0.00000	0.00000

$$S(0) = -.8$$

 $\beta = 20.00$ 
 $\beta = 10.00$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	2.13484	0.00000	-0.00000	0.48211	
0.025	0.00066	0.03210	2.03220	-0.01495	-0.78795	0.48211	
0.050	0.00250	0.10138	1.92623	-0.03940	-0.77599	0.48209	
0.075	0.00571	0.14940	1.81691	-0.05864	-0.76384	0.48205	
0.100	0.00990	0.19254	1.71213	-0.07759	-0.75179	0.48195	
0.125	0.01532	0.23402	1.60735	-0.09623	-0.73975	0.48180	
0.150	0.02166	0.27293	1.50374	-0.11458	-0.72770	0.48158	
0.175	0.02894	0.30934	1.40816	-0.13262	-0.71567	0.48127	
0.200	0.03711	0.34338	1.31524	-0.15036	-0.70364	0.48088	
0.225	0.04609	0.37515	1.22738	-0.16780	-0.69162	0.48038	
0.250	0.05585	0.40479	1.14462	-0.18494	-0.67962	0.47977	
0.275	0.06632	0.43243	1.06767	-0.20178	-0.66764	0.47904	
0.300	0.07745	0.45822	0.99589	-0.21832	-0.65567	0.47818	
0.325	0.08921	0.48227	0.92940	-0.23457	-0.64373	0.47718	
0.350	0.10153	0.50473	0.86800	-0.25051	-0.63181	0.47605	
0.500	0.18586	0.61244	0.59240	-0.33996	-0.56109	0.46599	
0.750	0.35456	0.72705	0.36432	-0.46594	-0.44801	0.43581	
1.000	0.54656	0.80466	0.26123	-0.56477	-0.34454	0.38953	
1.250	0.75727	0.86167	0.19836	-0.63931	-0.25426	0.33113	
1.500	0.97636	0.90580	0.14983	-0.69319	-0.17947	0.26474	
1.750	1.20665	0.93725	0.10941	-0.73040	-0.12083	0.20307	
2.000	1.44422	0.96034	0.07647	-0.75487	-0.07740	0.14581	
2.250	1.68641	0.97610	0.05077	-0.77019	-0.04708	0.09860	
2.500	1.93181	0.98630	0.03192	-0.77928	-0.02715	0.06273	
2.750	2.17923	0.99255	0.01895	-0.78439	-0.01482	0.03752	
3.000	2.42787	0.99616	0.01041	-0.78712	-0.00765	0.02110	
3.250	2.67718	0.99813	0.00559	-0.78849	-0.00373	0.01114	
3.500	2.92685	0.99914	0.00277	-0.78914	-0.00172	0.00593	
3.750	3.17671	0.99983	0.00129	-0.78944	-0.00075	0.00258	
4.000	3.42664	0.99995	0.00057	-0.78956	-0.00031	0.00113	
4.250	3.67662	0.99994	0.00023	-0.78961	-0.00012	0.00046	
4.500	3.92661	0.99990	0.00009	-0.78963	-8.00004	0.00018	
4.750	4.17661	0.99999	0.00003	-0.78964	-0.00001	0.00007	
5.000	4.42661	1.00000	0.00001	-0.78964	0.00000	0.00002	
5.250	4.67661	1.00000	0.00000	-0.78964	0.00000	0.00001	
5.500	4.92661	1.00000	0.00000	-0.78964	0.00000	0.00000	
5.750	5.17661	1.00000	0.00000	-0.78964	0.00000	0.00000	
6.000	5.42661	1.00000	0.00000	-0.78964	0.00000	0.00000	
6.250	5.67661	1.00000	0.00000	-0.78964	0.00000	0.00000	

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	1.64219	0.00000	-0.00000	-0.80000	0.46931
0.025	0.00051	0.04042	1.59085	-0.01905	-0.78877	-0.46880	0.46930
0.050	0.00201	0.07952	1.53734	-0.03941	-0.77653	-0.46829	0.46929
0.075	0.00447	0.11727	1.48234	-0.05868	-0.76460	-0.46825	0.46925
0.100	0.00766	0.15363	1.42648	-0.07765	-0.75307	-0.46818	0.46918
0.125	0.01214	0.18859	1.37029	-0.09633	-0.74134	-0.46907	0.46907
0.150	0.01728	0.22215	1.31425	-0.11472	-0.72962	-0.46889	0.46889
0.175	0.02324	0.25431	1.25876	-0.13281	-0.71790	-0.46864	0.46864
0.200	0.02998	0.28510	1.20418	-0.15062	-0.70619	-0.46835	0.46835
0.225	0.03740	0.31453	1.15070	-0.16812	-0.69448	-0.46795	0.46795
0.250	0.04570	0.34265	1.09880	-0.18534	-0.68279	-0.46747	0.46747
0.275	0.05460	0.36948	1.04842	-0.20226	-0.67111	-0.46688	0.46688
0.300	0.06416	0.39508	0.99979	-0.21890	-0.65945	-0.46619	0.46619
0.325	0.07435	0.41949	0.95301	-0.23524	-0.64780	-0.46538	0.46538
0.350	0.08513	0.44275	0.90815	-0.25129	-0.63618	-0.46444	0.46444
0.500	0.16084	0.56100	0.68014	-0.34151	-0.56708	-0.45607	0.45607
0.750	0.31941	0.69748	0.43575	-0.46926	-0.45601	-0.42980	0.42980
1.000	0.50578	0.78785	0.29980	-0.57023	-0.35349	-0.30764	0.30764
1.250	0.71116	0.85179	0.21740	-0.64703	-0.26314	-0.23324	0.23324
1.500	0.93026	0.89863	0.16007	-0.70303	-0.18747	-0.27149	0.27149
1.750	1.15944	0.93291	0.11593	-0.74207	-0.12745	-0.20912	0.20912
2.000	1.39590	0.95736	0.08106	-0.76801	-0.08247	-0.15196	0.15196
2.250	1.63748	0.97411	0.05414	-0.78441	-0.05070	-0.10401	0.10401
2.500	1.88247	0.98503	0.03433	-0.79425	-0.02955	-0.06699	0.06699
2.750	2.12964	0.99178	0.02059	-0.79984	-0.01631	-0.04057	0.04057
3.000	2.37813	0.99572	0.01165	-0.80286	-0.00852	-0.02310	0.02310
3.250	2.62736	0.99789	0.00621	-0.80439	-0.00420	-0.01235	0.01235
3.500	2.87699	0.99902	0.00311	-0.80513	-0.00196	-0.00621	0.00621
3.750	3.12682	0.99957	0.00147	-0.80546	-0.00086	-0.00293	0.00293
4.000	3.37675	0.99982	0.00065	-0.80561	-0.00046	-0.00150	0.00150
4.250	3.62672	0.99993	0.00027	-0.80567	-0.00014	-0.00054	0.00054
4.500	3.87671	0.99997	0.00011	-0.80569	-0.00005	-0.00021	0.00021
4.750	4.12670	0.99999	0.00004	-0.80570	-0.00002	-0.00008	0.00008
5.000	4.37670	1.00000	0.00001	-0.80570	-0.00001	-0.00003	0.00003
5.250	4.62670	1.00000	0.00000	-0.80570	0.00000	-0.00001	0.00001
5.500	4.87670	1.00000	0.00000	-0.80570	0.00000	0.00000	0.00000
5.750	5.12670	1.00000	0.00000	-0.80570	0.00000	0.00000	0.00000
6.000	5.37670	1.00000	0.00000	-0.80570	0.00000	0.00000	0.00000
6.250	5.62670	1.00000	0.00000	-0.80570	0.00000	0.00000	0.00000

$$S(0) = -.8$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	0.94832	0.00000	-0.80000	0.43337
0.025	0.00030	0.02358	0.93806	-0.01986	-0.78917	0.43337
0.050	0.00118	0.04690	0.92729	-0.03946	-0.77833	0.43336
0.075	0.00264	0.06994	0.91607	-0.05878	-0.76750	0.43334
0.100	0.00467	0.09270	0.90442	-0.07783	-0.75666	0.43331
0.125	0.00727	0.11516	0.89240	-0.09661	-0.74583	0.43324
0.150	0.01043	0.13732	0.88002	-0.11512	-0.73500	0.43315
0.175	0.01413	0.15916	0.86734	-0.13336	-0.72418	0.43301
0.200	0.01838	0.18068	0.85437	-0.15133	-0.71335	0.43284
0.225	0.02316	0.20187	0.84116	-0.16903	-0.70253	0.43261
0.250	0.02847	0.22274	0.82773	-0.18646	-0.69172	0.43233
0.275	0.03430	0.24326	0.81412	-0.20362	-0.68092	0.43200
0.300	0.04063	0.26344	0.80036	-0.22051	-0.67012	0.43159
0.325	0.04747	0.28326	0.78646	-0.23712	-0.65934	0.43112
0.350	0.05479	0.30276	0.77246	-0.25347	-0.64857	0.43057
0.500	0.10898	0.41227	0.68751	-0.34993	-0.58433	0.42541
0.750	0.23168	0.56676	0.55016	-0.47887	-0.47989	0.40802
1.000	0.38923	0.68857	0.42726	-0.58437	-0.38139	0.37779
1.250	0.57359	0.78197	0.32309	-0.67823	-0.29204	0.33512
1.500	0.77825	0.85170	0.23780	-0.73339	-0.21462	0.28312
1.750	0.99785	0.90232	0.16991	-0.77870	-0.15084	0.22681
2.000	1.22816	0.93793	0.1173	-0.80998	-0.10110	0.17175
2.250	1.46986	0.96209	0.07795	-0.83042	-0.06447	0.12264
2.500	1.70850	0.97782	0.04957	-0.84319	-0.03902	0.08249
2.750	1.95428	0.98761	0.03005	-0.85047	-0.02239	0.05219
3.000	2.20198	0.99341	0.01730	-0.85488	-0.01216	0.03104
3.250	2.45078	0.99667	0.00944	-0.85711	-0.00625	0.01735
3.500	2.70018	0.99840	0.00487	-0.85823	-0.00303	0.00912
3.750	2.94991	0.99920	0.00237	-0.85876	-0.00139	0.00450
4.000	3.19970	0.99949	0.00109	-0.85899	-0.00060	0.00209
4.250	3.44973	0.99987	0.00047	-0.85909	-0.00029	0.00091
4.500	3.69971	0.99999	0.00019	-0.85913	-0.00009	0.00037
4.750	3.94971	0.99999	0.00007	-0.85915	-0.00003	0.00014
5.000	4.19970	0.99999	0.00003	-0.85915	-0.00001	0.00005
5.250	4.44970	1.00000	0.00001	-0.85916	0.00000	0.00002
5.500	4.69970	1.00000	0.00000	-0.85916	0.00000	0.00001
5.750	4.94970	1.00000	0.00000	-0.85916	0.00000	0.00000
6.000	5.19970	1.00000	0.00000	-0.85916	0.00000	0.00000
6.250	5.44970	1.00000	0.00000	-0.85916	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS\eta$	$S$	$S'$
0.	0.00000	0.00000	0.77594	0.00000	-0.80000	0.41755
0.025	0.00024	0.01932	0.77061	-0.01987	-0.78956	0.41755
0.050	0.00097	0.03852	0.76503	-0.03946	-0.77912	0.41754
0.075	0.00217	0.05757	0.75948	-0.05883	-0.76868	0.41752
0.100	0.00384	0.07649	0.75355	-0.07791	-0.75825	0.41749
0.125	0.00599	0.09525	0.74747	-0.09674	-0.74781	0.41744
0.150	0.00860	0.11386	0.74117	-0.11530	-0.73737	0.41737
0.175	0.01160	0.13231	0.73467	-0.13361	-0.72694	0.41726
0.200	0.01522	0.15059	0.72797	-0.15165	-0.71651	0.41712
0.225	0.01921	0.16870	0.72100	-0.16943	-0.70609	0.41694
0.250	0.02365	0.18664	0.71400	-0.18695	-0.69567	0.41672
0.275	0.02854	0.20440	0.70676	-0.20422	-0.68525	0.41649
0.300	0.03387	0.22190	0.69935	-0.22122	-0.67484	0.41612
0.325	0.03964	0.23937	0.69170	-0.23796	-0.66444	0.41574
0.350	0.04584	0.25687	0.68407	-0.25444	-0.65404	0.41530
0.500	0.09184	0.35554	0.63509	-0.34780	-0.59204	0.41111
0.750	0.19967	0.50338	0.54645	-0.40310	-0.49085	0.39670
1.000	0.34143	0.62852	0.45447	-0.50173	-0.39444	0.37899
1.250	0.51203	0.73091	0.36520	-0.60115	-0.30033	0.33362
1.500	0.70829	0.81173	0.28272	-0.70170	-0.22663	0.28665
1.750	0.91627	0.87312	0.21023	-0.79652	-0.16347	0.23413
2.000	1.14046	0.91789	0.14974	-0.83667	-0.11161	0.18110
2.250	1.37407	0.94904	0.10186	-0.85354	-0.07257	0.13227
2.500	1.61411	0.96870	0.06600	-0.86785	-0.04403	0.09185
2.750	1.85933	0.98292	0.04063	-0.87650	-0.02627	0.05980
3.000	2.10513	0.99001	0.02372	-0.88156	-0.01458	0.03595
3.250	2.35345	0.99530	0.01310	-0.88426	-0.00766	0.02050
3.500	2.60261	0.99772	0.00664	-0.88563	-0.00380	0.01180
3.750	2.85221	0.99895	0.00337	-0.88632	-0.00170	0.00560
4.000	3.10203	0.99954	0.00157	-0.88662	-0.00070	0.00266
4.250	3.35196	0.99981	0.00069	-0.88675	-0.00033	0.00110
4.500	3.60193	0.99993	0.00020	-0.88681	-0.00013	0.00058
4.750	3.85192	0.99997	0.00011	-0.88683	-0.00005	0.00020
5.000	4.10191	0.99999	0.00004	-0.88684	-0.00002	0.00007
5.250	4.35191	1.00000	0.00001	-0.88684	-0.00001	0.00003
5.500	4.60191	1.00000	0.00000	-0.88684	0.00000	0.00001
5.750	4.85191	1.00000	0.00000	-0.88684	0.00000	0.00000
6.000	5.10191	1.00000	0.00000	-0.88684	0.00000	0.00000
6.250	5.35191	1.00000	0.00000	-0.88684	0.00000	0.00000

$$S(0) = -.8$$

 $\beta = 0.50$ 
 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	0.65496	0.00000	-0.00000	0.40359
0.025	0.00020	0.01634	0.65240	-0.01987	-0.78991	0.40359
0.050	0.00082	0.03262	0.64971	-0.03970	-0.77902	0.40359
0.075	0.00181	0.04883	0.64689	-0.05906	-0.76973	0.40357
0.100	0.00326	0.06496	0.64395	-0.07790	-0.75964	0.40355
0.125	0.00500	0.08102	0.64088	-0.09605	-0.74955	0.40350
0.150	0.00731	0.09701	0.63769	-0.11346	-0.73947	0.40344
0.175	0.01009	0.11291	0.63437	-0.13022	-0.72938	0.40336
0.200	0.01392	0.12872	0.63093	-0.15193	-0.71930	0.40324
0.225	0.01837	0.14445	0.62736	-0.16979	-0.70922	0.40309
0.250	0.02317	0.16009	0.62367	-0.18739	-0.69915	0.40291
0.275	0.02837	0.17563	0.61985	-0.20474	-0.68907	0.40269
0.300	0.03396	0.19100	0.61591	-0.22184	-0.67901	0.40242
0.325	0.03992	0.20623	0.61185	-0.23869	-0.66895	0.40210
0.350	0.04620	0.22137	0.60766	-0.25529	-0.65891	0.40173
0.500	0.07926	0.31080	0.58004	-0.34962	-0.59888	0.39225
0.750	0.17455	0.44910	0.52503	-0.48700	-0.50665	0.38609
1.000	0.30259	0.57254	0.46069	-0.60030	-0.40647	0.36397
1.250	0.45940	0.67899	0.39020	-0.69090	-0.31957	0.33100
1.500	0.64099	0.76747	0.31769	-0.76007	-0.24193	0.28860
1.750	0.84164	0.83804	0.24766	-0.81203	-0.17576	0.23995
2.000	1.05021	0.89189	0.18421	-0.84900	-0.12211	0.18920
2.250	1.26634	0.93095	0.13033	-0.87492	-0.08090	0.14122
2.500	1.52267	0.95794	0.08750	-0.89119	-0.05090	0.09942
2.750	1.78454	0.97562	0.05562	-0.90120	-0.03049	0.06593
3.000	2.06992	0.98556	0.03343	-0.90704	-0.01720	0.04113
3.250	2.25744	0.99297	0.01997	-0.91027	-0.00927	0.02413
3.500	2.50617	0.99852	0.01016	-0.91196	-0.00470	0.01330
3.750	2.75556	0.99937	0.00513	-0.91200	-0.00225	0.00669
4.000	3.00520	0.99920	0.00244	-0.91119	-0.00102	0.00335
4.250	3.25516	0.99970	0.00109	-0.91136	-0.00044	0.00153
4.500	3.50511	0.99980	0.00046	-0.91144	-0.00010	0.00066
4.750	3.75509	0.99995	0.00018	-0.91146	-0.00007	0.00027
5.000	4.00506	0.99990	0.00007	-0.91147	-0.00002	0.00010
5.250	4.25500	0.99999	0.00002	-0.91140	-0.00001	0.00004
5.500	4.50500	1.00000	0.00001	-0.91140	0.00000	0.00001
5.750	4.75500	1.00000	0.00000	-0.91140	0.00000	0.00000
6.000	5.00500	1.00000	0.00000	-0.91140	0.00000	0.00000
6.250	5.25500	1.00000	0.00000	-0.91140	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	0.50027	0.00000	-0.00000	0.39457
0.025	0.00018	0.01469	0.50000	-0.01980	-0.78914	0.39457
0.050	0.00073	0.02934	0.50027	-0.03951	-0.78027	0.39456
0.075	0.00165	0.04395	0.50000	-0.05909	-0.77041	0.39455
0.100	0.00293	0.05852	0.50017	-0.07801	-0.76054	0.39453
0.125	0.00458	0.07305	0.50020	-0.09692	-0.75068	0.39449
0.150	0.00657	0.08753	0.50035	-0.11596	-0.74082	0.39444
0.175	0.00895	0.10197	0.50041	-0.13500	-0.73096	0.39436
0.200	0.01160	0.11635	0.50039	-0.15411	-0.72110	0.39426
0.225	0.01477	0.13068	0.50029	-0.17301	-0.71125	0.39413
0.250	0.01822	0.14490	0.50009	-0.19167	-0.70140	0.39397
0.275	0.02202	0.15919	0.50000	-0.20980	-0.69155	0.39377
0.300	0.02617	0.17335	0.50002	-0.22725	-0.68171	0.39353
0.325	0.03060	0.18746	0.50004	-0.24401	-0.67186	0.39325
0.350	0.03535	0.20150	0.50007	-0.25994	-0.66201	0.39293
0.500	0.07201	0.28629	0.54202	-0.35074	-0.60331	0.38903
0.750	0.15960	0.41751	0.50515	-0.40960	-0.50704	0.37950
1.000	0.27807	0.53990	0.45693	-0.46450	-0.41460	0.35097
1.250	0.42657	0.64321	0.39956	-0.49730	-0.32041	0.32006
1.500	0.59921	0.73526	0.33110	-0.50951	-0.25092	0.28942
1.750	0.79204	0.81109	0.27063	-0.52367	-0.18420	0.24329
2.000	1.00340	0.87079	0.20770	-0.53854	-0.12953	0.19043
2.250	1.22699	0.91993	0.15195	-0.55405	-0.08491	0.14715
2.500	1.46099	0.96735	0.10474	-0.56901	-0.05551	0.10519
2.750	1.69960	0.99670	0.06645	-0.58300	-0.03367	0.07007
3.000	1.94303	0.99242	0.04223	-0.59630	-0.01937	0.04695
3.250	2.19055	0.99061	0.02457	-0.60814	-0.01055	0.02801
3.500	2.43804	0.99225	0.01347	-0.61800	-0.00545	0.01503
3.750	2.68000	0.99773	0.00695	-0.62605	-0.00264	0.00762
4.000	2.91761	0.99907	0.00336	-0.63151	-0.00122	0.00392
4.250	3.16743	0.99950	0.00154	-0.63472	-0.00053	0.00162
4.500	3.41736	0.99902	0.00066	-0.63614	-0.00022	0.00060
4.750	3.66733	0.99993	0.00027	-0.63604	-0.00006	0.00033
5.000	3.91732	0.99990	0.00010	-0.63505	-0.00003	0.00013
5.250	4.16732	0.99999	0.00004	-0.63304	-0.00001	0.00006
5.500	4.41732	1.00000	0.00001	-0.63100	0.00000	0.00002
5.750	4.66732	1.00000	0.00000	-0.63100	0.00000	0.00000
6.000	4.91732	1.00000	0.00000	-0.63100	0.00000	0.00000
6.250	5.16732	1.00000	0.00000	-0.63100	0.00000	0.00000

$$S(0) = -\beta$$

 $\beta = 0.00$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.46960	0.00000	-0.00000	0.37500	
0.2	0.00939	0.09391	0.46931	-0.15249	-0.72480	0.37504	
0.4	0.03755	0.18761	0.46725	-0.28996	-0.64992	0.37380	
0.6	0.08439	0.28050	0.46173	-0.41249	-0.57954	0.36919	
0.8	0.14967	0.37196	0.45119	-0.52026	-0.50243	0.36095	
1.0	0.23299	0.46063	0.43430	-0.61361	-0.43149	0.34750	
1.2	0.33366	0.54525	0.41057	-0.69307	-0.36380	0.32845	
1.4	0.45072	0.62439	0.37969	-0.75942	-0.30049	0.30375	
1.6	0.58296	0.69670	0.34249	-0.81363	-0.24284	0.27399	
1.8	0.72887	0.76106	0.30045	-0.85690	-0.19115	0.24036	
2.0	0.88680	0.81669	0.25567	-0.89056	-0.14464	0.20454	
2.2	1.05495	0.86330	0.21050	-0.91604	-0.10390	0.16866	
2.4	1.23153	0.90107	0.16796	-0.93470	-0.07919	0.13405	
2.6	1.41482	0.93060	0.12861	-0.94614	-0.05952	0.10289	
2.8	1.60328	0.95268	0.09511	-0.95737	-0.03770	0.07609	
3.0	1.79557	0.96905	0.06771	-0.96555	-0.02476	0.05417	
3.2	1.99058	0.98037	0.04637	-0.96753	-0.01571	0.03710	
3.4	2.18747	0.98797	0.03054	-0.97003	-0.00962	0.02443	
3.6	2.38599	0.99289	0.01933	-0.97153	-0.00569	0.01546	
3.8	2.58450	0.99594	0.01176	-0.97240	-0.00324	0.00941	
4.0	2.78309	0.99777	0.00687	-0.97289	-0.00179	0.00550	
4.2	2.98159	0.99882	0.00386	-0.97316	-0.00095	0.00369	
4.4	3.18030	0.99940	0.00200	-0.97329	-0.00048	0.00167	
4.6	3.38330	0.99970	0.00108	-0.97336	-0.00024	0.00086	
4.8	3.58325	0.99986	0.00054	-0.97340	-0.00011	0.00043	
5.0	3.78323	0.99994	0.00026	-0.97341	-0.00005	0.00021	
5.2	3.98323	0.99997	0.00012	-0.97342	-0.00002	0.00009	
5.4	4.18322	0.99999	0.00005	-0.97342	-0.00001	0.00004	
5.6	4.38322	1.00000	0.00002	-0.97342	0.00000	0.00002	
5.8	4.58322	1.00000	0.00001	-0.97342	0.00000	0.00001	

 $\beta = -0.12$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.39095	0.00000	-0.00000	0.36237	
0.2	0.00801	0.08011	0.40435	-0.15275	-0.72754	0.36210	
0.4	0.03220	0.16175	0.40986	-0.29182	-0.65521	0.36002	
0.6	0.07278	0.24415	0.41379	-0.41467	-0.58316	0.35715	
0.8	0.12990	0.32704	0.41430	-0.52444	-0.51297	0.35000	
1.0	0.20357	0.40957	0.41000	-0.62002	-0.44362	0.33669	
1.2	0.29363	0.49061	0.39925	-0.70207	-0.37743	0.32235	
1.4	0.39963	0.56879	0.38124	-0.77124	-0.31502	0.30804	
1.6	0.52005	0.64261	0.35572	-0.82846	-0.25742	0.27445	
1.8	0.65620	0.71061	0.32320	-0.87490	-0.20551	0.24403	
2.0	0.80642	0.77155	0.28534	-0.91103	-0.15999	0.21690	
2.2	0.96437	0.82452	0.24397	-0.93903	-0.12122	0.17674	
2.4	1.13367	0.86900	0.20163	-0.95997	-0.08924	0.14331	
2.6	1.31154	0.90527	0.16077	-0.97516	-0.06374	0.11224	
2.8	1.49546	0.93362	0.12350	-0.98305	-0.04410	0.08478	
3.0	1.68443	0.95501	0.09131	-0.98314	-0.02953	0.06169	
3.2	1.87767	0.97054	0.06491	-0.97709	-0.01912	0.04321	
3.4	2.07233	0.98137	0.04435	-0.96181	-0.01196	0.02911	
3.6	2.26798	0.98863	0.02911	-0.93920	-0.00722	0.01806	
3.8	2.46461	0.99231	0.01835	-0.90401	-0.00421	0.01174	
4.0	2.66250	0.99629	0.01111	-0.85645	-0.00236	0.00703	
4.2	2.86201	0.99792	0.00646	-0.80000	-0.00120	0.00404	
4.4	3.06371	0.99891	0.00361	-0.69519	-0.00067	0.00223	
4.6	3.26555	0.99945	0.00193	-0.50229	-0.00034	0.00119	
4.8	3.46547	0.99973	0.00100	-0.20934	-0.00016	0.00060	
5.0	3.66543	0.99987	0.00049	-0.00236	-0.00000	0.00030	
5.2	3.86541	0.99994	0.00023	-0.00137	-0.00003	0.00014	
5.4	4.06540	0.99997	0.00011	-0.00030	-0.00001	0.00006	
5.6	4.26540	0.99999	0.00005	-0.00005	-0.00001	0.00003	
5.8	4.46540	1.00000	0.00002	-0.00002	0.00000	0.00001	
6.0	4.66540	1.00000	0.00001	-0.00001	0.00000	0.00000	

$$S(0) = -.8$$

$$\beta = -.20$$

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.33641	0.00000	-0.80000	0.34902
0.2	0.00679	0.06816	0.34599	-0.15302	-0.73020	0.34886
0.4	0.02740	0.13833	0.35621	-0.29209	-0.66052	0.34776
0.6	0.06226	0.21065	0.36679	-0.41725	-0.59123	0.34473
0.8	0.11179	0.28493	0.37566	-0.52864	-0.52281	0.33887
1.0	0.17633	0.36068	0.38100	-0.62648	-0.45593	0.32933
1.2	0.25610	0.43702	0.38135	-0.71116	-0.39137	0.31547
1.4	0.35110	0.51278	0.37500	-0.78324	-0.33005	0.29696
1.6	0.46108	0.58651	0.36102	-0.84346	-0.27289	0.27386
1.8	0.58547	0.65665	0.33910	-0.89274	-0.22078	0.24671
2.0	0.72340	0.72185	0.30977	-0.93215	-0.17441	0.21649
2.2	0.87370	0.78016	0.27444	-0.96292	-0.13429	0.18457
2.4	1.03496	0.83117	0.23522	-0.98630	-0.10060	0.15252
2.6	1.20563	0.87416	0.19462	-1.00358	-0.07319	0.12193
2.8	1.38499	0.90910	0.15219	-1.01597	-0.05164	0.09412
3.0	1.56876	0.93646	0.11909	-1.02458	-0.03529	0.07006
3.2	1.75822	0.95706	0.09786	-1.03038	-0.02333	0.05024
3.4	1.95121	0.97190	0.08226	-1.03415	-0.01491	0.03467
3.6	2.14671	0.98235	0.07239	-1.03652	-0.00920	0.02301
3.8	2.34392	0.98928	0.06770	-1.03796	-0.00548	0.01469
4.0	2.54225	0.99373	0.06178	-1.03881	-0.00315	0.00901
4.2	2.74130	0.99646	0.05466	-1.03920	-0.00175	0.00531
4.4	2.94074	0.99808	0.00605	-1.03954	-0.00093	0.00301
4.6	3.14048	0.99899	0.00335	-1.03968	-0.00048	0.00164
4.8	3.34033	0.99949	0.00179	-1.03975	-0.00024	0.00086
5.0	3.54026	0.99975	0.00091	-1.03978	-0.00011	0.00043
5.2	3.74023	0.99989	0.00045	-1.03980	-0.00005	0.00021
5.4	3.94021	0.99995	0.00021	-1.03981	-0.00002	0.00010
5.6	4.14020	0.99998	0.00010	-1.03981	-0.00001	0.00004
5.8	4.34020	0.99999	0.00004	-1.03981	0.00000	0.00002
6.0	4.54020	1.00000	0.00002	-1.03981	0.00000	0.00001
6.2	4.74020	1.00000	0.00001	-1.03981	0.00000	0.00000

$$\beta = -.28$$

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.24411	0.00000	-0.80000	0.32597
0.2	0.00496	0.05006	0.25701	-0.15348	-0.73481	0.32586
0.4	0.02022	0.10299	0.27272	-0.29393	-0.66970	0.32510
0.6	0.04638	0.15927	0.29023	-0.42138	-0.60486	0.32300
0.8	0.08416	0.21912	0.30829	-0.53591	-0.54063	0.31888
1.0	0.13427	0.28252	0.32538	-0.63770	-0.47749	0.31206
1.2	0.19738	0.34909	0.33979	-0.72702	-0.41603	0.30194
1.4	0.27407	0.41813	0.34970	-0.80427	-0.35676	0.28810
1.6	0.36473	0.48856	0.35335	-0.87001	-0.30105	0.27036
1.8	0.46949	0.55896	0.34930	-0.92496	-0.24908	0.24876
2.0	0.58820	0.62770	0.33670	-0.96996	-0.20177	0.22384
2.2	0.72035	0.69306	0.31549	-1.00601	-0.15971	0.19643
2.4	0.86509	0.75338	0.28656	-1.03422	-0.12329	0.16767
2.6	1.02127	0.80729	0.25167	-1.05571	-0.09264	0.13807
2.8	1.18751	0.85382	0.21327	-1.07165	-0.06765	0.11136
3.0	1.36228	0.89254	0.17406	-1.08313	-0.04793	0.08631
3.2	1.54401	0.92356	0.13462	-1.09114	-0.03291	0.06455
3.4	1.73122	0.94745	0.10303	-1.09655	-0.02186	0.04632
3.6	1.92258	0.96512	0.07459	-1.10010	-0.01405	0.03229
3.8	2.11693	0.97766	0.05182	-1.10234	-0.00872	0.02156
4.0	2.31337	0.98421	0.03453	-1.10371	-0.00522	0.01384
4.2	2.51122	0.99180	0.02207	-1.10451	-0.00302	0.00854
4.4	2.70996	0.99530	0.01393	-1.10497	-0.00168	0.00507
4.6	2.90924	0.99741	0.00796	-1.10522	-0.00090	0.00289
4.8	3.10886	0.99862	0.00449	-1.10536	-0.00047	0.00158
5.0	3.30866	0.99930	0.00243	-1.10542	-0.00023	0.00083
5.2	3.50856	0.99965	0.00126	-1.10546	-0.00011	0.00042
5.4	3.70851	0.99984	0.00063	-1.10547	-0.00005	0.00020
5.6	3.90849	0.99993	0.00030	-1.10548	-0.00002	0.00010
5.8	4.10847	0.99997	0.00014	-1.10548	-0.00001	0.00004
6.0	4.30847	0.99999	0.00006	-1.10548	0.00000	0.00002
6.2	4.50847	0.99999	0.00003	-1.10548	0.00000	0.00001
6.4	4.70847	1.00000	0.00001	-1.10548	0.00000	0.00000
6.6	4.90847	1.00000	0.00000	-1.10548	0.00000	0.00000

$$S(O) = -.8$$

$$\beta = -.30861(S)$$

$$\beta = -.28(R)$$

$\eta$	$f$	$f'$	$f''$	$f/Sd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	-0.80000	0.22601
0.2	0.00009	0.00133	0.01374	-0.15549	-0.79480	0.22600
0.4	0.00073	0.00568	0.03027	-0.30192	-0.79060	0.22599
0.6	0.00260	0.01362	0.06957	-0.43932	-0.64441	0.22592
0.8	0.00646	0.02569	0.07160	-0.56768	-0.61924	0.22572
1.0	0.01319	0.04243	0.06626	-0.68702	-0.57413	0.22529
1.2	0.02377	0.06436	0.12335	-0.79735	-0.52915	0.22448
1.4	0.03930	0.09192	0.15256	-0.89869	-0.48438	0.22309
1.6	0.06094	0.12549	0.18335	-0.99112	-0.43997	0.22209
1.8	0.08992	0.16531	0.21498	-1.07472	-0.39610	0.21761
2.0	0.12749	0.21146	0.24640	-1.14961	-0.35301	0.21296
2.2	0.17491	0.26377	0.27626	-1.21599	-0.31102	0.20665
2.4	0.23338	0.32176	0.30295	-1.27412	-0.27048	0.19843
2.6	0.30394	0.38461	0.32463	-1.32431	-0.23179	0.18808
2.8	0.38747	0.45115	0.33944	-1.36699	-0.19539	0.17556
3.0	0.48454	0.51982	0.34572	-1.40265	-0.16171	0.16093
3.2	0.59542	0.58879	0.34227	-1.43188	-0.13116	0.14449
3.4	0.71995	0.65805	0.32867	-1.45533	-0.10400	0.12671
3.6	0.85759	0.71961	0.30545	-1.47372	-0.08050	0.10824
3.8	1.00742	0.77769	0.27415	-1.48778	-0.06070	0.08984
4.0	1.16821	0.82889	0.23718	-1.49824	-0.04451	0.07229
4.2	1.33867	0.87238	0.19747	-1.50581	-0.03168	0.05627
4.4	1.51663	0.90790	0.15800	-1.51112	-0.02186	0.04230
4.6	1.70112	0.93577	0.12137	-1.51473	-0.01461	0.03066
4.8	1.89008	0.95676	0.08944	-1.51710	-0.00944	0.02141
5.0	2.08343	0.97193	0.06320	-1.51861	-0.00589	0.01439
5.2	2.27894	0.98244	0.04281	-1.51954	-0.00355	0.00930
5.4	2.47617	0.98941	0.02780	-1.52009	-0.00207	0.00578
5.6	2.67453	0.99389	0.01730	-1.52040	-0.00116	0.00346
5.8	2.87350	0.99657	0.01032	-1.52057	-0.00063	0.00198
6.0	3.07309	0.99815	0.00590	-1.52067	-0.00033	0.00109
6.2	3.27281	0.99904	0.00324	-1.52071	-0.00016	0.00058
6.4	3.47260	0.99952	0.00170	-1.52074	-0.00008	0.00030
6.6	3.67261	0.99977	0.00086	-1.52075	-0.00004	0.00014
6.8	3.87250	0.99990	0.00042	-1.52075	-0.00002	0.00007
7.0	4.07256	0.99995	0.00019	-1.52076	-0.00001	0.00003
7.2	4.27256	0.99998	0.00009	-1.52076	0.00000	0.00001
7.4	4.47255	0.99999	0.00004	-1.52076	0.00000	0.00001
7.6	4.67255	1.00000	0.00002	-1.52076	0.00000	0.00000
7.8	4.87255	1.00000	0.00001	-1.52076	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f/Sd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	-0.03950	0.00000	-0.00000	0.19405
0.2	-0.00071	-0.00471	-0.02721	-0.15612	-0.76119	0.19406
0.4	-0.00258	-0.01074	-0.01276	-0.30448	-0.72237	0.19412
0.6	-0.00480	-0.01167	0.00386	-0.44507	-0.68354	0.19426
0.8	-0.00693	-0.00909	0.02268	-0.57799	-0.64467	0.19449
1.0	-0.00813	-0.00245	0.04372	-0.70293	-0.60574	0.19479
1.2	-0.00762	0.00859	0.06698	-0.82018	-0.56675	0.19510
1.4	-0.00440	0.02449	0.09241	-0.92943	-0.52770	0.19534
1.6	0.00253	0.04569	0.11991	-1.03124	-0.48862	0.19539
1.8	0.01426	0.07258	0.14923	-1.12508	-0.44957	0.19500
2.0	0.03196	0.10540	0.17995	-1.21109	-0.41063	0.19421
2.2	0.05697	0.14461	0.21144	-1.28935	-0.37194	0.19251
2.4	0.09023	0.19004	0.24279	-1.35990	-0.33370	0.18973
2.6	0.13329	0.24163	0.27281	-1.42287	-0.29614	0.18559
2.8	0.18726	0.29898	0.30000	-1.47842	-0.25958	0.17975
3.0	0.25322	0.36133	0.32265	-1.52679	-0.22437	0.17204
3.2	0.33206	0.42761	0.33897	-1.56829	-0.19090	0.16250
3.4	0.42443	0.49638	0.34725	-1.60329	-0.15959	0.15051
3.6	0.53066	0.56589	0.34628	-1.63229	-0.13062	0.13603
3.8	0.65071	0.63419	0.33517	-1.65582	-0.10496	0.12161
4.0	0.78413	0.69931	0.31441	-1.67448	-0.08225	0.10930
4.2	0.93009	0.75939	0.28515	-1.68894	-0.06203	0.09879
4.4	1.08745	0.81294	0.24954	-1.69984	-0.04670	0.07258
4.6	1.25477	0.85996	0.21034	-1.70703	-0.03373	0.05744
4.8	1.43050	0.89704	0.17053	-1.71152	-0.02342	0.04392
5.0	1.61306	0.92732	0.13282	-1.71744	-0.01603	0.03240
5.2	1.80095	0.95045	0.09929	-1.72007	-0.01092	0.02303
5.4	1.99283	0.96740	0.07121	-1.72176	-0.00667	0.01578
5.6	2.18757	0.97932	0.04697	-1.72262	-0.00409	0.01037
5.8	2.38430	0.98736	0.03229	-1.72346	-0.00242	0.00657
6.0	2.58233	0.99254	0.02042	-1.72383	-0.00138	0.00400
6.2	2.78119	0.99578	0.01238	-1.72404	-0.00076	0.00234
6.4	2.98055	0.99770	0.00719	-1.72415	-0.00040	0.00131
6.6	3.18021	0.99879	0.00401	-1.72421	-0.00021	0.00071
6.8	3.38004	0.99939	0.00214	-1.72424	-0.00010	0.00037
7.0	3.57975	0.99970	0.00110	-1.72425	-0.00005	0.00018
7.2	3.77991	0.99986	0.00054	-1.72426	-0.00002	0.00009
7.4	3.97989	0.99994	0.00026	-1.72426	-0.00001	0.00004
7.6	4.17988	0.99997	0.00012	-1.72426	0.00000	0.00002
7.8	4.37988	0.99999	0.00005	-1.72426	0.00000	0.00001
8.0	4.57987	1.00000	0.00002	-1.72426	0.00000	0.00000
8.2	4.77987	1.00000	0.00001	-1.72427	0.00000	0.00000



$$S(0) = -.8$$

$$\beta = -.20(R)$$

$q$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	-0.00041	0.00000	-0.00000	0.12373
0.2	-0.00195	-0.01529	-0.07192	-0.15793	-0.77529	0.12374
0.4	-0.00598	-0.02871	-0.06291	-0.31010	-0.75050	0.12383
0.6	-0.01290	-0.04619	-0.05210	-0.45772	-0.72971	0.12406
0.8	-0.02191	-0.06952	-0.04096	-0.60038	-0.70086	0.12449
1.0	-0.03256	-0.09651	-0.02879	-0.73806	-0.67590	0.12517
1.2	-0.04435	-0.06937	-0.01963	-0.87073	-0.65077	0.12613
1.4	-0.05676	-0.06269	-0.00140	-0.99835	-0.62542	0.12741
1.6	-0.06923	-0.06145	0.01402	-1.12008	-0.59978	0.12903
1.8	-0.08113	-0.05780	0.03079	-1.23824	-0.57379	0.13099
2.0	-0.09180	-0.04906	0.04890	-1.35037	-0.54737	0.13327
2.2	-0.10050	-0.03733	0.06800	-1.45716	-0.52046	0.13587
2.4	-0.10646	-0.02151	0.08993	-1.55891	-0.49300	0.13872
2.6	-0.10881	-0.00125	0.11293	-1.65432	-0.46496	0.14174
2.8	-0.10664	0.02370	0.13763	-1.74446	-0.43630	0.14484
3.0	-0.09996	0.05390	0.16380	-1.82880	-0.40763	0.14787
3.2	-0.08872	0.08036	0.19110	-1.90723	-0.37717	0.15063
3.4	-0.06283	0.10624	0.21924	-1.97963	-0.34601	0.15289
3.6	-0.03217	0.13789	0.24730	-2.04593	-0.31607	0.15437
3.8	0.00037	0.22927	0.27427	-2.10605	-0.28914	0.15476
4.0	0.05980	0.2804	0.29889	-2.15999	-0.26424	0.15374
4.2	0.12333	0.34857	0.31966	-2.20770	-0.23976	0.15098
4.4	0.19955	0.41414	0.33499	-2.24954	-0.19400	0.14622
4.6	0.28915	0.48208	0.34319	-2.28544	-0.16942	0.13927
4.8	0.39244	0.55086	0.34300	-2.31501	-0.13844	0.13013
5.0	0.50943	0.61870	0.33384	-2.34097	-0.11350	0.11893
5.2	0.63974	0.68378	0.31548	-2.36137	-0.09098	0.10604
5.4	0.78264	0.74434	0.28887	-2.37754	-0.07116	0.09200
5.6	0.93707	0.79890	0.25574	-2.39003	-0.05421	0.07748
5.8	1.10172	0.84637	0.21850	-2.39942	-0.04015	0.06320
6.0	1.27511	0.88620	0.17985	-2.40620	-0.02887	0.04984
6.2	1.45960	0.91839	0.14245	-2.41116	-0.02012	0.03793
6.4	1.64199	0.94341	0.10844	-2.41447	-0.01350	0.02783
6.6	1.82263	0.96209	0.07929	-2.41689	-0.00886	0.01966
6.8	2.00247	0.97549	0.05565	-2.41811	-0.00599	0.01337
7.0	2.22259	0.98472	0.03749	-2.41900	-0.00340	0.00874
7.2	2.42015	0.99081	0.02423	-2.41993	-0.00200	0.00559
7.4	2.61874	0.99468	0.01502	-2.41983	-0.00113	0.00332
7.6	2.81792	0.99703	0.00894	-2.41900	-0.00062	0.00193
7.8	3.01740	0.99841	0.00510	-2.42009	-0.00033	0.00108
8.0	3.21724	0.99918	0.00290	-2.42014	-0.00017	0.00058
8.2	3.41712	0.99959	0.00147	-2.42017	-0.00008	0.00030
8.4	3.61707	0.99980	0.00074	-2.42018	-0.00004	0.00015
8.6	3.81704	0.99991	0.00036	-2.42018	-0.00002	0.00007
8.8	4.01703	0.99996	0.00017	-2.42018	-0.00001	0.00003
9.0	4.21702	0.99998	0.00007	-2.42019	0.00000	0.00001
9.2	4.41702	0.99999	0.00003	-2.42019	0.00000	0.00001
9.4	4.61702	1.00000	0.00001	-2.42019	0.00000	0.00000
9.6	4.81702	1.00000	0.00001	-2.42019	0.00000	0.00000

$$\beta = -.12(R)$$

$q$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	-0.07511	0.00000	-0.00000	0.06003
0.2	-0.00147	-0.01453	-0.07010	-0.15660	-0.78799	0.06003
0.4	-0.00575	-0.02804	-0.06500	-0.31520	-0.77590	0.06007
0.6	-0.01242	-0.04052	-0.05962	-0.46919	-0.76396	0.06010
0.8	-0.02188	-0.05109	-0.05406	-0.62078	-0.75191	0.06039
1.0	-0.03330	-0.06213	-0.04832	-0.76995	-0.73900	0.06072
1.2	-0.04666	-0.07121	-0.04239	-0.91669	-0.72761	0.06121
1.4	-0.06171	-0.07908	-0.03627	-1.06099	-0.71530	0.06187
1.6	-0.07820	-0.08570	-0.02991	-1.20280	-0.70285	0.06274
1.8	-0.09590	-0.09102	-0.02320	-1.34211	-0.69019	0.06384
2.0	-0.11452	-0.09499	-0.01631	-1.47806	-0.67729	0.06520
2.2	-0.13380	-0.09752	-0.00894	-1.61301	-0.66409	0.06684
2.4	-0.15343	-0.09853	-0.00109	-1.74640	-0.65054	0.06878
2.6	-0.17310	-0.09792	0.00733	-1.87819	-0.63656	0.07107
2.8	-0.19248	-0.09559	0.01644	-1.99907	-0.62200	0.07371
3.0	-0.21120	-0.09129	0.02634	-2.12199	-0.60705	0.07675
3.2	-0.22884	-0.08490	0.03717	-2.24604	-0.59136	0.08021
3.4	-0.24503	-0.07635	0.04906	-2.37040	-0.57493	0.08410
3.6	-0.25923	-0.06525	0.06219	-2.49516	-0.55769	0.08849
3.8	-0.27093	-0.05140	0.07657	-2.62030	-0.53952	0.09327
4.0	-0.27959	-0.03453	0.09246	-2.68750	-0.52034	0.09856
4.2	-0.28453	-0.01432	0.10991	-2.70956	-0.50007	0.10429
4.4	-0.28508	0.00854	0.12890	-2.68745	-0.47860	0.11041
4.6	-0.28045	0.02730	0.14841	-2.60092	-0.45584	0.11684
4.8	-0.26984	0.04949	0.17174	-3.04971	-0.43109	0.12347
5.0	-0.25235	0.10615	0.19900	-3.15557	-0.40650	0.13010
5.2	-0.22706	0.14757	0.21920	-3.23222	-0.37983	0.13691
5.4	-0.19300	0.19304	0.23445	-3.30542	-0.35193	0.14239
5.6	-0.14920	0.24490	0.24696	-3.37292	-0.32293	0.14737
5.8	-0.09474	0.30050	0.25860	-3.43454	-0.29307	0.15104
6.0	-0.02873	0.36013	0.30703	-3.49011	-0.26264	0.15294
6.2	0.04953	0.42380	0.32000	-3.53950	-0.23204	0.15266
6.4	0.14061	0.48004	0.32849	-3.58295	-0.20174	0.14981
6.6	0.24401	0.53391	0.32806	-3.62033	-0.17230	0.14418
6.8	0.36213	0.61904	0.32111	-3.65196	-0.14426	0.13572
7.0	0.49226	0.68180	0.30509	-3.67817	-0.11819	0.12463
7.2	0.63450	0.74537	0.28139	-3.69940	-0.09455	0.11137
7.4	0.78813	0.79393	0.25138	-3.71618	-0.07374	0.09662
7.6	0.95172	0.84883	0.21710	-3.72909	-0.05595	0.08120
7.8	1.12399	0.88065	0.18094	-3.73876	-0.04124	0.06599
8.0	1.30350	0.91325	0.14532	-3.74579	-0.02949	0.05177
8.2	1.48883	0.93889	0.11234	-3.75074	-0.02042	0.03916
8.4	1.67868	0.95846	0.08351	-3.75411	-0.01369	0.02893
8.6	1.87188	0.97269	0.05967	-3.75634	-0.00887	0.02081
8.8	2.06746	0.98267	0.04095	-3.75776	-0.00555	0.01349
9.0	2.26471	0.98839	0.02699	-3.75844	-0.00334	0.00875
9.2	2.46325	0.99374	0.01708	-3.75916	-0.00196	0.00549
9.4	2.66200	0.99844	0.01138	-3.75946	-0.00110	0.00327
9.6	2.86156	0.99805	0.00664	-3.75962	-0.00060	0.00188
9.8	3.06127	0.99897	0.00339	-3.75971	-0.00031	0.00104
10.0	3.26112	0.99948	0.00182	-3.75975	-0.00016	0.00055
10.2	3.46104	0.99974	0.00094	-3.75976	-0.00008	0.00028
10.4	3.66100	0.99988	0.00047	-3.75975	-0.00004	0.00014
10.6	3.86099	0.99995	0.00023	-3.75973	-0.00002	0.00007
10.8	4.06098	0.99998	0.00010	-3.75979	-0.00001	0.00003
11.0	4.26098	0.99999	0.00004	-3.75980	0.00000	0.00001
11.2	4.46098	1.00000	0.00002	-3.75980	0.00000	0.00001
11.4	4.66098	1.00000	0.00001	-3.75980	0.00000	0.00000

$$S(0) = -1.0$$

 $\beta = 20.00$ 
 $\beta = 10.00$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	1.19344	0.00000	-1.00000	0.56109
0.025	0.00037	0.02981	1.19088	-0.02482	-0.99597	0.56109
0.050	0.00149	0.05965	1.18837	-0.04939	-0.97195	0.56107
0.075	0.00334	0.08879	1.18575	-0.07342	-0.95792	0.56104
0.100	0.00593	0.11770	1.18444	-0.09719	-0.94389	0.56098
0.125	0.00922	0.14680	1.12341	-0.12062	-0.92987	0.56087
0.150	0.01322	0.17305	1.09734	-0.14349	-0.91585	0.56072
0.175	0.01791	0.20093	1.06896	-0.16641	-0.90184	0.56050
0.200	0.02326	0.22728	1.03808	-0.18878	-0.88783	0.56021
0.225	0.02927	0.25204	1.00748	-0.21060	-0.87383	0.55994
0.250	0.03595	0.27653	0.97524	-0.23247	-0.85983	0.55939
0.275	0.04334	0.30162	0.94270	-0.25379	-0.84584	0.55884
0.300	0.05098	0.32470	0.91014	-0.27474	-0.83189	0.55818
0.325	0.05938	0.34713	0.87785	-0.29539	-0.81795	0.55741
0.350	0.06833	0.36880	0.84605	-0.31564	-0.80402	0.55652
0.500	0.13247	0.48223	0.67408	-0.43003	-0.72110	0.54832
0.750	0.27173	0.62359	0.47304	-0.59340	-0.58090	0.52169
1.000	0.44102	0.72571	0.35236	-0.72424	-0.44173	0.47747
1.250	0.63254	0.80296	0.26993	-0.82536	-0.34955	0.41768
1.500	0.84101	0.86210	0.20604	-0.90041	-0.29376	0.34752
1.750	1.06242	0.90490	0.15329	-0.95375	-0.17607	0.27400
2.000	1.29346	0.93950	0.10076	-0.98995	-0.11645	0.20414
2.250	1.53140	0.96252	0.07506	-1.01333	-0.07323	0.14343
2.500	1.77400	0.97783	0.04878	-1.02771	-0.04371	0.09409
2.750	2.01905	0.98753	0.03001	-1.03600	-0.02472	0.05906
3.000	2.26753	0.99335	0.01764	-1.04070	-0.01323	0.03456
3.250	2.51632	0.99664	0.00993	-1.04311	-0.00670	0.01900
3.500	2.76572	0.99840	0.00492	-1.04430	-0.00320	0.00902
3.750	3.01544	0.99920	0.00239	-1.04485	-0.00145	0.00477
4.000	3.26532	0.99969	0.00109	-1.04510	-0.00062	0.00217
4.250	3.51527	0.99988	0.00047	-1.04520	-0.00025	0.00093
4.500	3.76525	0.99995	0.00019	-1.04524	-0.00009	0.00037
4.750	4.01524	0.99998	0.00007	-1.04525	-0.00003	0.00014
5.000	4.26524	0.99999	0.00003	-1.04526	-0.00001	0.00005
5.250	4.51524	1.00000	0.00001	-1.04526	0.00000	0.00002
5.500	4.76524	1.00000	0.00000	-1.04526	0.00000	0.00001
5.750	5.01524	1.00000	0.00000	-1.04526	0.00000	0.00000
6.000	5.26524	1.00000	0.00000	-1.04526	0.00000	0.00000
6.250	5.51524	1.00000	0.00000	-1.04526	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f'''$	$S$	$S'$
0.	0.00000	0.00000	1.03079	0.00000	-1.00300	0.55099
0.025	0.00032	0.02574	1.02913	-0.02403	-0.99623	0.55099
0.050	0.00129	0.05143	1.02433	-0.04931	-0.97245	0.55098
0.075	0.00209	0.07695	1.01671	-0.07345	-0.95868	0.55095
0.100	0.00513	0.10224	1.00658	-0.09725	-0.94490	0.55090
0.125	0.00800	0.12726	0.99423	-0.12070	-0.93113	0.55081
0.150	0.01149	0.15194	0.97994	-0.14380	-0.91736	0.55067
0.175	0.01560	0.17624	0.96397	-0.16654	-0.90360	0.55049
0.200	0.02030	0.20013	0.94640	-0.18899	-0.88984	0.55024
0.225	0.02560	0.22354	0.92803	-0.21106	-0.87609	0.54993
0.250	0.03140	0.24652	0.90891	-0.23279	-0.86234	0.54964
0.275	0.03792	0.26890	0.88923	-0.25417	-0.84861	0.54936
0.300	0.04492	0.29093	0.86917	-0.27522	-0.83489	0.54909
0.325	0.05244	0.31235	0.84861	-0.29592	-0.82119	0.54883
0.350	0.06053	0.33323	0.82757	-0.31620	-0.80750	0.54858
0.500	0.11931	0.44723	0.69643	-0.43127	-0.72503	0.53904
0.750	0.25005	0.59794	0.51442	-0.59417	-0.59363	0.51503
1.000	0.41483	0.70000	0.39000	-0.72076	-0.44943	0.47402
1.250	0.60294	0.79210	0.28075	-0.81103	-0.35740	0.41837
1.500	0.80922	0.85907	0.21735	-0.90000	-0.26117	0.35878
1.750	1.02915	0.90206	0.16059	-0.96300	-0.16245	0.27003
2.000	1.25910	0.91628	0.11405	-1.00152	-0.12153	0.20951
2.250	1.49044	0.90820	0.07074	-1.02602	-0.07700	0.14840
2.500	1.73067	0.87630	0.05141	-1.04117	-0.04631	0.09910
2.750	1.98135	0.82044	0.03102	-1.05007	-0.02646	0.06223
3.000	2.23165	0.74282	0.01602	-1.05502	-0.01425	0.03674
3.250	2.48094	0.64635	0.00827	-1.05762	-0.00727	0.02039
3.500	2.72969	0.54024	0.00534	-1.05902	-0.00350	0.01003
3.750	2.97939	0.43020	0.00261	-1.05953	-0.00160	0.00521
4.000	3.22923	0.31966	0.00120	-1.05960	-0.00069	0.00240
4.250	3.47919	0.20906	0.00052	-1.05991	-0.00020	0.00104
4.500	3.72917	0.09995	0.00021	-1.05996	-0.00011	0.00042
4.750	3.97916	0.00000	0.00000	-1.05997	-0.00004	0.00016
5.000	4.22916	0.00000	0.00000	-1.05990	-0.00001	0.00006
5.250	4.47916	1.00000	0.00001	-1.05990	0.00000	0.00002
5.500	4.72916	1.00000	0.00000	-1.05990	0.00000	0.00001
5.750	4.97916	1.00000	0.00000	-1.05990	0.00000	0.00000
6.000	5.22916	1.00000	0.00000	-1.05990	0.00000	0.00000
6.250	5.47916	1.00000	0.00000	-1.05990	0.00000	0.00000

$$S(0) = -1.0$$

 $\beta = 2.00$ 
 $\beta = 1.00$ 

$\eta$	$f$	$f'$	$f''$	$fS_4$	$S$	$S'$
0.	0.00000	0.00000	0.73864	0.00000	-1.00000	0.52063
0.025	0.00021	0.01046	0.73832	-0.02404	-0.98698	0.52063
0.050	0.00082	0.03691	0.73737	-0.04939	-0.97397	0.52062
0.075	0.00208	0.05932	0.73583	-0.07354	-0.96095	0.52060
0.100	0.00366	0.07370	0.73371	-0.09740	-0.94794	0.52057
0.125	0.00576	0.09201	0.73104	-0.12093	-0.93493	0.52051
0.150	0.00828	0.11024	0.72784	-0.14414	-0.92191	0.52041
0.175	0.01127	0.12649	0.72415	-0.16703	-0.90890	0.52029
0.200	0.01471	0.14645	0.71998	-0.18959	-0.89590	0.52012
0.225	0.01859	0.16439	0.71536	-0.21187	-0.88290	0.51998
0.250	0.02293	0.18221	0.71032	-0.23375	-0.86990	0.51983
0.275	0.02776	0.19990	0.70487	-0.25532	-0.85692	0.51971
0.300	0.03292	0.21745	0.69904	-0.27656	-0.84394	0.51961
0.325	0.03837	0.23485	0.69285	-0.29752	-0.83097	0.51954
0.350	0.04414	0.25209	0.68632	-0.31813	-0.81802	0.51949
0.500	0.09004	0.35177	0.64124	-0.43502	-0.74067	0.51280
0.750	0.19712	0.50115	0.55171	-0.60431	-0.61441	0.49511
1.000	0.33865	0.62714	0.45634	-0.74274	-0.49430	0.46334
1.250	0.50873	0.72961	0.36440	-0.85228	-0.38397	0.41699
1.500	0.70162	0.81004	0.28177	-0.93582	-0.28681	0.35859
1.750	0.91216	0.87114	0.20974	-0.99699	-0.20524	0.29310
2.000	1.13584	0.91582	0.15002	-1.03984	-0.14029	0.22702
2.250	1.36896	0.94721	0.10305	-1.06647	-0.09132	0.16462
2.500	1.60654	0.96831	0.06760	-1.08668	-0.05644	0.11443
2.750	1.85244	0.98189	0.04221	-1.09978	-0.03314	0.07425
3.000	2.09907	0.99010	0.02501	-1.10397	-0.01842	0.04511
3.250	2.34723	0.99407	0.01403	-1.10738	-0.00949	0.02599
3.500	2.59633	0.99740	0.00744	-1.10913	-0.00481	0.01401
3.750	2.84584	0.99883	0.00372	-1.10998	-0.00224	0.00710
4.000	3.09564	0.99940	0.00175	-1.11037	-0.00100	0.00338
4.250	3.34564	0.99976	0.00078	-1.11054	-0.00042	0.00151
4.500	3.59554	0.99992	0.00032	-1.11061	-0.00016	0.00063
4.750	3.84554	0.99997	0.00013	-1.11063	-0.00004	0.00029
5.000	4.09554	0.99999	0.00005	-1.11064	-0.00002	0.00009
5.250	4.34554	1.00000	0.00002	-1.11064	-0.00001	0.00003
5.500	4.59554	1.00000	0.00001	-1.11065	0.00000	0.00001
5.750	4.84554	1.00000	0.00000	-1.11065	0.00000	0.00000
6.000	5.09554	1.00000	0.00000	-1.11065	0.00000	0.00000
6.250	5.34554	1.00000	0.00000	-1.11065	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_4$	$S$	$S'$
0.	0.00000	0.00000	0.64886	0.00000	-1.00000	0.50666
0.025	0.00020	0.01622	0.64870	-0.02484	-0.98733	0.50666
0.050	0.00081	0.03243	0.64823	-0.04937	-0.97467	0.50665
0.075	0.00182	0.04863	0.64746	-0.07350	-0.96200	0.50664
0.100	0.00324	0.06480	0.64639	-0.09747	-0.94934	0.50661
0.125	0.00506	0.08095	0.64504	-0.12104	-0.93667	0.50655
0.150	0.00729	0.09705	0.64339	-0.14430	-0.92401	0.50648
0.175	0.00992	0.11311	0.64148	-0.16724	-0.91135	0.50637
0.200	0.01294	0.12912	0.63929	-0.18987	-0.89869	0.50622
0.225	0.01637	0.14508	0.63683	-0.21210	-0.88604	0.50604
0.250	0.02020	0.16096	0.63412	-0.23417	-0.87339	0.50581
0.275	0.02442	0.17678	0.63116	-0.25595	-0.86075	0.50553
0.300	0.02904	0.19252	0.62795	-0.27721	-0.84811	0.50519
0.325	0.03404	0.20818	0.62451	-0.29825	-0.83549	0.50479
0.350	0.03944	0.22374	0.62083	-0.31908	-0.82287	0.50433
0.500	0.07990	0.31497	0.59429	-0.43675	-0.74752	0.49992
0.750	0.17644	0.45456	0.53591	-0.60814	-0.62423	0.46450
1.000	0.39682	0.58192	0.46541	-0.74931	-0.50633	0.45630
1.250	0.64606	0.68078	0.38899	-0.86204	-0.39718	0.41459
1.500	0.89460	0.77640	0.31234	-0.94891	-0.30005	0.36079
1.750	0.85270	0.84535	0.24042	-1.01327	-0.21745	0.29912
2.000	1.07086	0.89731	0.17691	-1.05895	-0.15067	0.23526
2.250	1.30014	0.93471	0.12412	-1.08991	-0.09952	0.17495
2.500	1.53723	0.96034	0.08283	-1.10990	-0.06251	0.12273
2.750	1.77956	0.97703	0.05246	-1.12215	-0.03727	0.08100
3.000	2.02522	0.98735	0.03146	-1.12928	-0.02105	0.05040
3.250	2.27288	0.99338	0.01785	-1.13321	-0.01126	0.02945
3.500	2.52169	0.99672	0.00954	-1.13526	-0.00569	0.01617
3.750	2.77111	0.99846	0.00483	-1.13627	-0.00272	0.00835
4.000	3.02084	0.99931	0.00230	-1.13674	-0.00123	0.00405
4.250	3.27071	0.99971	0.00103	-1.13695	-0.00052	0.00194
4.500	3.52068	0.99989	0.00044	-1.13704	-0.00021	0.00079
4.750	3.77066	0.99996	0.00017	-1.13707	-0.00008	0.00032
5.000	4.02065	0.99998	0.00006	-1.13708	-0.00003	0.00012
5.250	4.27065	0.99999	0.00002	-1.13709	-0.00001	0.00004
5.500	4.52065	1.00000	0.00001	-1.13709	0.00000	0.00001
5.750	4.77065	1.00000	0.00000	-1.13709	0.00000	0.00000
6.000	5.02065	1.00000	0.00000	-1.13709	0.00000	0.00000
6.250	5.27065	1.00000	0.00000	-1.13709	0.00000	0.00000

$$S(0) = -1.0$$

 $\beta = 0.50$ 
 $\beta = 0.28571$ 

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.98114	0.00000	-1.00000	0.49422
0.025	0.00018	0.01453	0.98107	-0.02405	-0.90764	0.49422
0.050	0.00073	0.02903	0.98083	-0.04730	-0.81529	0.49421
0.075	0.00163	0.04357	0.98045	-0.07361	-0.72793	0.49420
0.100	0.00290	0.05807	0.97991	-0.09753	-0.65036	0.49417
0.125	0.00454	0.07256	0.97921	-0.12114	-0.58223	0.49413
0.150	0.00653	0.08703	0.97836	-0.14444	-0.52507	0.49406
0.175	0.00889	0.10148	0.97736	-0.16743	-0.47352	0.49396
0.200	0.01161	0.11590	0.97620	-0.19012	-0.42618	0.49384
0.225	0.01468	0.13029	0.97489	-0.21249	-0.38283	0.49368
0.250	0.01812	0.14464	0.97343	-0.23456	-0.34349	0.49347
0.275	0.02192	0.15896	0.97181	-0.25632	-0.30816	0.49323
0.300	0.02607	0.17323	0.97003	-0.27777	-0.27683	0.49293
0.325	0.03058	0.18746	0.96811	-0.29891	-0.24951	0.49256
0.350	0.03544	0.20164	0.96603	-0.31974	-0.22720	0.49216
0.500	0.07200	0.28544	0.95504	-0.43830	-0.75363	0.48830
0.750	0.16026	0.41862	0.91276	-0.61156	-0.63305	0.47666
1.000	0.28839	0.54673	0.84217	-0.75522	-0.51726	0.44952
1.250	0.42940	0.64887	0.80157	-0.87085	-0.40936	0.41150
1.500	0.60349	0.74102	0.83508	-0.96082	-0.31246	0.36190
1.750	0.79850	0.81632	0.26771	-1.02821	-0.22911	0.30305
2.000	1.01026	0.87509	0.20364	-1.07663	-0.16082	0.24243
2.250	1.23479	0.91878	0.14730	-1.10909	-0.10772	0.18315
2.500	1.46858	0.94962	0.10115	-1.13167	-0.06867	0.13064
2.750	1.70875	0.97025	0.06370	-1.14522	-0.04158	0.08784
3.000	1.95307	0.98331	0.04032	-1.15324	-0.02387	0.05590
3.250	2.19997	0.99111	0.02336	-1.15772	-0.01297	0.03307
3.500	2.44835	0.99552	0.01276	-1.16010	-0.00667	0.01850
3.750	2.69755	0.99786	0.00657	-1.16129	-0.00324	0.00972
4.000	2.94710	0.99903	0.00310	-1.16184	-0.00148	0.00460
4.250	3.19702	0.99959	0.00145	-1.16211	-0.00064	0.00223
4.500	3.44695	0.99983	0.00062	-1.16222	-0.00026	0.00097
4.750	3.69693	0.99994	0.00027	-1.16226	-0.00010	0.00040
5.000	3.94692	0.99998	0.00010	-1.16228	-0.00004	0.00015
5.250	4.19691	0.99999	0.00003	-1.16228	-0.00001	0.00006
5.500	4.44691	1.00000	0.00001	-1.16228	0.00000	0.00002
5.750	4.69691	1.00000	0.00000	-1.16228	0.00000	0.00001
6.000	4.94691	1.00000	0.00000	-1.16228	0.00000	0.00000
6.250	5.19691	1.00000	0.00000	-1.16228	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fS_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.94192	0.00000	-1.00000	0.48618
0.025	0.00017	0.01355	0.94180	-0.02405	-0.90785	0.48618
0.050	0.00068	0.02709	0.94175	-0.04730	-0.81569	0.48618
0.075	0.00152	0.04063	0.94152	-0.07361	-0.72354	0.48616
0.100	0.00271	0.05417	0.94121	-0.09753	-0.65138	0.48614
0.125	0.00423	0.06769	0.94080	-0.12120	-0.58923	0.48610
0.150	0.00609	0.08121	0.94029	-0.14453	-0.52708	0.48603
0.175	0.00829	0.09471	0.93968	-0.16756	-0.46493	0.48595
0.200	0.01083	0.10819	0.93898	-0.19020	-0.40278	0.48583
0.225	0.01370	0.12166	0.93817	-0.21269	-0.34064	0.48566
0.250	0.01691	0.13510	0.93726	-0.23481	-0.27850	0.48550
0.275	0.02046	0.14852	0.93624	-0.25662	-0.21636	0.48527
0.300	0.02434	0.16191	0.93512	-0.27819	-0.15423	0.48500
0.325	0.02855	0.17527	0.93388	-0.29953	-0.09211	0.48460
0.350	0.03310	0.18860	0.93254	-0.32073	-0.03000	0.48411
0.500	0.06735	0.26775	0.92206	-0.43830	-0.75759	0.48074
0.750	0.15035	0.39516	0.84997	-0.61370	-0.63870	0.46813
1.000	0.26422	0.51421	0.49566	-0.75006	-0.52442	0.44478
1.250	0.40652	0.62204	0.40526	-0.87660	-0.41741	0.40924
1.500	0.57410	0.71613	0.34652	-0.98063	-0.32076	0.36221
1.750	0.76331	0.79495	0.28357	-1.03086	-0.23783	0.30657
2.000	0.97025	0.85708	0.22119	-1.06836	-0.16762	0.24602
2.250	1.19104	0.90597	0.16300	-1.12321	-0.11346	0.18951
2.500	1.42212	0.94064	0.11085	-1.16425	-0.07386	0.13601
2.750	1.66045	0.96434	0.07635	-1.16875	-0.04470	0.09253
3.000	1.90360	0.97966	0.04761	-1.16968	-0.02594	0.05927
3.250	2.14970	0.98608	0.02823	-1.17431	-0.01426	0.03571
3.500	2.39777	0.99336	0.01570	-1.17683	-0.00741	0.02023
3.750	2.64676	0.99727	0.00822	-1.17827	-0.00364	0.01077
4.000	2.89620	0.99875	0.00465	-1.17881	-0.00160	0.00530
4.250	3.14607	0.99946	0.00180	-1.17910	-0.00074	0.00253
4.500	3.39590	0.99970	0.00062	-1.17932	-0.00031	0.00112
4.750	3.64594	0.99991	0.00034	-1.17957	-0.00012	0.00046
5.000	3.89593	0.99997	0.00013	-1.17959	-0.00006	0.00010
5.250	4.14593	0.99999	0.00005	-1.17950	-0.00002	0.00007
5.500	4.39592	1.00000	0.00002	-1.17946	0.00000	0.00002
5.750	4.64592	1.00000	0.00001	-1.17946	0.00000	0.00001
6.000	4.89592	1.00000	0.00000	-1.17946	0.00000	0.00000
6.250	5.14592	1.00000	0.00000	-1.17946	0.00000	0.00000

$$S(0) = -1.0$$

 $\beta = 0.00$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	-1.00000	0.00000	0.00000
0.2	0.00030	0.00391	0.00931	-0.19061	-0.90600	0.00031	0.00031
0.4	0.00139	0.01651	0.04729	-0.36295	-0.81230	0.00139	0.00139
0.6	0.00430	0.02895	0.08173	-0.51561	-0.71962	0.00430	0.00430
0.8	0.01497	0.07100	0.15119	-0.65033	-0.62004	0.01497	0.01497
1.0	0.23290	0.46065	0.43430	-0.76701	-0.53937	0.43430	0.43430
1.2	0.33364	0.54325	0.41057	-0.80634	-0.49475	0.41057	0.41057
1.4	0.43072	0.62450	0.37969	-0.94920	-0.37561	0.37969	0.37969
1.6	0.52090	0.69676	0.34249	-1.01704	-0.30330	0.34249	0.34249
1.8	0.72007	0.76100	0.30045	-1.07113	-0.23094	0.30045	0.30045
2.0	0.80000	0.81669	0.25567	-1.11320	-0.18331	0.25567	0.25567
2.2	1.03495	0.86330	0.21050	-1.14507	-0.13670	0.21050	0.21050
2.4	1.23153	0.90107	0.16750	-1.16847	-0.09093	0.16750	0.16750
2.6	1.41402	0.93000	0.12061	-1.18516	-0.06940	0.12061	0.12061
2.8	1.60320	0.95200	0.09511	-1.19672	-0.06712	0.09511	0.09511
3.0	1.79357	0.96905	0.06771	-1.20443	-0.06995	0.06771	0.06771
3.2	1.99050	0.98057	0.04637	-1.20942	-0.07603	0.04637	0.04637
3.4	2.18747	0.98707	0.03054	-1.21253	-0.08120	0.03054	0.03054
3.6	2.38550	0.98920	0.01933	-1.21441	-0.08711	0.01933	0.01933
3.8	2.58450	0.98994	0.01170	-1.21590	-0.09400	0.01170	0.01170
4.0	2.78300	0.99777	0.00607	-1.21611	-0.09223	0.00607	0.00607
4.2	2.98150	0.99802	0.00300	-1.21644	-0.09110	0.00300	0.00300
4.4	3.18030	0.99940	0.00200	-1.21662	-0.09060	0.00200	0.00200
4.6	3.38330	0.99970	0.00100	-1.21670	-0.09030	0.00100	0.00100
4.8	3.58325	0.99980	0.00050	-1.21675	-0.09014	0.00050	0.00050
5.0	3.78325	0.99990	0.00020	-1.21677	-0.09004	0.00020	0.00020
5.2	3.98323	0.99997	0.00012	-1.21677	-0.09001	0.00012	0.00012
5.4	4.18322	0.99999	0.00005	-1.21676	-0.09001	0.00005	0.00005
5.6	4.38322	1.00000	0.00002	-1.21676	-0.09000	0.00002	0.00002
5.8	4.58322	1.00000	0.00001	-1.21676	-0.09000	0.00001	0.00001

 $\beta = -1.2$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.42370	0.00000	-1.00000	0.00000	0.42370
0.2	0.00052	0.00521	0.42650	-0.19003	-0.90634	0.00052	0.42650
0.4	0.00410	0.01706	0.42777	-0.36335	-0.81607	0.00410	0.42777
0.6	0.01679	0.05623	0.42753	-0.51762	-0.72604	0.01679	0.42753
0.8	0.13657	0.26145	0.42405	-0.65300	-0.63062	0.13657	0.42405
1.0	0.21320	0.42552	0.41570	-0.77243	-0.54003	0.42552	0.42552
1.2	0.30663	0.50732	0.40115	-0.87995	-0.46620	0.40115	0.40115
1.4	0.41590	0.50551	0.37901	-0.95620	-0.38793	0.37901	0.37901
1.6	0.54050	0.55009	0.35102	-1.02994	-0.31502	0.35102	0.35102
1.8	0.67903	0.72550	0.31612	-1.09610	-0.25110	0.31612	0.31612
2.0	0.83020	0.70402	0.27647	-1.15055	-0.19060	0.27647	0.27647
2.2	0.99241	0.63901	0.23620	-1.16462	-0.14673	0.23620	0.23620
2.4	1.16590	0.67049	0.19174	-1.15000	-0.10766	0.19174	0.19174
2.6	1.34825	0.91275	0.15145	-1.20009	-0.07632	0.15145	0.15145
2.8	1.52850	0.95934	0.11525	-1.22002	-0.05251	0.11525	0.11525
3.0	1.71054	0.99021	0.08041	-1.22947	-0.03405	0.08041	0.08041
3.2	1.91109	0.97550	0.05905	-1.23514	-0.02269	0.05905	0.05905
3.4	2.10764	0.98337	0.04024	-1.23673	-0.01700	0.04024	0.04024
3.6	2.30502	0.98994	0.02617	-1.24002	-0.00830	0.02617	0.02617
3.8	2.50340	0.99412	0.01635	-1.24222	-0.00405	0.01635	0.01635
4.0	2.70250	0.99660	0.00801	-1.24295	-0.00271	0.00801	0.00801
4.2	2.90207	0.99821	0.00505	-1.24330	-0.00140	0.00505	0.00505
4.4	3.10100	0.99900	0.00313	-1.24357	-0.00070	0.00313	0.00313
4.6	3.30100	0.99953	0.00160	-1.24360	-0.00030	0.00160	0.00160
4.8	3.50300	0.99977	0.00085	-1.24370	-0.00010	0.00085	0.00085
5.0	3.70157	0.99980	0.00042	-1.24370	-0.00000	0.00042	0.00042
5.2	3.90155	0.99995	0.00020	-1.24377	-0.00000	0.00020	0.00020
5.4	4.10154	0.99990	0.00000	-1.24370	-0.00002	0.00007	0.00007
5.6	4.30154	0.99990	0.00000	-1.24370	-0.00001	0.00003	0.00003
5.8	4.50154	1.00000	0.00002	-1.24370	0.00000	0.00001	0.00001
6.0	4.70154	1.00000	0.00001	-1.24370	0.00000	0.00000	0.00000

$$S(0) = -1.0$$

$$\beta = -.20$$

$$\beta = -.28$$

$\eta$	$f$	$f'$	$f''$	$f/3d_\eta$	$S$	$S'$
0.	0.00000	0.00000	0.38751	0.00000	-1.00000	0.44771
0.2	0.00776	0.07761	0.38902	-0.19105	-0.91047	0.44748
0.4	0.03108	0.15573	0.39241	-0.38420	-0.82110	0.44586
0.6	0.07010	0.23498	0.39591	-0.51952	-0.73231	0.44149
0.8	0.12495	0.31398	0.39770	-0.65720	-0.64477	0.43306
1.0	0.19569	0.39342	0.39597	-0.77758	-0.55942	0.41952
1.2	0.28226	0.47203	0.38907	-0.88119	-0.47736	0.40005
1.4	0.38437	0.54862	0.37569	-0.96882	-0.39981	0.37435
1.6	0.50148	0.62182	0.35512	-1.04150	-0.32802	0.34269
1.8	0.63278	0.69019	0.32744	-1.10049	-0.26307	0.30602
2.0	0.77715	0.75238	0.29353	-1.14724	-0.20585	0.26593
2.2	0.93324	0.80730	0.25511	-1.18337	-0.15685	0.22408
2.4	1.09953	0.85427	0.21443	-1.21054	-0.11610	0.18289
2.6	1.27441	0.89309	0.17395	-1.23038	-0.08352	0.14426
2.8	1.45624	0.92402	0.13397	-1.24444	-0.05819	0.10980
3.0	1.64353	0.94776	0.10228	-1.25488	-0.03925	0.08054
3.2	1.83493	0.96529	0.07397	-1.26049	-0.02560	0.05688
3.4	2.02931	0.97773	0.05140	-1.26460	-0.01614	0.03865
3.6	2.22576	0.98621	0.03430	-1.26715	-0.00982	0.02526
3.8	2.42360	0.99177	0.02196	-1.26868	-0.00577	0.01587
4.0	2.62233	0.99527	0.01352	-1.26956	-0.00327	0.00998
4.2	2.82161	0.99738	0.00799	-1.27005	-0.00178	0.00584
4.4	3.02122	0.99860	0.00453	-1.27032	-0.00094	0.00310
4.6	3.22102	0.99928	0.00247	-1.27045	-0.00048	0.00166
4.8	3.42091	0.99964	0.00129	-1.27052	-0.00023	0.00085
5.0	3.62086	0.99983	0.00065	-1.27055	-0.00011	0.00042
5.2	3.82084	0.99992	0.00031	-1.27057	-0.00005	0.00020
5.4	4.02083	0.99997	0.00014	-1.27058	-0.00002	0.00009
5.6	4.22082	0.99999	0.00006	-1.27058	-0.00001	0.00004
5.8	4.42082	0.99999	0.00003	-1.27058	0.00000	0.00002
6.0	4.62082	1.00000	0.00001	-1.27058	0.00000	0.00001
6.2	4.82082	1.00000	0.00000	-1.27058	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$f/3d_\eta$	$S$	$S'$
0.	0.00000	0.00000	0.33523	0.00000	-1.00000	0.43188
0.2	0.00671	0.06720	0.33742	-0.19136	-0.91364	0.43164
0.4	0.02693	0.13519	0.34101	-0.36547	-0.82742	0.43029
0.6	0.06088	0.20452	0.35047	-0.52236	-0.74168	0.42642
0.8	0.10885	0.27540	0.35813	-0.66221	-0.65780	0.41954
1.0	0.17113	0.34767	0.36418	-0.78529	-0.57416	0.40806
1.2	0.24797	0.42084	0.36674	-0.89206	-0.49412	0.39140
1.4	0.33947	0.49402	0.36408	-0.98319	-0.41797	0.36916
1.6	0.44550	0.56602	0.35477	-1.05950	-0.34683	0.34138
1.8	0.56570	0.63543	0.33797	-1.12233	-0.28175	0.30862
2.0	0.69940	0.70071	0.31364	-1.17275	-0.22344	0.27280
2.2	0.84562	0.76043	0.28262	-1.21229	-0.17311	0.23311
2.4	1.00312	0.81367	0.24658	-1.24251	-0.13042	0.19080
2.6	1.17048	0.86080	0.20780	-1.26498	-0.09549	0.15596
2.8	1.34615	0.89653	0.16882	-1.28020	-0.06703	0.12127
3.0	1.52858	0.92655	0.13201	-1.29255	-0.04688	0.08698
3.2	1.71631	0.94960	0.09923	-1.30024	-0.03110	0.06378
3.4	1.90882	0.96660	0.07168	-1.30529	-0.02003	0.04578
3.6	2.10662	0.97864	0.04968	-1.30848	-0.01246	0.03066
3.8	2.29922	0.98682	0.03305	-1.31044	-0.00740	0.01974
4.0	2.49716	0.99217	0.02110	-1.31160	-0.00434	0.01222
4.2	2.69995	0.99551	0.01292	-1.31226	-0.00242	0.00727
4.4	2.90527	0.99753	0.00759	-1.31262	-0.00130	0.00416
4.6	3.09491	0.99869	0.00428	-1.31281	-0.00060	0.00228
4.8	3.29471	0.99933	0.00232	-1.31291	-0.00034	0.00121
5.0	3.49462	0.99967	0.00120	-1.31296	-0.00016	0.00061
5.2	3.69457	0.99984	0.00060	-1.31298	-0.00008	0.00030
5.4	3.89455	0.99993	0.00029	-1.31299	-0.00003	0.00014
5.6	4.09454	0.99997	0.00013	-1.31300	-0.00001	0.00006
5.8	4.29454	0.99999	0.00006	-1.31300	-0.00001	0.00003
6.0	4.49453	0.99999	0.00002	-1.31300	0.00000	0.00001
6.2	4.69453	1.00000	0.00001	-1.31300	0.00000	0.00000

S(0) = -1.0

$\beta = -0.36$

$\beta = -0.36$

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.24475	0.00000	-1.00000	0.39990
0.2	0.00490	0.04914	0.24749	-0.19200	-0.92000	0.39977
0.4	0.01972	0.09932	0.25514	-0.36800	-0.84014	0.39885
0.6	0.04470	0.15145	0.26673	-0.52800	-0.76059	0.39636
0.8	0.08000	0.20620	0.28111	-0.67200	-0.68176	0.39190
1.0	0.12745	0.26399	0.29697	-0.80000	-0.60420	0.38551
1.2	0.18620	0.32493	0.31233	-0.91411	-0.52861	0.37714
1.4	0.25761	0.38870	0.32761	-1.01250	-0.45379	0.36580
1.6	0.34197	0.45490	0.33472	-1.09665	-0.38064	0.35055
1.8	0.43966	0.52226	0.33777	-1.16766	-0.32207	0.33993
2.0	0.55069	0.59090	0.33325	-1.22586	-0.26294	0.28077
2.2	0.67534	0.65950	0.32026	-1.27300	-0.20997	0.24842
2.4	0.81262	0.71709	0.29868	-1.31030	-0.16370	0.21412
2.6	0.96180	0.77409	0.27001	-1.33899	-0.12436	0.17934
2.8	1.12101	0.82668	0.23556	-1.36050	-0.09169	0.14563
3.0	1.29121	0.88007	0.19804	-1.37610	-0.06594	0.11443
3.2	1.46853	0.93387	0.16017	-1.38727	-0.04580	0.08684
3.4	1.65228	0.98828	0.12446	-1.39487	-0.03091	0.06157
3.6	1.84099	0.95393	0.09202	-1.39992	-0.02019	0.04403
3.8	2.03349	0.96976	0.06641	-1.40319	-0.01267	0.03043
4.0	2.22956	0.98087	0.04955	-1.40516	-0.00772	0.01987
4.2	2.42959	0.98833	0.02996	-1.40634	-0.00453	0.01248
4.4	2.62374	0.99319	0.01809	-1.40702	-0.00257	0.00753
4.6	2.82269	0.99613	0.01141	-1.40744	-0.00140	0.00437
4.8	3.02211	0.99789	0.00661	-1.40764	-0.00074	0.00243
5.0	3.22180	0.99890	0.00368	-1.40779	-0.00037	0.00130
5.2	3.42164	0.99942	0.00196	-1.40781	-0.00018	0.00067
5.4	3.62156	0.99973	0.00100	-1.40783	-0.00009	0.00033
5.6	3.82152	0.99985	0.00049	-1.40784	-0.00004	0.00016
5.8	4.02150	0.99994	0.00023	-1.40785	-0.00002	0.00007
6.0	4.22150	0.99998	0.00010	-1.40785	-0.00001	0.00003
6.2	4.42149	0.99999	0.00005	-1.40785	0.00000	0.00001
6.4	4.62149	1.00000	0.00002	-1.40785	0.00000	0.00001
6.6	4.82149	1.00000	0.00001	-1.40785	0.00000	0.00000

$\eta$	$f$	$f'$	$f''$	$fSd_{\eta}$	$S$	$S'$
0.	0.00000	0.00000	0.04112	0.00000	-1.00000	0.20050
0.2	0.00083	0.00836	0.04319	-0.19423	-0.94210	0.20040
0.4	0.00340	0.01755	0.04939	-0.37692	-0.86961	0.20037
0.6	0.00796	0.02839	0.05967	-0.54800	-0.82697	0.20005
0.8	0.01492	0.04169	0.07397	-0.70772	-0.76942	0.20740
1.0	0.02405	0.05823	0.09213	-0.85586	-0.71294	0.20620
1.2	0.03540	0.07870	0.11393	-0.99255	-0.65495	0.20449
1.4	0.04960	0.10403	0.13902	-1.11707	-0.59830	0.20182
1.6	0.06695	0.13457	0.16805	-1.23191	-0.54230	0.27001
1.8	0.11089	0.17090	0.19665	-1.33485	-0.48719	0.27277
2.0	0.14921	0.21330	0.22737	-1.42687	-0.43330	0.26581
2.2	0.19662	0.26182	0.25763	-1.50827	-0.38100	0.25681
2.4	0.25433	0.31621	0.28776	-1.57941	-0.33073	0.24556
2.6	0.32345	0.37585	0.30987	-1.64073	-0.28299	0.23160
2.8	0.40496	0.43975	0.32702	-1.69279	-0.23810	0.21556
3.0	0.49956	0.50649	0.33802	-1.73623	-0.19669	0.19896
3.2	0.60762	0.57433	0.34068	-1.77101	-0.15953	0.17826
3.4	0.72922	0.64170	0.32912	-1.80033	-0.12644	0.15432
3.6	0.86394	0.70530	0.30949	-1.82265	-0.09764	0.13162
3.8	1.01101	0.76440	0.28103	-1.83977	-0.07378	0.10914
4.0	1.16931	0.81727	0.24593	-1.85249	-0.05411	0.08770
4.2	1.33742	0.86240	0.20705	-1.86169	-0.03854	0.06835
4.4	1.51382	0.90004	0.16747	-1.86815	-0.02661	0.05130
4.6	1.69692	0.92973	0.13000	-1.87254	-0.01700	0.03727
4.8	1.88524	0.95233	0.09677	-1.87543	-0.01151	0.02609
5.0	2.07744	0.96881	0.06904	-1.87720	-0.00719	0.01793
5.2	2.27243	0.98034	0.04720	-1.87841	-0.00434	0.01135
5.4	2.46932	0.98806	0.03092	-1.87900	-0.00253	0.00706
5.6	2.66747	0.99302	0.01960	-1.87947	-0.00142	0.00423
5.8	2.86641	0.99607	0.01167	-1.87980	-0.00077	0.00243
6.0	3.06582	0.99788	0.00673	-1.87979	-0.00040	0.00134
6.2	3.26550	0.99869	0.00372	-1.87965	-0.00020	0.00071
6.4	3.46534	0.99945	0.00197	-1.87960	-0.00010	0.00036
6.6	3.66527	0.99973	0.00100	-1.87960	-0.00005	0.00018
6.8	3.86523	0.99988	0.00049	-1.87960	-0.00002	0.00008
7.0	4.06521	0.99994	0.00023	-1.87960	-0.00001	0.00004
7.2	4.26520	0.99990	0.00010	-1.87961	0.00000	0.00002
7.4	4.46520	0.99999	0.00004	-1.87961	0.00000	0.00001
7.6	4.66520	1.00000	0.00002	-1.87961	0.00000	0.00000
7.8	4.86520	1.00000	0.00001	-1.87961	0.00000	0.00000

$$S(0) = -10$$

$$\beta = -.32641(S)$$

$$\beta = -.28(R)$$

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	0.00000	0.00000	-1.00000	0.24778	
0.2	0.00001	0.00011	0.00162	-0.19504	-0.95044	0.24778	
0.4	0.00009	0.00084	0.00647	-0.38018	-0.90089	0.24778	
0.6	0.00044	0.00291	0.01456	-0.55540	-0.85133	0.24777	
0.8	0.00138	0.00690	0.02567	-0.72071	-0.80178	0.24773	
1.0	0.00337	0.01348	0.04041	-0.87611	-0.75225	0.24762	
1.2	0.00699	0.02328	0.07813	-1.02161	-0.70274	0.24737	
1.4	0.01294	0.03693	0.07899	-1.15722	-0.65331	0.24689	
1.6	0.02204	0.05506	0.10274	-1.28295	-0.60401	0.24604	
1.8	0.03539	0.07821	0.12925	-1.39884	-0.55493	0.24465	
2.0	0.05371	0.10691	0.15806	-1.50494	-0.50620	0.24251	
2.2	0.07804	0.14155	0.18859	-1.60135	-0.45800	0.23955	
2.4	0.11075	0.18240	0.21996	-1.68819	-0.41055	0.23609	
2.6	0.15184	0.22952	0.25103	-1.76564	-0.36415	0.23204	
2.8	0.20294	0.28270	0.28032	-1.83395	-0.31914	0.22701	
3.0	0.26528	0.34141	0.30612	-1.89342	-0.27593	0.22104	
3.2	0.33984	0.40470	0.32651	-1.94447	-0.23496	0.19550	
3.4	0.42742	0.47153	0.33962	-1.98758	-0.19648	0.18308	
3.6	0.52857	0.54004	0.34386	-2.02335	-0.16154	0.16716	
3.8	0.64343	0.60840	0.33809	-2.05243	-0.12993	0.14870	
4.0	0.77178	0.67459	0.32218	-2.07557	-0.10214	0.12911	
4.2	0.91299	0.73664	0.29688	-2.09355	-0.07832	0.10911	
4.4	1.06605	0.79284	0.26400	-2.10717	-0.05846	0.08954	
4.6	1.22965	0.84191	0.22613	-2.11719	-0.04242	0.07118	
4.8	1.40229	0.88316	0.18628	-2.12437	-0.02966	0.05472	
5.0	1.58238	0.91649	0.14740	-2.12934	-0.02037	0.04060	
5.2	1.76839	0.94235	0.11192	-2.13269	-0.01345	0.02905	
5.4	1.95888	0.96160	0.08149	-2.13486	-0.00859	0.02001	
5.6	2.15264	0.97539	0.05609	-2.13623	-0.00530	0.01326	
5.8	2.34873	0.98474	0.03606	-2.13706	-0.00315	0.00846	
6.0	2.54634	0.99090	0.02440	-2.13754	-0.00191	0.00518	
6.2	2.74494	0.99478	0.01500	-2.13781	-0.00100	0.00305	
6.4	2.94415	0.99712	0.00883	-2.13796	-0.00054	0.00173	
6.6	3.14372	0.99847	0.00499	-2.13804	-0.00028	0.00094	
6.8	3.34349	0.99922	0.00270	-2.13808	-0.00014	0.00049	
7.0	3.54338	0.99942	0.00140	-2.13810	-0.00007	0.00025	
7.2	3.74335	0.99982	0.00070	-2.13811	-0.00003	0.00012	
7.4	3.94330	0.99992	0.00033	-2.13811	-0.00001	0.00006	
7.6	4.14324	0.99996	0.00015	-2.13812	-0.00001	0.00002	
7.8	4.34320	0.99998	0.00007	-2.13812	0.00000	0.00001	
8.0	4.54320	0.99999	0.00003	-2.13812	0.00000	0.00000	
8.2	4.74320	1.00000	0.00001	-2.13812	0.00000	0.00000	
8.4	4.94320	1.00000	0.00000	-2.13812	0.00000	0.00000	

$\eta$	$f$	$f'$	$f''$	$f'''$	$f^{(4)}$	$S$	$S'$
0.	0.00000	0.00000	-0.01094	0.00000	-1.00000	0.19969	
0.2	-0.00062	-0.00411	-0.02782	-0.19601	-0.94006	0.19970	
0.4	-0.00242	-0.01178	-0.02640	-0.38402	-0.92812	0.19976	
0.6	-0.00527	-0.01656	-0.02692	-0.56405	-0.90813	0.19991	
0.8	-0.00895	-0.02000	-0.01313	-0.71688	-0.84814	0.20019	
1.0	-0.01315	-0.02164	-0.00210	-0.90810	-0.80000	0.20063	
1.2	-0.01747	-0.02169	0.00921	-1.05610	-0.75908	0.20125	
1.4	-0.02141	-0.01782	0.02382	-1.20405	-0.71955	0.20203	
1.6	-0.02439	-0.01140	0.04008	-1.34391	-0.67906	0.20297	
1.8	-0.02572	-0.00135	0.06016	-1.47565	-0.63836	0.20409	
2.0	-0.02465	0.01282	0.08191	-1.59924	-0.59746	0.20543	
2.2	-0.02020	0.03150	0.10600	-1.71442	-0.55635	0.20697	
2.4	-0.01160	0.05337	0.13228	-1.82177	-0.51500	0.20864	
2.6	0.00222	0.08042	0.16047	-1.92065	-0.47373	0.21040	
2.8	0.02255	0.11969	0.19089	-2.01120	-0.43230	0.21227	
3.0	0.05048	0.16070	0.22044	-2.09362	-0.39124	0.21426	
3.2	0.08073	0.20701	0.25055	-2.16770	-0.35032	0.21633	
3.4	0.11400	0.26002	0.27913	-2.23387	-0.31050	0.21846	
3.6	0.15192	0.31924	0.30463	-2.29286	-0.27155	0.21964	
3.8	0.20202	0.38235	0.32931	-2.34525	-0.23487	0.21988	
4.0	0.26510	0.44604	0.35326	-2.39181	-0.19951	0.17224	
4.2	0.44173	0.51755	0.36517	-2.43215	-0.16532	0.15924	
4.4	0.59213	0.50638	0.34157	-2.45213	-0.13405	0.14621	
4.6	0.67617	0.45352	0.32011	-2.47034	-0.10775	0.12757	
4.8	0.81330	0.37180	0.30525	-2.48566	-0.08390	0.10994	
5.0	0.98261	0.27580	0.27646	-2.51018	-0.06370	0.09207	
5.2	1.12200	0.02640	0.23602	-2.52121	-0.04712	0.07673	
5.4	1.25264	0.07011	0.19077	-2.52825	-0.03300	0.06072	
5.6	1.47059	0.08502	0.15041	-2.53493	-0.02151	0.04455	
5.8	1.65452	0.93413	0.12310	-2.53883	-0.01503	0.03260	
6.0	1.80359	0.95546	0.09112	-2.54141	-0.01031	0.02290	
6.2	2.03631	0.97895	0.05470	-2.54384	-0.00649	0.01550	
6.4	2.23105	0.98173	0.04406	-2.54409	-0.00395	0.01017	
6.6	2.42077	0.98893	0.03876	-2.54474	-0.00232	0.00630	
6.8	2.62705	0.99554	0.01001	-2.54506	-0.00131	0.00369	
7.0	2.82007	0.99637	0.01001	-2.54526	-0.00072	0.00223	
7.2	3.02552	0.99804	0.00622	-2.54536	-0.00020	0.00124	
7.4	3.22523	0.99890	0.00343	-2.54542	-0.00010	0.00067	
7.6	3.42500	0.99940	0.00182	-2.54544	-0.00000	0.00034	
7.8	3.62501	0.99975	0.00092	-2.54546	-0.00004	0.00017	
8.0	3.82499	0.99989	0.00045	-2.54546	-0.00002	0.00008	
8.2	4.02496	0.99995	0.00021	-2.54547	-0.00001	0.00004	
8.4	4.22494	0.99998	0.00009	-2.54547	0.00000	0.00002	
8.6	4.42495	0.99999	0.00004	-2.54547	0.00000	0.00001	
8.8	4.62495	1.00000	0.00002	-2.54547	0.00000	0.00000	
9.0	4.82495	1.00000	0.00001	-2.54547	0.00000	0.00000	





TABLE IV SUMMARY OF GLOBAL QUANTITIES

S(O)	$\beta$	$f''(O)$	$S'(O)$	$\theta_{tr}N$	$H_{tr}$	$\theta_{tr}^*N$
+1.0	20.00	8.32032	-.79348	-.21840	-2.95481	-.49052
	10.00	9.79955	-.75997	-.15222	-4.91004	-.39006
	2.00	2.48768	-.66146	.06727	16.98925	.08138
	1.00	1.73668	-.61558	.17610	7.86175	.27686
	0.50	1.23481	-.57289	.27462	5.99271	.44319
	0.28571	.96305	-.54332	.33835	5.46209	.54504
	0.00	.46960	-.46960	.46960	5.18220	.73848
	-.04	.37182	-.45001	.49606	5.26153	.77431
	-.08	.29435	-.42283	.52612	5.45698	.81336
	-.12	.08379	-.37229	.56047	6.08750	.85525
	-.129505	.00000	-.33892	.56761	6.72191	.86349
	-.12R	-.12588	-.25909	.53650	9.28853	.83394
	-.08R	-.16908	-.16518	.42294	16.49727	.73824
	-.04R	-.13782	-.08546	.27255	36.64144	.62446
	+.5	20.00	6.80892	-.37756	-.06726	-6.11152
10.00		4.77511	-.36224	-.01787	-27.81691	-.06736
2.00		2.09961	-.31772	.14941	5.52651	.23490
1.00		1.49158	-.29726	.23443	4.36261	.37890
0.50		1.08492	-.27844	.31254	3.94270	.50516
0.28571		.86493	-.26559	.36357	3.82643	.58425
0.00		.46960	-.23480	.46960	3.88865	.73848
-.04		.39363	-.22717	.49105	3.96009	.76774
-.08		.30568	-.21731	.51543	4.08679	.80002
-.12		.19545	-.20285	.54380	4.33825	.83607
-.157355		.00000	-.16709	.57426	5.35531	.87230
-.12R		-.15091	-.10264	.49021	9.89870	.79554
-.08R		-.15550	-.06787	.38140	16.59624	.70759
-.04R		-.11958	-.03423	.24030	36.44035	.60162
0.0		20.00	5.18072	.70907	.08276	2.07979
	10.00	3.67523	.68217	.11523	2.08950	.19028
	2.00	1.68722	.60520	.23078	2.15541	.37790
	1.00	1.23259	.57047	.29234	2.21623	.47528
	0.50	.92768	.53898	.35027	2.29694	.56454
	0.28571	.76274	.51786	.38872	2.36781	.62222
	0.00	.46960	.46960	.46960	2.59110	.73848
	-.04	.41495	.45849	.48573	2.65639	.76110
	-.08	.35351	.44493	.50468	2.74409	.78626
	-.12	.28176	.42736	.52628	2.87177	.81469
	-.16	.19078	.40165	.55219	3.09067	.84759
	-.198845	.00000	.32581	.58543	4.02923	.88698
	-.16R	-.12557	.21907	.52250	6.75200	.82714
	-.12R	-.14294	.19917	.43744	10.05630	.75489
	-.08R	-.13223	.10428	.33273	16.46750	.67249
-.04R	-.09664	.04955	.20228	35.94357	.57434	
-.2	20.00	4.48429	.13749	.14177	.53150	.24546
	10.00	3.20661	.13250	.16753	.81404	.28457
	2.00	1.51346	.11830	.26287	1.37876	.43150
	1.00	1.12410	.11195	.31926	1.56562	.51192
	0.50	.86228	.10623	.36526	1.72148	.58744
	0.28571	.72053	.10243	.39873	1.82484	.63702
	0.00	.46960	.09392	.46960	2.07288	.73848
	-.04	.42335	.09202	.48402	2.13375	.75842
	-.12	.31289	.08691	.51924	2.31179	.80583
	-.20	.14282	.07675	.57006	2.74728	.87024
	-.221155	.00000	.06408	.59223	3.52183	.89582
	-.20R	-.08638	.05119	.56672	4.76208	.86997
	-.12R	-.13321	.02809	.41334	10.01894	.73697
	-.04R	-.08553	.00824	.18453	35.58789	.56138

S(O)	$\beta$	f''(O)	S'(O)	$\theta_{tr}N$	H <sub>tr</sub>	$\theta_{tr}^*N$
-.4	20.00	3.75284	.26531	.19960	-.10988	.34637
	10.00	2.71619	.25623	.21879	.14144	.37265
	2.00	1.33335	.23063	.29448	.76387	.48264
	1.00	1.01219	.21927	.33794	.99518	.54728
	0.50	.79519	.20913	.38015	1.18356	.60979
	0.28571	.67745	.20246	.40870	1.30154	.65156
	0.00	.46960	.18784	.46960	1.55466	.73848
	-.08	.38985	.18096	.49606	1.67648	.77502
	-.16	.28750	.17069	.53125	1.86768	.82207
	-.20	.21842	.16258	.55463	2.03097	.85217
	-.247565	.00000	.12509	.60119	3.03940	.90734
	-.20R	-.10045	.08762	.54367	4.92383	.85049
	-.16R	-.11968	.06712	.47287	6.83187	.78810
	-.08R	-.10427	.03023	.28489	16.07477	.63820
	-.6	20.00	2.97574	.38133	.25540	-.46744
10.00		2.19796	.36942	.26837	-.28101	.45327
2.00		1.14560	.33608	.32542	.26016	.53090
1.00		.89627	.32140	.36028	.48769	.58117
0.50		.72618	.30839	.39491	.67770	.63150
0.28571		.63340	.29991	.41862	.79575	.66503
0.00		.46960	.28176	.46960	1.03644	.73848
-.08		.40748	.27354	.49176	1.14238	.76933
-.16		.32996	.26198	.52094	1.29130	.80903
-.24		.21759	.24185	.56385	1.55874	.86499
-.277805		.00000	.18074	.61307	2.59965	.92236
-.24R		-.07026	.14154	.57706	3.67395	.88478
-.16R		-.10531	.08521	.44419	6.73182	.76449
-.08R		-.08533	.03531	.25548	15.67498	.61688
-.8		20.00	2.13484	.48212	.30760	-.70299
	10.00	1.64218	.46931	.31511	-.57885	.52444
	2.00	.94832	.43337	.35535	-.16563	.57572
	1.00	.77554	.41755	.38216	.02944	.61334
	0.50	.65496	.40359	.40949	.19889	.65251
	0.28571	.58827	.39457	.42847	.30532	.67979
	0.00	.46960	.37568	.46960	.51822	.73848
	-.12	.39895	.36237	.49824	.66077	.77861
	-.20	.33641	.34902	.52551	.79921	.81597
	-.28	.24411	.32597	.56695	1.03368	.87063
	-.308615	.00000	.22601	.62789	2.24035	.94060
	-.28R	-.03950	.19405	.60465	2.80472	.91518
	-.20R	-.08041	.12373	.49019	4.82017	.80846
	-.12R	-.07511	.06003	.32090	9.28397	.66947
	-1.0	20.00	1.19344	.56109	.35255	-.88074
10.00		1.03080	.55099	.35656	-.81091	.58266
2.00		.73864	.52063	.38367	-.53741	.61622
1.00		.64886	.50666	.40330	-.39112	.64344
0.50		.58114	.49422	.42383	-.25764	.67270
0.28571		.54192	.48618	.43824	-.17187	.69341
0.00		.46960	.46960	.46960	.00000	.73848
-.12		.42578	.45835	.49129	.11129	.76937
-.20		.38751	.44771	.51153	.21230	.79781
-.28		.33523	.43183	.54045	.35612	.83761
-.36		.24475	.39990	.59091	.62726	.90392
-.36		.04112	.28850	.65762	1.60410	.97671
-.326415		.00000	.24778	.63897	2.06364	.95367
-.28R		-.03094	.19969	.59075	2.75848	.90363
-.20R		-.04855	.12184	.46170	4.52578	.78690
-.12R	-.03388	.04198	.27458	8.36154	.63421	

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13. ABSTRACT The development of governing equations and tabulation of similar solutions to the two-dimensional, laminar, compressible boundary layer with heat transfer are presented. Similar velocity and temperature profiles and global quantities such as displacement thickness, momentum thickness, form factor, etc., are presented for 116 pressure gradient-heat transfer combinations. Surface temperatures for these cases range from absolute zero ( $S(0) = -1$ ) to twice the free stream stagnation temperature ( $S(0) = +1$ ), while the streamwise pressure gradient varies from values corresponding to maximum reversed flow ( $\beta = -0.36$ ) to those of extremely accelerated flows ( $\beta = 20$ ). Results are presented at regular intervals of the parameters $S(0)$ and $\beta$ , allowing for straight-forward comparisons between cases. Five decimal place accuracy is maintained for all results.		

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