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SOME NUMERICAL SOLUTIONS OF SIMILARITY EQUATIONS FOR
THREE-DIMENSIONAL LAMINAR INCOMPRESSIBLE
BOUNDARY-LAYER FLOWS

By Peggy L. Yohner and Arthur G. Hansen

Lewis Flight Propulsion Laboratory
Cleveland, Ohio



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SUMMARY

Numerical solutions are presented for two classes of similarity equations corresponding to a range of three-dimensional boundary-layer flows. Equations for limiting-flow deflection and equations for the calculation of boundary-layer streamlines are also presented.

INTRODUCTION

Recent years have seen an increase in research activity aimed at understanding three-dimensional boundary-layer behavior. At present, basic research is continuing in both the theoretical and experimental phases of the problem. In the theoretical phase, one particular approach has been to seek exact solutions of the laminar incompressible boundary-layer equations as was done earlier for two-dimensional flows. The search for exact solutions has been based on the so-called similarity method in which the partial differential equations of the boundary layer are reduced to a two-equation system of ordinary differential equations. This research can in turn be divided into two categories. One category consists of solutions of specific problems. The other consists of general investigations for determining the circumstances under which similarity solutions exist. Research in this last category (e.g., refs. 1 to 6) has generally been carried to the point of obtaining the similarity equations but has not taken the next logical step, namely, solving the systems. In no small measure, this is a consequence of the complexity of the equations and the great variety of possible cases. Such a program is probably best accomplished by numerical analyses on high-speed computing equipment.

The value of carrying out a program for determining solutions of systems of similarity equations is twofold. First, the solutions can

give qualitative and quantitative information on boundary-layer behavior (see ref. 7). Secondly, the solutions provide a basis for developing so-called approximate methods (e.g., momentum integral techniques). In view of these considerations, certain specific systems of equations were chosen from reference 1 and analyzed on high-speed computers. The systems chosen correspond to mainstream flows which were felt to be of greatest practical interest from those given in reference 1. (A detailed discussion of the flows appears in the ANALYSIS section.) The research presented in the following sections will have three objectives:

- (1) Discussion and presentation of solutions of systems of similarity equations
- (2) Determination of characteristics of solutions under changes of basic flow parameters
- (3) Investigation of limiting boundary-layer deflection and calculation of boundary-layer streamlines.

ANALYSIS

The three-dimensional laminar incompressible boundary-layer equations in rectangular coordinates oriented as in figure 1 are

$$u \frac{\partial u}{\partial x} + v \frac{\partial u}{\partial y} + w \frac{\partial u}{\partial z} - \nu \frac{\partial^2 u}{\partial y^2} = U \frac{\partial U}{\partial x} + W \frac{\partial U}{\partial z} \quad (1a)$$

$$u \frac{\partial w}{\partial x} + v \frac{\partial w}{\partial y} + w \frac{\partial w}{\partial z} - \nu \frac{\partial^2 w}{\partial y^2} = U \frac{\partial W}{\partial x} + W \frac{\partial W}{\partial z} \quad (1b)$$

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

(All symbols are defined in the appendix.) The boundary conditions are

$$u = v = w = 0 \quad \text{for } y = 0$$

$$\lim_{y \rightarrow \infty} u = U \quad \lim_{y \rightarrow \infty} w = W$$

As explained in reference 4, the previous equations can be reduced to ordinary differential equations in terms of functions of a similarity parameter η under the transformation

$$\frac{u}{U} = F'(\eta) \quad (2a)$$

$$\frac{W}{\bar{W}} = G'(\eta) \quad (2b)$$

$$v = \frac{-\sqrt{v}}{g} \left[\left(\frac{\partial U}{\partial x} - U \frac{\partial \ln g}{\partial x} \right) F + \left(\frac{\partial W}{\partial z} - W \frac{\partial \ln g}{\partial z} \right) G + \right. \\ \left. U \frac{\partial \ln g}{\partial x} \eta F' + W \frac{\partial \ln g}{\partial z} \eta G' \right] \quad (2c)$$

where

$$\eta = \frac{y}{\sqrt{v}} g(x, z)$$

and where U , W , and $g(x, z)$ are defined by the four possible basic sets of values shown as follows (refs. 1 and 4):

Case I:

$$U = ax^n$$

$$W = bx^m$$

$$g = \sqrt{\frac{cU}{x}}$$

Case II:

$$U = ax^n z^{m-1}$$

$$W = bx^{n-1} z^m$$

$$g = \sqrt{\frac{cU}{x}}$$

Case III:

$$U = ae^{nx} z^{m-1}$$

$$W = be^{nx} z^m$$

$$g = \sqrt{cU}$$

Case IV:

$$U = ae^{nx}$$

$$W = be^{mx}$$

$$g = \sqrt{cU}$$

As explained in reference 4, the flows defined by Cases I to IV are restricted to take place over developable surfaces. (It is well known, however, that eqs. (1) apply only in regions where the principal curvatures of the surface are less than the corresponding boundary-layer thickness.) The coordinates x and z are then considered as a system of orthogonal coordinates embedded in the surface, which, furthermore, are geodesics of the surface. (If the surface is a plane, the coordinate system is the usual rectangular system.)

In each of the four cases, the equations of the main-flow streamlines in the vicinity of the surface can be determined from

$$\frac{dz}{dx} = \frac{W}{U} \quad (3)$$

The equations for main-flow streamlines are therefore:

Case I:

$$\left. \begin{aligned} z &= \frac{b}{a} \frac{x^{m-n+1}}{(m-n+1)} + \text{const.} \quad \text{for } m \neq n-1 \\ z &= \frac{b}{a} \ln x + \text{const.} \quad \text{for } m = n-1 \end{aligned} \right\} \quad (4a)$$

Case II:

$$z = (\text{const.})x^{b/a} \quad (4b)$$

Case III:

$$z = (\text{const.})e^{(b/a)x} \quad (4c)$$

Case IV:

$$z = \frac{b}{a(m-n)} e^{(m-n)x} + \text{const.} \quad (4d)$$

Of these four cases, I and II were chosen for further analysis. Limited time and effort necessitated choosing only certain classes of problems, and it was felt that I and II corresponded to flows of greatest practical importance. One reason for this choice is that it is possible to define mainstream flows with pressure gradients which either give rise to boundary layers starting from a leading edge or from a stagnation line or point. In Cases III and IV this is not possible. (A discussion of this problem is given on p. 10 of ref. 1.)

The ordinary differential equations resulting from substitution of equations (2) into equations (1) are as follows for Cases I and II:

Case I:

$$n(F'^2 - 1) - \frac{n+1}{2} FF'' - F''' = 0 \quad (5a)$$

$$m(F'G' - 1) - \frac{n+1}{2} G''F - G''' = 0 \quad (5b)$$

where $c = 1$ in expression for g .

Case II:

$$n(F'^2 - 1) - \frac{n+1}{2} FF'' + p(m-1)(G'F' - 1) - \frac{p(m+1)}{2} GF'' - F''' = 0 \quad (6a)$$

$$pm(G'^2 - 1) - \frac{p(m+1)}{2} GG'' + (n-1)(F'G' - 1) - \frac{n+1}{2} G''F - G''' = 0 \quad (6b)$$

where $p = b/a$ and $c = 1$.

The boundary conditions for both cases are

$$F(0) = F'(0) = G(0) = G'(0) = 0$$

$$\lim_{\eta \rightarrow \infty} F'(\eta) = 1, \quad \lim_{\eta \rightarrow \infty} G'(\eta) = 1$$

CALCULATIONS OF SOLUTIONS

A method is presented for the numerical solution of the preceding equations. The calculations were done on the IBM 650 Magnetic Drum Data Processing Machine with a 653 High-Speed Storage Unit, Indexing Accumulators, and Floating Point Arithmetic. All calculations used single precision arithmetic, that is, eight significant figures.

In order to avoid large truncation errors introduced in the first term of each of the equations to be solved, the following changes in variable were introduced:

Let

$$\phi(\eta) = F(\eta) - \eta \quad \text{and} \quad \psi(\eta) = G(\eta) - \eta$$

then

$$\varphi'(\eta) = F'(\eta) - 1 \quad \psi'(\eta) = G'(\eta) - 1$$

$$\varphi''(\eta) = F''(\eta) \quad \psi''(\eta) = G''(\eta)$$

and

$$\varphi'''(\eta) = F'''(\eta) \quad \psi'''(\eta) = G'''(\eta)$$

The equations to be solved then become:

Case I:

$$n(\varphi'^2 + 2\varphi') - \left(\frac{n+1}{2}\right)(\varphi\varphi'' + \varphi''\eta) - \varphi''' = 0 \quad (7a)$$

$$m(\varphi'\psi' + \varphi' + \psi') - \left(\frac{n+1}{2}\right)(\varphi\psi'' + \psi''\eta) - \psi''' = 0 \quad (7b)$$

Case II:

$$n(\varphi'^2 + 2\varphi') - \frac{n+1}{2}(\varphi\varphi'' + \varphi''\eta) + p(m-1)(\varphi'\psi' + \varphi' + \psi') - \frac{p(m+1)}{2}(\psi\varphi'' + \varphi''\eta) - \varphi''' = 0 \quad (8a)$$

$$pm(\psi'^2 + 2\psi') - \frac{p(m+1)}{2}(\psi\psi'' + \psi''\eta) + (n-1)(\varphi'\psi' + \varphi' + \psi') - \frac{n+1}{2}(\psi''\varphi + \psi''\eta) - \psi''' = 0 \quad (8b)$$

The following boundary conditions hold for both equations:

$$\varphi(0) = 0$$

$$\varphi'(0) = -1.0$$

$$\lim_{\eta \rightarrow \infty} \varphi'(\eta) = 0$$

$$\psi(0) = 0$$

$$\psi'(0) = -1.0$$

$$\lim_{\eta \rightarrow \infty} \psi'(\eta) = 0$$

Each third-order equation was treated as a set of three simultaneous first-order equations, and the integration was done using the Runge-Kutta method with fourth-order accuracy. For example, equations (7a) and (7b) for Case I were rewritten in the following manner:

Let

$$\varphi' = P \quad (9a)$$

$$\psi' = R \quad (9b)$$

and

$$P' = Q = \varphi'' \quad (9c)$$

$$R' = S = \psi'' \quad (9d)$$

Substituting equations (9a), (9b), (9c), and (9d) into (7a) and (7b) gives

$$Q' = n(P^2 + 2P) - \frac{n+1}{2} (\varphi Q + Q\eta) \quad (9e)$$

$$S' = m(PR + P + R) - \frac{n+1}{2} (\varphi S + S\eta) \quad (9f)$$

The previous set of six simultaneous first-order differential equations (eqs. (9)) for Case I was programmed for numerical solution. Case II was treated in a similar manner.

The approach used to find the solutions to the equations was to assume values for $F''(0)$ and $G''(0)$, hereinafter called eigenvalues, and integrate the equations numerically to a finite set value of η , labeled " ∞ ". For purposes of computational brevity ∞ was defined as that value of η (to the next largest whole number) at which $F'(\eta) = 1.0 \pm 0.000005$ and $F''(\eta) = 0.0 \pm 0.000005$. The trial eigenvalues were then adjusted, and the process was repeated until the boundary conditions were satisfied. The step-size control was external. The step size was set such that there was no significant change in the eigenvalues when the example was rerun with a step size equal to one-half of the original value.

The results of the numerical solutions for Case I are tabulated in table I. Each part of this table contains the values of η , $G(\eta)$, $G'(\eta)$, and $G''(\eta)$ which satisfy the boundary conditions for given values of m and n . Examination of equations (5a) and (5b) shows that when $m = n$ then $F \equiv G$; therefore, there are no tabulations of $F(\eta)$ and its derivatives for the Case I solutions. They are available from the G tables for which m and n are equal.

In Case II, a similar condition exists. Examination of equations (6a) and (6b) reveals that $F \equiv G$ when $p = 1$. In addition to this, when $p = 1$, the solutions are not dependent on m and n but are dependent only on $m + n$. Tables II(1) to (8) contain the results for Case II when $p = 1$, tabulated in a similar manner to Case I, with $m + n$ as the parameter.

The solutions for Case II for $p = 2$ are presented in tables II(9) to (22). Here the results are presented in two parts. Part (a) in each table contains the values of η , $F(\eta)$, $F'(\eta)$, and $F''(\eta)$; whereas part (b) contains the values of η , $G(\eta)$, $G'(\eta)$, and $G''(\eta)$.

In all the aforementioned tables, the results are presented to three-decimal-place accuracy. However, in most solutions, the eigenvalues had to be determined to the full eight-significant-figure precision in order to match the required boundary conditions. Table III lists the accurate eigenvalues for all cases as well as the values for the ratio $G''(0)/F''(0)$. In addition, table III contains an index to the preceding tables indicating the correspondence between the values of the parameters m , n , and p and the table number in which the solution is presented.

GENERAL PROPERTIES OF SOLUTIONS

Examination of figures 2 to 4 discloses trends in the graphed solutions as the parameters n , m , and p vary. In this section, an attempt will be made to analyze these trends and ascertain general properties of the solutions.

Solutions for Case I

Examination of equation (4a) indicates that the solutions for Case I apply to differing types of main-flow streamlines depending on the relation between m and n . When $m = n$, the main-flow streamline is linear; when $m = n - 1$, the streamline is logarithmic; when $m = n - d$,

$d > 1$, the equation of the streamline takes the form $z = -\frac{1}{(d-1)x^{d-1}}$;

and, finally, when $m = n + d$, $d > -1$, the equation of the streamline takes the form $z = x^{d+1}/(d+1)$. In order to illustrate the previous variation, curves were plotted from equation (4a) for $b/a = 1$. These streamlines are shown in figure 5. Examination of figures 2 (e.g., fig. 2(b)) and 5 shows that certain features of the F' and G' variations with m and n can be related to the streamline configurations. When $m < n - 1$, the streamline shape is that of a negative-reciprocal-power curve while $G'(\eta) < F'(\eta) \leq 1.0$. When $m = n - 1$, the streamline shape is logarithmic and $G'(\eta) < G'(\eta) < F'(\eta) \leq 1.0$. When $m = n$, the

$m < n - 1$ $m = n - 1$

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streamline shape is linear while $G'(\eta) = F'(\eta) \leq 1.0$. Finally, when $m > n$, the shapes of the streamlines are power curves, $G'(\eta) > F'(\eta)$, and $G'(\eta)$ does exceed 1.0.

Studies of approximate solutions made of Case I in reference 5 indicated that the curves of the solutions should fall in certain well-determined regions in the plane. However, the form of the equations examined was not the same as that given in equations (5a) and (5b). The form was altered by a transformation of the variable η given by

$$\eta^* = \sqrt{\frac{n+1}{2}} \eta \tag{10}$$

With this transformation, equations (5a) and (5b) become

$$\frac{2n}{n+1} (F'^2 - 1) - FF'' - F''' = 0 \tag{11a}$$

$$\frac{2m}{n+1} (F'G' - 1) - FG'' - G''' = 0 \tag{11b}$$

where the primes now indicate differentiation with respect to η^* . First, it is observed that as $n \rightarrow \infty$ equations (11a) and (11b) might be approximated by

$$2(F_\infty'^2 - 1) - F_\infty F_\infty'' - F_\infty''' = 0 \tag{12a}$$

$$F_\infty G_\infty'' + G_\infty''' = 0 \tag{12b}$$

The solution for F_∞' from equation (12a) is plotted in figure 6. The solution for G_∞' from equation (12b) is given by

$$G_\infty' = c \int_0^{\eta^*} e^{-\int_0^{\eta^*} F_\infty(\eta^*) d\eta^*} d\eta^* \tag{13}$$

where the constant c is chosen to fulfill the boundary condition

$$\lim_{\eta \rightarrow \infty} G_\infty' = 1$$

The solution for G_∞' from equation (13) can be obtained by quadratures and is also shown in figure 6.

It is conjectured in reference 5 that the curves F_∞' and G_∞' divide the plane into three regions such that the curves for $G'(\eta^*)$ can

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be characterized as always falling in a specific region for a range of values of n and m . This conjecture was examined more closely by plotting $G'(\eta^*)$ for $n = 0, 4,$ and 10 . The results are shown in figure 5. The region to the left of F'_∞ is designated by A, the region between F'_∞ and G'_∞ by B, and the region to right of G'_∞ by C.

If $m = 0$ in equation (11b), the result is $F_n G''_{n,0} + G''_{n,0} = 0$, which is the same form as equation (12b). It might be expected, therefore, that the solutions for $G'_{n,0}$ should be related to the $G'_{\infty,m}$ curve. This relation is illustrated in figure 6. For $m = 0$, the G' curves lie in region C and approach the $G'_{\infty,m}$ curve as n increases. For $n > 1$ the main-flow streamlines are the negative-reciprocal-power type (fig. 5).

When $m > 0$, the $G'_{m,n}$ curves have a relation to the F'_∞ curve in the following manner. The $G'_{m,n}$ curves are nearest to the F'_∞ curve (in fig. 6) whenever $m = n \neq 0$. This result is reasonable since $F' = G'$ when $m = n$. However, when $m > n$, the $G'_{m,n}$ curves are found in region A, and the main-flow streamlines are the integral-power type in figure 5. When $m \leq n$, the $G'_{m,n}$ curves are located in region B, and the main-flow streamlines are the linear-, logarithmic-, or negative-reciprocal-power curve in figure 5.

Solutions for Case II

Examination of the curves of Case II (figs. 3 and 4) reveals the following general trends in the solutions. In all solutions computed, all values of F' and G' lie below 1.0 in contrast to the solutions found for Case I. For $p = 1$, $F' = G'$, and the curves shift to the left for increasing values of $n + m$ (fig. 3). For $p = 2$, the curves for F' and G' have roughly the same shape. The curves for G' lie slightly to the left of the corresponding F' curves with the increment between the two curves decreasing as either m or n increases (fig. 4). The curves shift to the left with increasing values of m or n , however, the variation is less sensitive to n than m . It should be noted that the shape of the main-flow streamlines when $p = 1$ is linear, and, when $p = 2$, the shape is parabolic.

DETERMINATION OF LIMITING-FLOW DEFLECTION

AND BOUNDARY-LAYER STREAMLINES

By knowing the solutions from previous sections it is a simple matter to calculate the limiting-flow deflection of the boundary layer on the

surface and also the actual boundary-layer streamlines for a given flow. Derivation of appropriate equations and various numerical calculations are given as follows.

Limiting-Flow Deflection of Boundary Layer

The limiting-flow deflection angle α of the boundary layer is defined by

$$\tan \alpha = \lim_{y \rightarrow 0} \frac{w}{u} = \lim_{\eta \rightarrow 0} \frac{W}{U} \frac{G'(\eta)}{F'(\eta)} \quad (14)$$

As $G'(0) = F'(0) = 0$, evaluation of $\tan \alpha$ requires the application of L'Hospital's rule. The result is

$$\tan \alpha = \frac{W}{U} \frac{G''(0)}{F''(0)} \quad (15)$$

Values of $G''(0)/F''(0)$ for the range of parameters used in the solution of Cases I and II are given in table III. In Case II it follows at once for $p = 1$ that $G''(0)/F''(0) = 1$ as the F' and G' curves coincide.

The large number of values of $G''(0)/F''(0)$ makes it desirable to study the variations of these values with changes in a given parameter. Consequently, the various values of $G''(0)/F''(0)$ for Case I are plotted against m in figure 7(a). The curves in the log-log coordinate system depicted are plotted for values of n ranging from 0 to 10. (The value for $m = 0$ is, of course, omitted.) It is seen that the curves are generally quite flat, and, in the case of $n = 0$, the curve approximates closely a straight-line variation. Furthermore, the portion of the curve from $m = 6$ on becomes quite linear in all cases. It is interesting to note that, for increasing n , the slopes of the curves at $m = 10$ apparently approach a relatively constant limiting direction.

The curves for Case II, $p = 2$, are shown in figure 7(b). There are striking differences between the two figures. In figure 7(b), the range of values for $G''(0)/F''(0)$ is very small compared with figure 7(a). Also, for $n = 0$, the curve is extremely nonlinear, with linearity being approached as n increases. As either m or n increase, the ratio of the eigenvalues approaches 1.0, and the curves approach zero slope.

The "limiting streamline" at the wall can be calculated from the differential equation:

$$\frac{dz}{dx} = \tan \alpha = \frac{G''(0)}{F''(0)} \frac{W}{U} \quad (16)$$

It follows that the limiting streamlines for Cases I and II are:

Case I:

$$z = \frac{G''(0)}{F'''(0)} \frac{b}{a} \frac{x^{m-n+1}}{(m-n+1)} + \text{const.} \quad (17)$$

Case II:

$$z = \text{const.} \frac{G''(0)}{F'''(0)} x^{b/a} \quad (18)$$

Numerical Calculation of Limiting Streamlines

As an illustration of the calculation of limiting streamlines, the following specific example is considered.

From Case I, choose

$$m - n + 1 = 3$$

$$\frac{b}{a(m-n+1)} = 1$$

and calculate limiting streamlines for the pairs of values

$$\begin{array}{l} n = 0, \quad n = 2, \quad n = 4, \quad n = 6, \quad n = 8 \\ m = 2, \quad m = 4, \quad m = 6, \quad m = 8, \quad m = 10 \end{array}$$

The equation for the main-flow streamline is seen to be

$$z = x^3$$

A plot of the various limiting streamlines is given in figure 8.

It might be well at this point to examine the physical implications of the results given in figure 8. To this end, consider the mainstream velocity defined by

$$\text{Velocity} = \sqrt{U^2 + W^2} = ax^n \sqrt{1 + 9x^4}$$

It is seen that, for $x \leq 1$, the higher the values of n , the smaller the velocity. Now, near $x = 0$, the boundary layer feels an acceleration normal to the main-flow streamline which is proportional to $\text{velocity}^2/r$ where r is the radius of curvature of the streamline. One would expect, therefore, that greater overturning of the boundary layer would occur initially for the smaller values of n (i.e., higher velocities). Once the boundary layer has initially turned, the influence of

the resultant mainstream pressure gradient on further turning is generally decreased as the boundary-layer direction approaches more closely the direction of the pressure gradient. These facts are evident in figure 8. It should also be noted that, for the particular case $n = 0$, velocity $\neq 0$ at $x = 0$, and, as a result, this case corresponds to a different type of physical situation than that of the other curves shown in figure 8.

Boundary-Layer Streamlines

The equation of the boundary-layer streamlines for a given flow can be obtained parametrically by separately determining the projection of streamlines in the x, y plane and the z, x plane. The calculation of the boundary-layer streamlines for Case I will initially be considered.

The projection of the streamlines in the x, y plane can be found from the differential equation $dy/dx = v/u$. Employing equations (2a) and (2c) in this equation gives

$$\frac{dy}{dx} = \frac{v}{u} = \frac{-\gamma\sqrt{v}}{UF'(\eta)g} \left[\left(\frac{\partial U}{\partial x} - U \frac{\partial \ln g}{\partial x} \right) F + \left(\frac{\partial W}{\partial z} - W \frac{\partial \ln g}{\partial z} \right) G + U \frac{\partial \ln g}{\partial x} \eta F' + W \frac{\partial \ln g}{\partial z} \eta G' \right] \quad (19)$$

For Case I, this becomes

$$\frac{dy}{dx} = -\frac{1}{2x} \sqrt{\frac{vx}{cU}} \frac{1}{F'} \left[(n+1)F + (n-1)\eta F' \right] \quad (20)$$

Along a streamline, y can be considered a function of x ; hence, $\eta = y \sqrt{\frac{cU}{vx}}$ can be considered a function of x . By differentiating η with respect to x and employing equation (20), the following equation can be obtained:

$$\frac{dx}{x} = \frac{-2}{n+1} \frac{\partial \ln F}{\partial \eta}$$

Integration of this equation then yields

$$x = \frac{K}{F^{2/(n+1)}} \quad (21)$$

By specifying the initial values x_0 and η_0 , $F(\eta_0)$ can be calculated for a given n , and the value of the constant stream function K can be calculated. For this value of K , $F(\eta)$ and, hence, η (and $G'(\eta)$) can be obtained from the tables for all values of x along the streamline.

With a correspondence established between x and η for all points along the streamline, y can be computed from $y = \eta \sqrt{\frac{v_x}{cU}}$. The projection of the streamline in the x, y plane is thereby obtained.

The projection of the boundary-layer streamline in the x, z plane can be obtained from

$$\frac{dz}{dx} = \frac{w}{u} = \frac{WG'}{UF'} = \frac{bx^{m-n}}{a} \frac{G'}{F'} \quad (22)$$

With a correspondence established between x and η along a streamline by equation (21), the right side of equation (22) is determined as a function of x alone. Hence, integration of equation (22) gives

$$z = \frac{b}{a} \int_{x_0}^x x^{m-n} \frac{G'(\eta)}{F'(\eta)} dx + z_0 \quad (23)$$

On the other hand, if the expression for x given by equation (21) is substituted into equation (23), there is obtained

$$z = \frac{-2K^{m-n+1}}{n+1} \frac{b}{a} \int_{\eta_0}^{\eta} \frac{G'}{\frac{2m-n+3}{F^{n+1}}} d\eta + z_0 \quad (24)$$

Equations (21) and (24) can then be considered as parametric equations for the projection of the boundary-layer streamline in the x, z plane with η as the parameter.

An example of the use of equations of the previous type can be found in reference 7.

For Case II a slightly differing procedure is required inasmuch as z now enters as a variable in the expression for η and it is not possible to solve for x directly. However, the three relations, $\frac{dy}{dx} = f(x, z, \eta)$, $\frac{dz}{dx} = f(x, z, \eta)$, and $\eta = f(x, y, z)$, can be solved simultaneously for the calculation of the streamlines. The result is given as follows where η serves as a parameter:

$$x = x_0 e^{-2 \int_{\eta_0}^{\eta} \frac{F' d\eta}{(n+1)F + (m+1)\frac{b}{a}G}} \quad (25)$$

$$z = z_0 e^{-2\frac{b}{a} \int_{\eta_0}^{\eta} \frac{G' d\eta}{(n+1)F + \frac{b}{a}(m+1)G}} \quad (26)$$

$$y = y_0 e^{\int_{\eta_0}^{\eta} \left[\frac{1}{\eta} + \frac{(n-1)F' + \frac{b}{a}(m-1)G'}{(n+1)F + \frac{b}{a}(m+1)G} \right] d\eta} \quad (27)$$

where

$$\eta_0 = y_0 \sqrt{\frac{ax_0^{n-1}}{bv} z_0^{m-1}}$$

CONCLUDING REMARKS

A number of solutions for two classes of similarity equations have been presented. The similarity equations were obtained from boundary-layer equations referred to rectangular coordinates. The main-flow streamlines for one class of flows (Case I) are curves on which corresponding points on any two streamlines are related by a constant displacement along one of the coordinate axes (a system of translates). The streamlines for the other set (Case II) are lines emanating from a point. The first class of flows might be used to analyze flows qualitatively which give rise to boundary layers originating near a leading edge or stagnation line. The second class of flows would probably find application in investigation of boundary layers originating near a point (e.g., stagnation-point flow).

The computed solutions for the first class of flows indicate that curves of the similarity function $G'(\eta)$ be in one of the three regions in the plane depending upon a choice of parameters. These parameters are exponents appearing in expressions for main-flow velocity components and, consequently, in the expression for main-flow streamlines. Sample curves of main-flow streamlines are shown that indicate the varying types of flows for which these solutions are applicable.

Equations are presented for the limiting streamlines. A numerical example is given for a flow of Case I type, and several limiting streamlines are plotted.

Finally, an analysis gives the parametric equations for calculation of streamlines in the boundary for both Case I and Case II.

Lewis Flight Propulsion Laboratory
National Advisory Committee for Aeronautics
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APPENDIX - SYMBOLS

| | |
|---------------|--|
| a,b,c,d | constants |
| F,F(η) | function of similarity parameter, $u \equiv UF'(\eta)$ |
| F $_{\infty}$ | particular function of η , eqs. (12) |
| G,G(η) | function of similarity parameter, $w = WG'(\eta)$ |
| G $_{\infty}$ | particular function of η , eqs. (12) |
| g,g(x,z) | function of coordinates x and z, $g = \eta\sqrt{v}/y$ |
| K | constant of integration for stream equation in x,y plane |
| m,n,p | constants |
| P,R | symbols for ϕ' and ψ' , respectively |
| Q,S | symbols for P' and R', respectively |
| U,W | mainstream velocity components in x- and z-directions, respectively |
| u,v,w | boundary-layer velocity components in x-, y-, and z-directions, respectively |
| x,y,z | rectangular coordinates |
| α | limiting-flow deflection angle |
| η | similarity (space) variable, $\eta \equiv \frac{y}{\sqrt{v}} g(x,z)$ |
| η^* | similarity variable, $\eta^* = \sqrt{\frac{n+1}{2}} \eta$ |
| ν | coefficient of kinematic viscosity |
| ϕ | function of η , $\phi = F(\eta) - \eta$ |
| ψ | function of η , $\psi = G(\eta) - \eta$ |

Subscript:

0 constant

Superscripts:

Primes denote differentiation

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TABLE I. - NUMERICAL SOLUTION TO CASE I ($U = ax^m$, $W = bx^m$)

(1) $n = 0$ and $m = 0$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 0.332 | 2.500 | 0.996 | 0.751 | 0.217 | 5.000 | 3.283 | 0.992 | 0.016 |
| .050 | .000 | .017 | .332 | 2.550 | 1.034 | .762 | .212 | 5.050 | 3.333 | .992 | .015 |
| .100 | .002 | .033 | .332 | 2.600 | 1.073 | .772 | .206 | 5.100 | 3.383 | .993 | .013 |
| .150 | .004 | .050 | .332 | 2.650 | 1.111 | .783 | .201 | 5.150 | 3.432 | .994 | .012 |
| .200 | .007 | .066 | .332 | 2.700 | 1.151 | .793 | .195 | 5.200 | 3.482 | .994 | .011 |
| .250 | .010 | .083 | .332 | 2.750 | 1.191 | .802 | .190 | 5.250 | 3.532 | .995 | .010 |
| .300 | .015 | .100 | .332 | 2.800 | 1.231 | .812 | .184 | 5.300 | 3.581 | .995 | .010 |
| .350 | .020 | .116 | .332 | 2.850 | 1.272 | .821 | .178 | 5.350 | 3.631 | .996 | .009 |
| .400 | .027 | .133 | .331 | 2.900 | 1.313 | .829 | .173 | 5.400 | 3.681 | .996 | .008 |
| .450 | .034 | .149 | .331 | 2.950 | 1.355 | .838 | .167 | 5.450 | 3.731 | .997 | .007 |
| .500 | .041 | .166 | .331 | 3.000 | 1.397 | .846 | .161 | 5.500 | 3.781 | .997 | .007 |
| .550 | .050 | .182 | .331 | 3.050 | 1.439 | .854 | .156 | 5.550 | 3.830 | .997 | .007 |
| .600 | .060 | .199 | .330 | 3.100 | 1.482 | .862 | .150 | 5.600 | 3.880 | .997 | .005 |
| .650 | .070 | .215 | .330 | 3.150 | 1.525 | .869 | .145 | 5.650 | 3.930 | .998 | .005 |
| .700 | .081 | .232 | .329 | 3.200 | 1.569 | .876 | .139 | 5.700 | 3.980 | .998 | .004 |
| .750 | .093 | .248 | .328 | 3.250 | 1.613 | .883 | .134 | 5.750 | 4.030 | .998 | .004 |
| .800 | .106 | .265 | .327 | 3.300 | 1.657 | .889 | .128 | 5.800 | 4.080 | .998 | .004 |
| .850 | .120 | .281 | .326 | 3.350 | 1.702 | .896 | .123 | 5.850 | 4.130 | .999 | .003 |
| .900 | .134 | .297 | .325 | 3.400 | 1.747 | .902 | .118 | 5.900 | 4.180 | .999 | .003 |
| .950 | .149 | .314 | .324 | 3.450 | 1.792 | .908 | .113 | 5.950 | 4.230 | .999 | .003 |
| 1.000 | .165 | .330 | .323 | 3.500 | 1.838 | .913 | .108 | 6.000 | 4.280 | .999 | .002 |
| 1.050 | .182 | .346 | .322 | 3.550 | 1.883 | .918 | .103 | 6.050 | 4.330 | .999 | .002 |
| 1.100 | .200 | .362 | .320 | 3.600 | 1.930 | .923 | .098 | 6.100 | 4.380 | .999 | .002 |
| 1.150 | .219 | .378 | .318 | 3.650 | 1.976 | .928 | .093 | 6.150 | 4.429 | .999 | .002 |
| 1.200 | .238 | .394 | .317 | 3.700 | 2.022 | .933 | .089 | 6.200 | 4.479 | .999 | .002 |
| 1.250 | .258 | .410 | .315 | 3.750 | 2.069 | .937 | .084 | 6.250 | 4.529 | .999 | .001 |
| 1.300 | .279 | .425 | .313 | 3.800 | 2.116 | .941 | .080 | 6.300 | 4.579 | 1.000 | .001 |
| 1.350 | .301 | .441 | .310 | 3.850 | 2.163 | .945 | .076 | 6.350 | 4.629 | 1.000 | .001 |
| 1.400 | .323 | .456 | .308 | 3.900 | 2.211 | .949 | .072 | 6.400 | 4.679 | 1.000 | .001 |
| 1.450 | .346 | .472 | .305 | 3.950 | 2.258 | .952 | .068 | 6.450 | 4.729 | 1.000 | .001 |
| 1.500 | .370 | .487 | .303 | 4.000 | 2.306 | .956 | .064 | 6.500 | 4.779 | 1.000 | .001 |
| 1.550 | .395 | .502 | .300 | 4.050 | 2.354 | .959 | .061 | 6.550 | 4.829 | 1.000 | .001 |
| 1.600 | .420 | .517 | .297 | 4.100 | 2.402 | .962 | .057 | 6.600 | 4.879 | 1.000 | .001 |
| 1.650 | .447 | .532 | .293 | 4.150 | 2.450 | .964 | .054 | 6.650 | 4.929 | 1.000 | .001 |
| 1.700 | .473 | .546 | .290 | 4.200 | 2.498 | .967 | .051 | 6.700 | 4.979 | 1.000 | .000 |
| 1.750 | .501 | .561 | .287 | 4.250 | 2.546 | .969 | .047 | 6.750 | 5.029 | 1.000 | .000 |
| 1.800 | .530 | .575 | .283 | 4.300 | 2.595 | .972 | .044 | 6.800 | 5.079 | 1.000 | .000 |
| 1.850 | .559 | .589 | .279 | 4.350 | 2.644 | .974 | .042 | 6.850 | 5.129 | 1.000 | .000 |
| 1.900 | .588 | .603 | .275 | 4.400 | 2.692 | .976 | .039 | 6.900 | 5.179 | 1.000 | .000 |
| 1.950 | .619 | .616 | .271 | 4.450 | 2.741 | .978 | .036 | 6.950 | 5.229 | 1.000 | .000 |
| 2.000 | .650 | .630 | .267 | 4.500 | 2.790 | .980 | .034 | 7.000 | 5.279 | 1.000 | .000 |
| 2.050 | .682 | .643 | .262 | 4.550 | 2.839 | .981 | .032 | | | | |
| 2.100 | .714 | .656 | .258 | 4.600 | 2.888 | .983 | .029 | | | | |
| 2.150 | .747 | .669 | .253 | 4.650 | 2.937 | .984 | .027 | | | | |
| 2.200 | .781 | .681 | .248 | 4.700 | 2.987 | .985 | .025 | | | | |
| 2.250 | .816 | .694 | .243 | 4.750 | 3.036 | .987 | .024 | | | | |
| 2.300 | .851 | .706 | .238 | 4.800 | 3.085 | .988 | .022 | | | | |
| 2.350 | .886 | .717 | .233 | 4.850 | 3.135 | .989 | .020 | | | | |
| 2.400 | .922 | .729 | .228 | 4.900 | 3.184 | .990 | .019 | | | | |
| 2.450 | .959 | .740 | .223 | 4.950 | 3.234 | .991 | .017 | | | | |

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CJ-3 back

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)
(2) $n = 0$ and $m = 1$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.418 | 2.500 | 2.229 | 1.154 | -0.070 | 5.000 | 4.887 | 1.008 | -0.014 |
| .050 | .002 | .070 | 1.368 | 2.550 | 2.287 | 1.151 | -0.075 | 5.050 | 4.937 | 1.007 | -0.013 |
| .100 | .007 | .137 | 1.318 | 2.600 | 2.344 | 1.147 | -0.079 | 5.100 | 4.987 | 1.006 | -0.012 |
| .150 | .015 | .201 | 1.268 | 2.650 | 2.401 | 1.143 | -0.082 | 5.150 | 5.038 | 1.006 | -0.011 |
| .200 | .027 | .264 | 1.219 | 2.700 | 2.458 | 1.139 | -0.085 | 5.200 | 5.088 | 1.005 | -0.010 |
| .250 | .042 | .323 | 1.170 | 2.750 | 2.515 | 1.134 | -0.087 | 5.250 | 5.138 | 1.005 | -0.009 |
| .300 | .059 | .381 | 1.121 | 2.800 | 2.572 | 1.130 | -0.089 | 5.300 | 5.188 | 1.004 | -0.009 |
| .350 | .080 | .435 | 1.073 | 2.850 | 2.628 | 1.126 | -0.090 | 5.350 | 5.239 | 1.004 | -0.008 |
| .400 | .103 | .488 | 1.025 | 2.900 | 2.684 | 1.121 | -0.090 | 5.400 | 5.289 | 1.004 | -0.007 |
| .450 | .128 | .538 | .978 | 2.950 | 2.740 | 1.117 | -0.091 | 5.450 | 5.339 | 1.003 | -0.007 |
| .500 | .157 | .586 | .931 | 3.000 | 2.796 | 1.112 | -0.091 | 5.500 | 5.389 | 1.003 | -0.006 |
| .550 | .187 | .631 | .886 | 3.050 | 2.851 | 1.107 | -0.090 | 5.550 | 5.439 | 1.003 | -0.005 |
| .600 | .220 | .674 | .841 | 3.100 | 2.907 | 1.103 | -0.090 | 5.600 | 5.489 | 1.002 | -0.005 |
| .650 | .254 | .715 | .797 | 3.150 | 2.962 | 1.098 | -0.089 | 5.650 | 5.540 | 1.002 | -0.004 |
| .700 | .291 | .754 | .753 | 3.200 | 3.017 | 1.094 | -0.087 | 5.700 | 5.590 | 1.002 | -0.004 |
| .750 | .330 | .791 | .711 | 3.250 | 3.071 | 1.090 | -0.086 | 5.750 | 5.640 | 1.002 | -0.004 |
| .800 | .370 | .825 | .670 | 3.300 | 3.126 | 1.085 | -0.084 | 5.800 | 5.690 | 1.002 | -0.003 |
| .850 | .412 | .858 | .629 | 3.350 | 3.180 | 1.081 | -0.082 | 5.850 | 5.740 | 1.001 | -0.003 |
| .900 | .456 | .888 | .590 | 3.400 | 3.234 | 1.077 | -0.080 | 5.900 | 5.790 | 1.001 | -0.003 |
| .950 | .501 | .917 | .552 | 3.450 | 3.287 | 1.073 | -0.078 | 5.950 | 5.840 | 1.001 | -0.002 |
| 1.000 | .548 | .943 | .515 | 3.500 | 3.341 | 1.069 | -0.076 | 6.000 | 5.890 | 1.001 | -0.002 |
| 1.050 | .595 | .968 | .479 | 3.550 | 3.394 | 1.066 | -0.074 | 6.050 | 5.940 | 1.001 | -0.002 |
| 1.100 | .644 | .991 | .444 | 3.600 | 3.448 | 1.062 | -0.071 | 6.100 | 5.990 | 1.001 | -0.002 |
| 1.150 | .694 | 1.012 | .410 | 3.650 | 3.501 | 1.059 | -0.069 | 6.150 | 6.040 | 1.001 | -0.002 |
| 1.200 | .746 | 1.032 | .378 | 3.700 | 3.553 | 1.055 | -0.066 | 6.200 | 6.090 | 1.001 | -0.001 |
| 1.250 | .798 | 1.050 | .346 | 3.750 | 3.606 | 1.052 | -0.064 | 6.250 | 6.140 | 1.001 | -0.001 |
| 1.300 | .851 | 1.067 | .316 | 3.800 | 3.659 | 1.049 | -0.061 | 6.300 | 6.190 | 1.000 | -0.001 |
| 1.350 | .904 | 1.082 | .287 | 3.850 | 3.711 | 1.046 | -0.059 | 6.350 | 6.240 | 1.000 | -0.001 |
| 1.400 | .959 | 1.096 | .260 | 3.900 | 3.763 | 1.043 | -0.056 | 6.400 | 6.290 | 1.000 | -0.001 |
| 1.450 | 1.014 | 1.108 | .233 | 3.950 | 3.815 | 1.040 | -0.053 | 6.450 | 6.340 | 1.000 | -0.001 |
| 1.500 | 1.069 | 1.119 | .208 | 4.000 | 3.867 | 1.038 | -0.051 | 6.500 | 6.390 | 1.000 | -0.001 |
| 1.550 | 1.126 | 1.129 | .184 | 4.050 | 3.919 | 1.035 | -0.048 | 6.550 | 6.440 | 1.000 | -0.001 |
| 1.600 | 1.182 | 1.137 | .161 | 4.100 | 3.971 | 1.033 | -0.046 | 6.600 | 6.490 | 1.000 | -0.001 |
| 1.650 | 1.239 | 1.145 | .139 | 4.150 | 4.022 | 1.031 | -0.044 | 6.650 | 6.540 | 1.000 | -0.001 |
| 1.700 | 1.297 | 1.151 | .118 | 4.200 | 4.074 | 1.028 | -0.041 | 6.700 | 6.590 | 1.000 | .000 |
| 1.750 | 1.354 | 1.157 | .099 | 4.250 | 4.125 | 1.026 | -0.039 | 6.750 | 6.640 | 1.000 | .000 |
| 1.800 | 1.412 | 1.161 | .081 | 4.300 | 4.176 | 1.025 | -0.037 | 6.800 | 6.690 | 1.000 | .000 |
| 1.850 | 1.471 | 1.165 | .064 | 4.350 | 4.228 | 1.023 | -0.035 | 6.850 | 6.740 | 1.000 | .000 |
| 1.900 | 1.529 | 1.168 | .048 | 4.400 | 4.279 | 1.021 | -0.033 | 6.900 | 6.790 | 1.000 | .000 |
| 1.950 | 1.587 | 1.170 | .033 | 4.450 | 4.330 | 1.019 | -0.031 | 6.950 | 6.840 | 1.000 | .000 |
| 2.000 | 1.646 | 1.171 | .019 | 4.500 | 4.381 | 1.018 | -0.029 | 7.000 | 6.890 | 1.000 | .000 |
| 2.050 | 1.704 | 1.171 | .006 | 4.550 | 4.431 | 1.017 | -0.027 | | | | |
| 2.100 | 1.763 | 1.171 | -.006 | 4.600 | 4.482 | 1.015 | -0.025 | | | | |
| 2.150 | 1.822 | 1.171 | -.017 | 4.650 | 4.533 | 1.014 | -0.023 | | | | |
| 2.200 | 1.880 | 1.170 | -.027 | 4.700 | 4.584 | 1.013 | -0.022 | | | | |
| 2.250 | 1.938 | 1.168 | -.036 | 4.750 | 4.634 | 1.012 | -0.020 | | | | |
| 2.300 | 1.997 | 1.166 | -.045 | 4.800 | 4.685 | 1.011 | -0.019 | | | | |
| 2.350 | 2.055 | 1.164 | -.052 | 4.850 | 4.735 | 1.010 | -0.018 | | | | |
| 2.400 | 2.113 | 1.161 | -.059 | 4.900 | 4.786 | 1.009 | -0.016 | | | | |
| 2.450 | 2.171 | 1.158 | -.065 | 4.950 | 4.836 | 1.008 | -0.015 | | | | |

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TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)

(3) $n = 0$ and $m = 2$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.197 | 2.500 | 2.820 | 1.268 | -0.210 | 5.000 | 5.553 | 1.009 | -0.017 |
| .050 | .003 | .107 | 2.097 | 2.550 | 2.883 | 1.258 | -.209 | 5.050 | 5.603 | 1.008 | -.015 |
| .100 | .011 | .210 | 1.998 | 2.600 | 2.946 | 1.248 | -.207 | 5.100 | 5.653 | 1.007 | -.014 |
| .150 | .024 | .307 | 1.898 | 2.650 | 3.008 | 1.237 | -.205 | 5.150 | 5.704 | 1.007 | -.013 |
| .200 | .041 | .400 | 1.800 | 2.700 | 3.069 | 1.227 | -.202 | 5.200 | 5.754 | 1.006 | -.012 |
| .250 | .063 | .487 | 1.703 | 2.750 | 3.130 | 1.217 | -.199 | 5.250 | 5.804 | 1.005 | -.011 |
| .300 | .090 | .570 | 1.608 | 2.800 | 3.191 | 1.207 | -.195 | 5.300 | 5.855 | 1.005 | -.010 |
| .350 | .120 | .648 | 1.514 | 2.850 | 3.251 | 1.198 | -.191 | 5.350 | 5.905 | 1.004 | -.009 |
| .400 | .155 | .721 | 1.421 | 2.900 | 3.311 | 1.188 | -.187 | 5.400 | 5.955 | 1.004 | -.008 |
| .450 | .192 | .790 | 1.331 | 2.950 | 3.370 | 1.179 | -.182 | 5.450 | 6.005 | 1.004 | -.008 |
| .500 | .234 | .854 | 1.243 | 3.000 | 3.429 | 1.170 | -.177 | 5.500 | 6.055 | 1.003 | -.007 |
| .550 | .278 | .914 | 1.157 | 3.050 | 3.487 | 1.161 | -.171 | 5.550 | 6.106 | 1.003 | -.006 |
| .600 | .325 | .970 | 1.073 | 3.100 | 3.545 | 1.153 | -.166 | 5.600 | 6.156 | 1.003 | -.006 |
| .650 | .375 | 1.022 | .992 | 3.150 | 3.602 | 1.145 | -.161 | 5.650 | 6.206 | 1.002 | -.005 |
| .700 | .427 | 1.069 | .914 | 3.200 | 3.659 | 1.137 | -.155 | 5.700 | 6.256 | 1.002 | -.005 |
| .750 | .482 | 1.113 | .838 | 3.250 | 3.716 | 1.129 | -.149 | 5.750 | 6.306 | 1.002 | -.004 |
| .800 | .538 | 1.153 | .765 | 3.300 | 3.772 | 1.122 | -.143 | 5.800 | 6.356 | 1.002 | -.004 |
| .850 | .597 | 1.190 | .695 | 3.350 | 3.828 | 1.115 | -.138 | 5.850 | 6.406 | 1.001 | -.003 |
| .900 | .657 | 1.223 | .628 | 3.400 | 3.884 | 1.108 | -.132 | 5.900 | 6.456 | 1.001 | -.003 |
| .950 | .719 | 1.253 | .564 | 3.450 | 3.939 | 1.102 | -.126 | 5.950 | 6.506 | 1.001 | -.003 |
| 1.000 | .782 | 1.279 | .502 | 3.500 | 3.994 | 1.095 | -.121 | 6.000 | 6.556 | 1.001 | -.002 |
| 1.050 | .847 | 1.303 | .444 | 3.550 | 4.048 | 1.090 | -.115 | 6.050 | 6.606 | 1.001 | -.002 |
| 1.100 | .913 | 1.324 | .388 | 3.600 | 4.103 | 1.084 | -.110 | 6.100 | 6.656 | 1.001 | -.002 |
| 1.150 | .979 | 1.342 | .336 | 3.650 | 4.157 | 1.079 | -.104 | 6.150 | 6.707 | 1.001 | -.002 |
| 1.200 | 1.047 | 1.357 | .286 | 3.700 | 4.211 | 1.073 | -.099 | 6.200 | 6.757 | 1.001 | -.002 |
| 1.250 | 1.115 | 1.370 | .239 | 3.750 | 4.264 | 1.069 | -.094 | 6.250 | 6.807 | 1.001 | -.001 |
| 1.300 | 1.184 | 1.381 | .195 | 3.800 | 4.317 | 1.064 | -.089 | 6.300 | 6.857 | 1.001 | -.001 |
| 1.350 | 1.253 | 1.390 | .154 | 3.850 | 4.371 | 1.060 | -.084 | 6.350 | 6.907 | 1.000 | -.001 |
| 1.400 | 1.323 | 1.397 | .115 | 3.900 | 4.423 | 1.056 | -.080 | 6.400 | 6.957 | 1.000 | -.001 |
| 1.450 | 1.393 | 1.401 | .079 | 3.950 | 4.476 | 1.052 | -.075 | 6.450 | 7.007 | 1.000 | -.001 |
| 1.500 | 1.463 | 1.405 | .046 | 4.000 | 4.529 | 1.048 | -.071 | 6.500 | 7.057 | 1.000 | -.001 |
| 1.550 | 1.533 | 1.406 | .015 | 4.050 | 4.581 | 1.045 | -.067 | 6.550 | 7.107 | 1.000 | -.001 |
| 1.600 | 1.603 | 1.405 | -.013 | 4.100 | 4.633 | 1.041 | -.063 | 6.600 | 7.157 | 1.000 | -.001 |
| 1.650 | 1.674 | 1.405 | -.039 | 4.150 | 4.685 | 1.038 | -.059 | 6.650 | 7.207 | 1.000 | -.001 |
| 1.700 | 1.744 | 1.402 | -.063 | 4.200 | 4.737 | 1.035 | -.055 | 6.700 | 7.257 | 1.000 | -.000 |
| 1.750 | 1.814 | 1.399 | -.085 | 4.250 | 4.789 | 1.033 | -.052 | 6.750 | 7.307 | 1.000 | .000 |
| 1.800 | 1.884 | 1.394 | -.104 | 4.300 | 4.840 | 1.030 | -.049 | 6.800 | 7.357 | 1.000 | .000 |
| 1.850 | 1.953 | 1.388 | -.122 | 4.350 | 4.892 | 1.028 | -.045 | 6.850 | 7.407 | 1.000 | .000 |
| 1.900 | 2.023 | 1.382 | -.137 | 4.400 | 4.943 | 1.026 | -.042 | 6.900 | 7.457 | 1.000 | .000 |
| 1.950 | 2.091 | 1.375 | -.151 | 4.450 | 4.994 | 1.024 | -.040 | 6.950 | 7.507 | 1.000 | .000 |
| 2.000 | 2.160 | 1.367 | -.163 | 4.500 | 5.045 | 1.022 | -.037 | 7.000 | 7.557 | 1.000 | .000 |
| 2.050 | 2.228 | 1.358 | -.174 | 4.550 | 5.096 | 1.020 | -.034 | | | | |
| 2.100 | 2.296 | 1.349 | -.183 | 4.600 | 5.147 | 1.018 | -.032 | | | | |
| 2.150 | 2.363 | 1.340 | -.190 | 4.650 | 5.198 | 1.017 | -.029 | | | | |
| 2.200 | 2.430 | 1.330 | -.196 | 4.700 | 5.249 | 1.015 | -.027 | | | | |
| 2.250 | 2.496 | 1.320 | -.201 | 4.750 | 5.300 | 1.014 | -.025 | | | | |
| 2.300 | 2.562 | 1.310 | -.205 | 4.800 | 5.350 | 1.013 | -.023 | | | | |
| 2.350 | 2.627 | 1.300 | -.208 | 4.850 | 5.401 | 1.012 | -.022 | | | | |
| 2.400 | 2.692 | 1.289 | -.209 | 4.900 | 5.452 | 1.011 | -.020 | | | | |
| 2.450 | 2.756 | 1.279 | -.210 | 4.950 | 5.502 | 1.010 | -.018 | | | | |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)

(4) $n = 0$ and $m = 4$

| η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.450 | 2.500 | 3.497 | 1.339 | -0.339 | 5.000 | 6.263 | 1.009 | -0.017 |
| .050 | .004 | .168 | 3.250 | 2.550 | 3.564 | 1.322 | -.329 | 5.050 | 6.313 | 1.008 | -.016 |
| .100 | .017 | .325 | 3.051 | 2.600 | 3.630 | 1.306 | -.319 | 5.100 | 6.363 | 1.007 | -.014 |
| .150 | .037 | .473 | 2.855 | 2.650 | 3.694 | 1.290 | -.309 | 5.150 | 6.414 | 1.007 | -.013 |
| .200 | .064 | .611 | 2.661 | 2.700 | 3.759 | 1.275 | -.298 | 5.200 | 6.464 | 1.006 | -.012 |
| .250 | .097 | .739 | 2.470 | 2.750 | 3.822 | 1.261 | -.287 | 5.250 | 6.514 | 1.005 | -.011 |
| .300 | .137 | .858 | 2.284 | 2.800 | 3.885 | 1.246 | -.276 | 5.300 | 6.565 | 1.005 | -.010 |
| .350 | .183 | .967 | 2.103 | 2.850 | 3.947 | 1.233 | -.266 | 5.350 | 6.615 | 1.004 | -.009 |
| .400 | .234 | 1.068 | 1.927 | 2.900 | 4.008 | 1.220 | -.255 | 5.400 | 6.665 | 1.004 | -.008 |
| .450 | .290 | 1.160 | 1.757 | 2.950 | 4.069 | 1.207 | -.244 | 5.450 | 6.715 | 1.004 | -.008 |
| .500 | .350 | 1.244 | 1.594 | 3.000 | 4.129 | 1.196 | -.234 | 5.500 | 6.765 | 1.003 | -.007 |
| .550 | .414 | 1.320 | 1.437 | 3.050 | 4.188 | 1.184 | -.223 | 5.550 | 6.816 | 1.003 | -.006 |
| .600 | .482 | 1.388 | 1.286 | 3.100 | 4.247 | 1.173 | -.213 | 5.600 | 6.866 | 1.003 | -.006 |
| .650 | .553 | 1.448 | 1.143 | 3.150 | 4.306 | 1.163 | -.203 | 5.650 | 6.916 | 1.002 | -.005 |
| .700 | .626 | 1.502 | 1.007 | 3.200 | 4.363 | 1.153 | -.193 | 5.700 | 6.966 | 1.002 | -.005 |
| .750 | .703 | 1.549 | .878 | 3.250 | 4.421 | 1.143 | -.184 | 5.750 | 7.016 | 1.002 | -.004 |
| .800 | .781 | 1.590 | .757 | 3.300 | 4.478 | 1.134 | -.175 | 5.800 | 7.066 | 1.002 | -.004 |
| .850 | .862 | 1.625 | .643 | 3.350 | 4.534 | 1.126 | -.166 | 5.850 | 7.116 | 1.001 | -.003 |
| .900 | .944 | 1.654 | .536 | 3.400 | 4.590 | 1.118 | -.157 | 5.900 | 7.166 | 1.001 | -.003 |
| .950 | 1.027 | 1.679 | .436 | 3.450 | 4.646 | 1.110 | -.149 | 5.950 | 7.216 | 1.001 | -.003 |
| 1.000 | 1.111 | 1.698 | .343 | 3.500 | 4.701 | 1.103 | -.141 | 6.000 | 7.266 | 1.001 | -.002 |
| 1.050 | 1.197 | 1.713 | .257 | 3.550 | 4.756 | 1.096 | -.133 | 6.050 | 7.316 | 1.001 | -.002 |
| 1.100 | 1.283 | 1.724 | .178 | 3.600 | 4.811 | 1.090 | -.126 | 6.100 | 7.366 | 1.001 | -.002 |
| 1.150 | 1.369 | 1.731 | .105 | 3.650 | 4.865 | 1.084 | -.119 | 6.150 | 7.417 | 1.001 | -.002 |
| 1.200 | 1.456 | 1.735 | .038 | 3.700 | 4.919 | 1.078 | -.112 | 6.200 | 7.467 | 1.001 | -.002 |
| 1.250 | 1.542 | 1.735 | -.023 | 3.750 | 4.973 | 1.072 | -.105 | 6.250 | 7.517 | 1.001 | -.001 |
| 1.300 | 1.629 | 1.732 | -.078 | 3.800 | 5.027 | 1.067 | -.099 | 6.300 | 7.567 | 1.001 | -.001 |
| 1.350 | 1.716 | 1.727 | -.127 | 3.850 | 5.080 | 1.062 | -.093 | 6.350 | 7.617 | 1.000 | -.001 |
| 1.400 | 1.802 | 1.720 | -.171 | 3.900 | 5.133 | 1.058 | -.087 | 6.400 | 7.667 | 1.000 | -.001 |
| 1.450 | 1.888 | 1.710 | -.210 | 3.950 | 5.186 | 1.054 | -.082 | 6.450 | 7.717 | 1.000 | -.001 |
| 1.500 | 1.973 | 1.699 | -.245 | 4.000 | 5.238 | 1.050 | -.077 | 6.500 | 7.767 | 1.000 | -.001 |
| 1.550 | 2.057 | 1.686 | -.275 | 4.050 | 5.291 | 1.046 | -.072 | 6.550 | 7.817 | 1.000 | -.001 |
| 1.600 | 2.141 | 1.671 | -.301 | 4.100 | 5.343 | 1.043 | -.067 | 6.600 | 7.867 | 1.000 | -.001 |
| 1.650 | 2.225 | 1.656 | -.323 | 4.150 | 5.395 | 1.039 | -.063 | 6.650 | 7.917 | 1.000 | .000 |
| 1.700 | 2.307 | 1.639 | -.342 | 4.200 | 5.447 | 1.036 | -.059 | 6.700 | 7.967 | 1.000 | .000 |
| 1.750 | 2.388 | 1.622 | -.357 | 4.250 | 5.499 | 1.033 | -.055 | 6.750 | 8.017 | 1.000 | .000 |
| 1.800 | 2.469 | 1.603 | -.370 | 4.300 | 5.550 | 1.031 | -.051 | 6.800 | 8.067 | 1.000 | .000 |
| 1.850 | 2.549 | 1.585 | -.379 | 4.350 | 5.602 | 1.028 | -.047 | 6.850 | 8.117 | 1.000 | .000 |
| 1.900 | 2.628 | 1.565 | -.386 | 4.400 | 5.653 | 1.026 | -.044 | 6.900 | 8.167 | 1.000 | .000 |
| 1.950 | 2.705 | 1.546 | -.390 | 4.450 | 5.704 | 1.024 | -.041 | 6.950 | 8.217 | 1.000 | .000 |
| 2.000 | 2.782 | 1.526 | -.393 | 4.500 | 5.755 | 1.022 | -.038 | 7.000 | 8.267 | 1.000 | .000 |
| 2.050 | 2.858 | 1.507 | -.393 | 4.550 | 5.806 | 1.020 | -.035 | | | | |
| 2.100 | 2.933 | 1.487 | -.392 | 4.600 | 5.857 | 1.018 | -.033 | | | | |
| 2.150 | 3.007 | 1.468 | -.389 | 4.650 | 5.908 | 1.017 | -.030 | | | | |
| 2.200 | 3.080 | 1.448 | -.385 | 4.700 | 5.959 | 1.015 | -.028 | | | | |
| 2.250 | 3.151 | 1.429 | -.379 | 4.750 | 6.010 | 1.014 | -.026 | | | | |
| 2.300 | 3.222 | 1.410 | -.373 | 4.800 | 6.060 | 1.013 | -.024 | | | | |
| 2.350 | 3.293 | 1.392 | -.365 | 4.850 | 6.111 | 1.012 | -.022 | | | | |
| 2.400 | 3.362 | 1.374 | -.357 | 4.900 | 6.162 | 1.011 | -.020 | | | | |
| 2.450 | 3.430 | 1.356 | -.348 | 4.950 | 6.212 | 1.010 | -.018 | | | | |

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TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)

(5) $n = 0$ and $m = 6$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 4.506 | 2.500 | 3.915 | 1.356 | -0.391 | 5.000 | 6.684 | 1.009 | -0.017 |
| .050 | .006 | .218 | 4.206 | 2.550 | 3.982 | 1.337 | -.376 | 5.050 | 6.734 | 1.008 | -.015 |
| .100 | .022 | .421 | 3.908 | 2.600 | 4.049 | 1.319 | -.361 | 5.100 | 6.784 | 1.007 | -.014 |
| .150 | .047 | .609 | 3.615 | 2.650 | 4.114 | 1.301 | -.345 | 5.150 | 6.835 | 1.006 | -.013 |
| .200 | .082 | .782 | 3.326 | 2.700 | 4.179 | 1.284 | -.330 | 5.200 | 6.885 | 1.006 | -.012 |
| .250 | .125 | .941 | 3.045 | 2.750 | 4.243 | 1.268 | -.316 | 5.250 | 6.935 | 1.005 | -.011 |
| .300 | .176 | 1.087 | 2.772 | 2.800 | 4.306 | 1.253 | -.301 | 5.300 | 6.986 | 1.005 | -.010 |
| .350 | .234 | 1.219 | 2.508 | 2.850 | 4.368 | 1.238 | -.287 | 5.350 | 7.036 | 1.004 | -.009 |
| .400 | .298 | 1.338 | 2.255 | 2.900 | 4.429 | 1.224 | -.274 | 5.400 | 7.086 | 1.004 | -.008 |
| .450 | .367 | 1.444 | 2.012 | 2.950 | 4.490 | 1.210 | -.260 | 5.450 | 7.136 | 1.004 | -.007 |
| .500 | .442 | 1.539 | 1.781 | 3.000 | 4.550 | 1.198 | -.247 | 5.500 | 7.186 | 1.003 | -.007 |
| .550 | .521 | 1.623 | 1.562 | 3.050 | 4.610 | 1.186 | -.235 | 5.550 | 7.236 | 1.003 | -.006 |
| .600 | .604 | 1.696 | 1.355 | 3.100 | 4.669 | 1.174 | -.223 | 5.600 | 7.287 | 1.003 | -.006 |
| .650 | .690 | 1.758 | 1.160 | 3.150 | 4.727 | 1.163 | -.211 | 5.650 | 7.337 | 1.002 | -.005 |
| .700 | .780 | 1.812 | .978 | 3.200 | 4.785 | 1.153 | -.200 | 5.700 | 7.387 | 1.002 | -.005 |
| .750 | .872 | 1.856 | .808 | 3.250 | 4.843 | 1.143 | -.190 | 5.750 | 7.437 | 1.002 | -.004 |
| .800 | .965 | 1.893 | .651 | 3.300 | 4.900 | 1.134 | -.179 | 5.800 | 7.487 | 1.002 | -.004 |
| .850 | 1.061 | 1.922 | .505 | 3.350 | 4.956 | 1.125 | -.169 | 5.850 | 7.537 | 1.001 | -.003 |
| .900 | 1.157 | 1.944 | .372 | 3.400 | 5.012 | 1.117 | -.160 | 5.900 | 7.587 | 1.001 | -.003 |
| .950 | 1.254 | 1.959 | .250 | 3.450 | 5.068 | 1.109 | -.151 | 5.950 | 7.637 | 1.001 | -.003 |
| 1.000 | 1.353 | 1.969 | .138 | 3.500 | 5.123 | 1.102 | -.142 | 6.000 | 7.687 | 1.001 | -.002 |
| 1.050 | 1.452 | 1.973 | .038 | 3.550 | 5.178 | 1.095 | -.134 | 6.050 | 7.737 | 1.001 | -.002 |
| 1.100 | 1.550 | 1.973 | -.053 | 3.600 | 5.233 | 1.089 | -.126 | 6.100 | 7.787 | 1.001 | -.002 |
| 1.150 | 1.649 | 1.968 | -.133 | 3.650 | 5.287 | 1.083 | -.119 | 6.150 | 7.837 | 1.001 | -.002 |
| 1.200 | 1.747 | 1.960 | -.205 | 3.700 | 5.341 | 1.077 | -.112 | 6.200 | 7.887 | 1.001 | -.002 |
| 1.250 | 1.845 | 1.948 | -.268 | 3.750 | 5.395 | 1.071 | -.105 | 6.250 | 7.938 | 1.001 | -.001 |
| 1.300 | 1.942 | 1.933 | -.323 | 3.800 | 5.448 | 1.066 | -.098 | 6.300 | 7.988 | 1.001 | -.001 |
| 1.350 | 2.038 | 1.915 | -.371 | 3.850 | 5.501 | 1.062 | -.092 | 6.350 | 8.038 | 1.000 | -.001 |
| 1.400 | 2.133 | 1.896 | -.411 | 3.900 | 5.554 | 1.057 | -.087 | 6.400 | 8.088 | 1.000 | -.001 |
| 1.450 | 2.228 | 1.874 | -.445 | 3.950 | 5.607 | 1.053 | -.081 | 6.450 | 8.138 | 1.000 | -.001 |
| 1.500 | 2.321 | 1.851 | -.473 | 4.000 | 5.660 | 1.049 | -.076 | 6.500 | 8.188 | 1.000 | -.001 |
| 1.550 | 2.413 | 1.827 | -.496 | 4.050 | 5.712 | 1.045 | -.071 | 6.550 | 8.238 | 1.000 | -.001 |
| 1.600 | 2.504 | 1.802 | -.513 | 4.100 | 5.764 | 1.042 | -.066 | 6.600 | 8.288 | 1.000 | -.001 |
| 1.650 | 2.593 | 1.776 | -.526 | 4.150 | 5.816 | 1.039 | -.062 | 6.650 | 8.338 | 1.000 | .000 |
| 1.700 | 2.681 | 1.749 | -.535 | 4.200 | 5.868 | 1.036 | -.058 | 6.700 | 8.388 | 1.000 | .000 |
| 1.750 | 2.768 | 1.722 | -.541 | 4.250 | 5.920 | 1.033 | -.054 | 6.750 | 8.438 | 1.000 | .000 |
| 1.800 | 2.853 | 1.695 | -.543 | 4.300 | 5.971 | 1.030 | -.050 | 6.800 | 8.488 | 1.000 | .000 |
| 1.850 | 2.937 | 1.668 | -.542 | 4.350 | 6.023 | 1.028 | -.047 | 6.850 | 8.538 | 1.000 | .000 |
| 1.900 | 3.020 | 1.641 | -.538 | 4.400 | 6.074 | 1.026 | -.043 | 6.900 | 8.588 | 1.000 | .000 |
| 1.950 | 3.102 | 1.614 | -.533 | 4.450 | 6.125 | 1.024 | -.040 | 6.950 | 8.638 | 1.000 | .000 |
| 2.000 | 3.182 | 1.588 | -.525 | 4.500 | 6.176 | 1.022 | -.037 | 7.000 | 8.688 | 1.000 | .000 |
| 2.050 | 3.260 | 1.562 | -.516 | 4.550 | 6.227 | 1.020 | -.035 | | | | |
| 2.100 | 3.338 | 1.537 | -.505 | 4.600 | 6.278 | 1.018 | -.032 | | | | |
| 2.150 | 3.414 | 1.512 | -.493 | 4.650 | 6.329 | 1.017 | -.030 | | | | |
| 2.200 | 3.489 | 1.487 | -.480 | 4.700 | 6.380 | 1.015 | -.027 | | | | |
| 2.250 | 3.563 | 1.464 | -.466 | 4.750 | 6.431 | 1.014 | -.025 | | | | |
| 2.300 | 3.635 | 1.441 | -.452 | 4.800 | 6.481 | 1.013 | -.023 | | | | |
| 2.350 | 3.707 | 1.418 | -.437 | 4.850 | 6.532 | 1.012 | -.021 | | | | |
| 2.400 | 3.777 | 1.397 | -.422 | 4.900 | 6.583 | 1.011 | -.020 | | | | |
| 2.450 | 3.847 | 1.376 | -.407 | 4.950 | 6.633 | 1.010 | -.018 | | | | |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(6) $n = 0$ and $m = 8$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 5.449 | 2.500 | 4.215 | 1.360 | -0.414 | 5.000 | 6.982 | 1.009 | -0.017 |
| .050 | .007 | .262 | 5.050 | 2.550 | 4.282 | 1.340 | -.395 | 5.050 | 7.033 | 1.008 | -.015 |
| .100 | .026 | .503 | 4.654 | 2.600 | 4.349 | 1.320 | -.377 | 5.100 | 7.083 | 1.007 | -.014 |
| .150 | .057 | .728 | 4.264 | 2.650 | 4.414 | 1.302 | -.359 | 5.150 | 7.133 | 1.006 | -.013 |
| .200 | .098 | .932 | 3.883 | 2.700 | 4.479 | 1.284 | -.342 | 5.200 | 7.184 | 1.006 | -.012 |
| .250 | .150 | 1.116 | 3.513 | 2.750 | 4.543 | 1.268 | -.325 | 5.250 | 7.234 | 1.005 | -.011 |
| .300 | .210 | 1.283 | 3.156 | 2.800 | 4.606 | 1.252 | -.309 | 5.300 | 7.284 | 1.005 | -.010 |
| .350 | .278 | 1.432 | 2.813 | 2.850 | 4.668 | 1.237 | -.293 | 5.350 | 7.334 | 1.004 | -.009 |
| .400 | .353 | 1.565 | 2.486 | 2.900 | 4.730 | 1.223 | -.278 | 5.400 | 7.385 | 1.004 | -.008 |
| .450 | .434 | 1.681 | 2.176 | 2.950 | 4.790 | 1.209 | -.264 | 5.450 | 7.435 | 1.003 | -.008 |
| .500 | .521 | 1.783 | 1.884 | 3.000 | 4.851 | 1.196 | -.250 | 5.500 | 7.485 | 1.003 | -.007 |
| .550 | .612 | 1.870 | 1.609 | 3.050 | 4.910 | 1.184 | -.237 | 5.550 | 7.535 | 1.003 | -.006 |
| .600 | .707 | 1.944 | 1.352 | 3.100 | 4.969 | 1.173 | -.224 | 5.600 | 7.585 | 1.002 | -.006 |
| .650 | .806 | 2.005 | 1.114 | 3.150 | 5.027 | 1.162 | -.212 | 5.650 | 7.635 | 1.002 | -.005 |
| .700 | .908 | 2.055 | .894 | 3.200 | 5.085 | 1.151 | -.200 | 5.700 | 7.685 | 1.002 | -.005 |
| .750 | 1.011 | 2.095 | .692 | 3.250 | 5.142 | 1.142 | -.189 | 5.750 | 7.735 | 1.002 | -.005 |
| .800 | 1.117 | 2.125 | .507 | 3.300 | 5.199 | 1.133 | -.178 | 5.800 | 7.785 | 1.001 | -.004 |
| .850 | 1.224 | 2.146 | .339 | 3.350 | 5.256 | 1.124 | -.168 | 5.850 | 7.836 | 1.001 | -.004 |
| .900 | 1.331 | 2.159 | .187 | 3.400 | 5.312 | 1.116 | -.159 | 5.900 | 7.886 | 1.001 | -.004 |
| .950 | 1.440 | 2.165 | .051 | 3.450 | 5.367 | 1.108 | -.150 | 5.950 | 7.936 | 1.001 | -.003 |
| 1.000 | 1.548 | 2.164 | -.070 | 3.500 | 5.423 | 1.101 | -.141 | 6.000 | 7.986 | 1.001 | -.003 |
| 1.050 | 1.656 | 2.158 | -.178 | 3.550 | 5.477 | 1.094 | -.133 | 6.050 | 8.036 | 1.001 | -.003 |
| 1.100 | 1.764 | 2.147 | -.272 | 3.600 | 5.532 | 1.087 | -.125 | 6.100 | 8.086 | 1.000 | -.002 |
| 1.150 | 1.871 | 2.131 | -.354 | 3.650 | 5.586 | 1.081 | -.117 | 6.150 | 8.136 | 1.000 | -.002 |
| 1.200 | 1.977 | 2.112 | -.424 | 3.700 | 5.640 | 1.076 | -.110 | 6.200 | 8.186 | 1.000 | -.002 |
| 1.250 | 2.082 | 2.089 | -.484 | 3.750 | 5.694 | 1.070 | -.103 | 6.250 | 8.236 | 1.000 | -.002 |
| 1.300 | 2.185 | 2.064 | -.533 | 3.800 | 5.747 | 1.065 | -.097 | 6.300 | 8.286 | 1.000 | -.001 |
| 1.350 | 2.288 | 2.036 | -.574 | 3.850 | 5.800 | 1.061 | -.091 | 6.350 | 8.336 | 1.000 | -.001 |
| 1.400 | 2.389 | 2.006 | -.607 | 3.900 | 5.853 | 1.056 | -.085 | 6.400 | 8.386 | 1.000 | -.001 |
| 1.450 | 2.489 | 1.975 | -.633 | 3.950 | 5.906 | 1.052 | -.080 | 6.450 | 8.436 | 1.000 | -.001 |
| 1.500 | 2.587 | 1.943 | -.651 | 4.000 | 5.958 | 1.048 | -.075 | 6.500 | 8.486 | 1.000 | -.001 |
| 1.550 | 2.683 | 1.910 | -.664 | 4.050 | 6.011 | 1.045 | -.070 | 6.550 | 8.536 | 1.000 | -.001 |
| 1.600 | 2.778 | 1.877 | -.672 | 4.100 | 6.063 | 1.041 | -.065 | 6.600 | 8.586 | 1.000 | -.001 |
| 1.650 | 2.871 | 1.843 | -.674 | 4.150 | 6.115 | 1.038 | -.061 | 6.650 | 8.636 | 1.000 | -.001 |
| 1.700 | 2.962 | 1.809 | -.673 | 4.200 | 6.167 | 1.035 | -.057 | 6.700 | 8.686 | 1.000 | -.001 |
| 1.750 | 3.051 | 1.776 | -.668 | 4.250 | 6.218 | 1.033 | -.053 | 6.750 | 8.735 | 1.000 | .000 |
| 1.800 | 3.139 | 1.743 | -.660 | 4.300 | 6.270 | 1.030 | -.049 | 6.800 | 8.785 | 1.000 | .000 |
| 1.850 | 3.226 | 1.710 | -.649 | 4.350 | 6.321 | 1.028 | -.046 | 6.850 | 8.835 | 1.000 | .000 |
| 1.900 | 3.310 | 1.678 | -.637 | 4.400 | 6.373 | 1.025 | -.043 | 6.900 | 8.885 | 1.000 | .000 |
| 1.950 | 3.394 | 1.646 | -.622 | 4.450 | 6.424 | 1.023 | -.040 | 6.950 | 8.935 | 1.000 | .000 |
| 2.000 | 3.475 | 1.616 | -.606 | 4.500 | 6.475 | 1.021 | -.037 | 7.000 | 8.985 | 1.000 | .000 |
| 2.050 | 3.555 | 1.586 | -.588 | 4.550 | 6.526 | 1.020 | -.034 | | | | |
| 2.100 | 3.634 | 1.557 | -.570 | 4.600 | 6.577 | 1.018 | -.032 | | | | |
| 2.150 | 3.711 | 1.529 | -.551 | 4.650 | 6.628 | 1.016 | -.029 | | | | |
| 2.200 | 3.787 | 1.502 | -.532 | 4.700 | 6.679 | 1.015 | -.027 | | | | |
| 2.250 | 3.861 | 1.476 | -.512 | 4.750 | 6.729 | 1.014 | -.025 | | | | |
| 2.300 | 3.934 | 1.450 | -.492 | 4.800 | 6.780 | 1.013 | -.023 | | | | |
| 2.350 | 4.006 | 1.426 | -.472 | 4.850 | 6.831 | 1.012 | -.021 | | | | |
| 2.400 | 4.077 | 1.403 | -.453 | 4.900 | 6.881 | 1.011 | -.020 | | | | |
| 2.450 | 4.146 | 1.381 | -.433 | 4.950 | 6.932 | 1.009 | -.018 | | | | |

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TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)
(7) $n = 0$ and $m = 10$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 6.317 | 2.500 | 4.448 | 1.359 | -0.423 | 5.000 | 7.213 | 1.009 | -0.016 |
| .050 | .008 | .303 | 5.818 | 2.550 | 4.516 | 1.339 | -.403 | 5.050 | 7.264 | 1.008 | -.015 |
| .100 | .030 | .582 | 5.324 | 2.600 | 4.582 | 1.319 | -.383 | 5.100 | 7.314 | 1.007 | -.014 |
| .150 | .065 | .836 | 4.838 | 2.650 | 4.648 | 1.300 | -.363 | 5.150 | 7.364 | 1.007 | -.013 |
| .200 | .113 | 1.066 | 4.365 | 2.700 | 4.712 | 1.283 | -.345 | 5.200 | 7.415 | 1.006 | -.012 |
| .250 | .172 | 1.273 | 3.908 | 2.750 | 4.776 | 1.266 | -.327 | 5.250 | 7.465 | 1.005 | -.011 |
| .300 | .240 | 1.457 | 3.470 | 2.800 | 4.839 | 1.250 | -.310 | 5.300 | 7.515 | 1.005 | -.010 |
| .350 | .317 | 1.620 | 3.052 | 2.850 | 4.901 | 1.235 | -.293 | 5.350 | 7.565 | 1.004 | -.009 |
| .400 | .402 | 1.763 | 2.655 | 2.900 | 4.962 | 1.221 | -.278 | 5.400 | 7.616 | 1.004 | -.008 |
| .450 | .493 | 1.886 | 2.282 | 2.950 | 5.023 | 1.207 | -.263 | 5.450 | 7.666 | 1.004 | -.007 |
| .500 | .590 | 1.991 | 1.933 | 3.000 | 5.083 | 1.194 | -.249 | 5.500 | 7.716 | 1.003 | -.006 |
| .550 | .692 | 2.080 | 1.609 | 3.050 | 5.142 | 1.182 | -.235 | 5.550 | 7.766 | 1.003 | -.006 |
| .600 | .798 | 2.153 | 1.309 | 3.100 | 5.201 | 1.171 | -.222 | 5.600 | 7.816 | 1.003 | -.005 |
| .650 | .907 | 2.211 | 1.033 | 3.150 | 5.259 | 1.160 | -.210 | 5.650 | 7.866 | 1.003 | -.005 |
| .700 | 1.019 | 2.256 | .781 | 3.200 | 5.317 | 1.150 | -.198 | 5.700 | 7.916 | 1.002 | -.004 |
| .750 | 1.132 | 2.289 | .553 | 3.250 | 5.374 | 1.140 | -.187 | 5.750 | 7.967 | 1.002 | -.004 |
| .800 | 1.247 | 2.312 | .347 | 3.300 | 5.431 | 1.131 | -.176 | 5.800 | 8.017 | 1.002 | -.004 |
| .850 | 1.363 | 2.325 | .163 | 3.350 | 5.488 | 1.123 | -.166 | 5.850 | 8.067 | 1.002 | -.003 |
| .900 | 1.480 | 2.328 | -.001 | 3.400 | 5.543 | 1.114 | -.157 | 5.900 | 8.117 | 1.002 | -.002 |
| .950 | 1.596 | 2.325 | -.145 | 3.450 | 5.599 | 1.107 | -.148 | 5.950 | 8.167 | 1.001 | -.002 |
| 1.000 | 1.712 | 2.314 | -.271 | 3.500 | 5.654 | 1.100 | -.139 | 6.000 | 8.217 | 1.001 | -.002 |
| 1.050 | 1.827 | 2.298 | -.380 | 3.550 | 5.709 | 1.093 | -.131 | 6.050 | 8.267 | 1.001 | -.002 |
| 1.100 | 1.942 | 2.276 | -.473 | 3.600 | 5.763 | 1.087 | -.123 | 6.100 | 8.317 | 1.001 | -.001 |
| 1.150 | 2.055 | 2.251 | -.552 | 3.650 | 5.818 | 1.081 | -.116 | 6.150 | 8.367 | 1.000 | -.001 |
| 1.200 | 2.167 | 2.221 | -.617 | 3.700 | 5.871 | 1.075 | -.109 | 6.200 | 8.417 | 1.000 | -.001 |
| 1.250 | 2.277 | 2.189 | -.670 | 3.750 | 5.925 | 1.070 | -.102 | 6.250 | 8.467 | 1.000 | .000 |
| 1.300 | 2.386 | 2.155 | -.712 | 3.800 | 5.978 | 1.065 | -.096 | 6.300 | 8.517 | 1.000 | .000 |
| 1.350 | 2.492 | 2.118 | -.745 | 3.850 | 6.032 | 1.060 | -.090 | 6.350 | 8.567 | 1.000 | .000 |
| 1.400 | 2.597 | 2.080 | -.768 | 3.900 | 6.084 | 1.056 | -.084 | 6.400 | 8.618 | 1.000 | .000 |
| 1.450 | 2.700 | 2.042 | -.783 | 3.950 | 6.137 | 1.052 | -.079 | 6.450 | 8.668 | 1.000 | .000 |
| 1.500 | 2.802 | 2.002 | -.792 | 4.000 | 6.190 | 1.048 | -.074 | 6.500 | 8.718 | 1.000 | .000 |
| 1.550 | 2.901 | 1.962 | -.794 | 4.050 | 6.242 | 1.044 | -.069 | 6.550 | 8.768 | 1.000 | .000 |
| 1.600 | 2.998 | 1.923 | -.792 | 4.100 | 6.294 | 1.041 | -.064 | 6.600 | 8.818 | 1.000 | .000 |
| 1.650 | 3.093 | 1.883 | -.784 | 4.150 | 6.346 | 1.038 | -.060 | 6.650 | 8.868 | 1.000 | .000 |
| 1.700 | 3.186 | 1.844 | -.773 | 4.200 | 6.398 | 1.035 | -.056 | 6.700 | 8.918 | 1.000 | .000 |
| 1.750 | 3.277 | 1.806 | -.759 | 4.250 | 6.450 | 1.032 | -.052 | 6.750 | 8.968 | 1.000 | .000 |
| 1.800 | 3.367 | 1.769 | -.742 | 4.300 | 6.501 | 1.030 | -.049 | 6.800 | 9.018 | 1.000 | .000 |
| 1.850 | 3.454 | 1.732 | -.723 | 4.350 | 6.553 | 1.027 | -.045 | 6.850 | 9.068 | 1.000 | .000 |
| 1.900 | 3.540 | 1.696 | -.702 | 4.400 | 6.604 | 1.025 | -.042 | 6.900 | 9.118 | 1.000 | .000 |
| 1.950 | 3.624 | 1.662 | -.680 | 4.450 | 6.655 | 1.023 | -.039 | 6.950 | 9.168 | 1.000 | .000 |
| 2.000 | 3.706 | 1.628 | -.657 | 4.500 | 6.706 | 1.021 | -.037 | 7.000 | 9.218 | 1.000 | .000 |
| 2.050 | 3.787 | 1.596 | -.633 | 4.550 | 6.757 | 1.020 | -.034 | | | | |
| 2.100 | 3.866 | 1.565 | -.609 | 4.600 | 6.808 | 1.018 | -.031 | | | | |
| 2.150 | 3.943 | 1.535 | -.585 | 4.650 | 6.859 | 1.016 | -.029 | | | | |
| 2.200 | 4.019 | 1.506 | -.561 | 4.700 | 6.910 | 1.015 | -.027 | | | | |
| 2.250 | 4.094 | 1.479 | -.537 | 4.750 | 6.961 | 1.014 | -.025 | | | | |
| 2.300 | 4.167 | 1.453 | -.513 | 4.800 | 7.011 | 1.013 | -.023 | | | | |
| 2.350 | 4.239 | 1.428 | -.490 | 4.850 | 7.062 | 1.011 | -.021 | | | | |
| 2.400 | 4.310 | 1.404 | -.467 | 4.900 | 7.112 | 1.010 | -.019 | | | | |
| 2.450 | 4.380 | 1.381 | -.445 | 4.950 | 7.163 | 1.010 | -.018 | | | | |

CJ-4

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)

(8) $n = 1$ and $m = 0$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 0.570 | 2.000 | 1.024 | 0.891 | 0.198 | 4.000 | 2.974 | 1.000 | 0.002 |
| .050 | .001 | .029 | .570 | 2.050 | 1.069 | .901 | .184 | 4.050 | 3.024 | 1.000 | .002 |
| .100 | .003 | .057 | .570 | 2.100 | 1.114 | .910 | .172 | 4.100 | 3.074 | 1.000 | .001 |
| .150 | .006 | .086 | .570 | 2.150 | 1.160 | .918 | .159 | 4.150 | 3.124 | 1.000 | .001 |
| .200 | .011 | .114 | .570 | 2.200 | 1.206 | .926 | .148 | 4.200 | 3.174 | 1.000 | .001 |
| .250 | .018 | .143 | .569 | 2.250 | 1.252 | .933 | .136 | 4.250 | 3.224 | 1.000 | .001 |
| .300 | .026 | .171 | .568 | 2.300 | 1.299 | .939 | .126 | 4.300 | 3.274 | 1.000 | .001 |
| .350 | .035 | .199 | .566 | 2.350 | 1.346 | .945 | .116 | 4.350 | 3.324 | 1.000 | .001 |
| .400 | .046 | .227 | .564 | 2.400 | 1.394 | .951 | .106 | 4.400 | 3.374 | 1.000 | .000 |
| .450 | .058 | .256 | .561 | 2.450 | 1.441 | .956 | .097 | 4.450 | 3.424 | 1.000 | .000 |
| .500 | .071 | .284 | .557 | 2.500 | 1.489 | .961 | .088 | 4.500 | 3.474 | 1.000 | .000 |
| .550 | .086 | .311 | .553 | 2.550 | 1.537 | .965 | .081 | 4.550 | 3.524 | 1.000 | .000 |
| .600 | .102 | .339 | .549 | 2.600 | 1.586 | .969 | .073 | 4.600 | 3.574 | 1.000 | .000 |
| .650 | .120 | .366 | .543 | 2.650 | 1.634 | .972 | .066 | 4.650 | 3.624 | 1.000 | .000 |
| .700 | .139 | .393 | .537 | 2.700 | 1.683 | .975 | .060 | 4.700 | 3.674 | 1.000 | .000 |
| .750 | .159 | .420 | .530 | 2.750 | 1.732 | .978 | .054 | 4.750 | 3.724 | 1.000 | .000 |
| .800 | .181 | .446 | .522 | 2.800 | 1.781 | .981 | .048 | 4.800 | 3.774 | 1.000 | .000 |
| .850 | .204 | .472 | .514 | 2.850 | 1.830 | .983 | .043 | 4.850 | 3.824 | 1.000 | .000 |
| .900 | .228 | .498 | .504 | 2.900 | 1.879 | .985 | .039 | 4.900 | 3.874 | 1.000 | .000 |
| .950 | .254 | .522 | .494 | 2.950 | 1.928 | .987 | .035 | 4.950 | 3.924 | 1.000 | .000 |
| 1.000 | .280 | .547 | .483 | 3.000 | 1.978 | .989 | .031 | 5.000 | 3.974 | 1.000 | .000 |
| 1.050 | .308 | .571 | .472 | 3.050 | 2.027 | .990 | .027 | | | | |
| 1.100 | .337 | .594 | .460 | 3.100 | 2.077 | .991 | .024 | | | | |
| 1.150 | .368 | .617 | .447 | 3.150 | 2.126 | .992 | .021 | | | | |
| 1.200 | .399 | .639 | .434 | 3.200 | 2.176 | .993 | .019 | | | | |
| 1.250 | .432 | .660 | .420 | 3.250 | 2.226 | .994 | .017 | | | | |
| 1.300 | .465 | .681 | .406 | 3.300 | 2.275 | .995 | .015 | | | | |
| 1.350 | .500 | .701 | .392 | 3.350 | 2.325 | .996 | .013 | | | | |
| 1.400 | .535 | .720 | .377 | 3.400 | 2.375 | .996 | .011 | | | | |
| 1.450 | .572 | .738 | .362 | 3.450 | 2.425 | .997 | .010 | | | | |
| 1.500 | .609 | .756 | .346 | 3.500 | 2.475 | .997 | .008 | | | | |
| 1.550 | .647 | .773 | .331 | 3.550 | 2.524 | .998 | .007 | | | | |
| 1.600 | .686 | .789 | .315 | 3.600 | 2.574 | .998 | .006 | | | | |
| 1.650 | .726 | .805 | .300 | 3.650 | 2.624 | .998 | .005 | | | | |
| 1.700 | .767 | .819 | .285 | 3.700 | 2.674 | .999 | .005 | | | | |
| 1.750 | .808 | .833 | .269 | 3.750 | 2.724 | .999 | .004 | | | | |
| 1.800 | .850 | .846 | .254 | 3.800 | 2.774 | .999 | .003 | | | | |
| 1.850 | .893 | .859 | .240 | 3.850 | 2.824 | .999 | .003 | | | | |
| 1.900 | .936 | .870 | .223 | 3.900 | 2.874 | .999 | .002 | | | | |
| 1.950 | .980 | .881 | .211 | 3.950 | 2.924 | .999 | .002 | | | | |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)

(9) $n = 1$ and $m = 1$

(10) $n = 1$ and $m = 2$

| (9) $n = 1$ and $m = 1$ | | | | (10) $n = 1$ and $m = 2$ | | | | | | | | | | | |
|-------------------------|-----------|------------|-------------|--------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
| 0.000 | 0.000 | 0.000 | 1.233 | 2.000 | 1.362 | 0.973 | 0.066 | 0.000 | 0.000 | 0.000 | 1.748 | 2.000 | 1.555 | 1.004 | 0.004 |
| .050 | .002 | .060 | 1.183 | 2.050 | 1.411 | .976 | .059 | .050 | .002 | .085 | 1.648 | 2.050 | 1.605 | 1.004 | 0.002 |
| .100 | .006 | .118 | 1.133 | 2.100 | 1.460 | .979 | .053 | .100 | .008 | .165 | 1.549 | 2.100 | 1.655 | 1.004 | .000 |
| .150 | .013 | .174 | 1.083 | 2.150 | 1.509 | .982 | .047 | .150 | .019 | .240 | 1.451 | 2.150 | 1.705 | 1.004 | -.002 |
| .200 | .023 | .227 | 1.034 | 2.200 | 1.558 | .984 | .042 | .200 | .032 | .310 | 1.356 | 2.200 | 1.755 | 1.004 | -.003 |
| .250 | .036 | .277 | .986 | 2.250 | 1.607 | .986 | .037 | .250 | .049 | .375 | 1.262 | 2.250 | 1.806 | 1.004 | -.004 |
| .300 | .051 | .325 | .939 | 2.300 | 1.656 | .988 | .033 | .300 | .070 | .436 | 1.172 | 2.300 | 1.856 | 1.004 | -.004 |
| .350 | .068 | .371 | .892 | 2.350 | 1.706 | .989 | .029 | .350 | .093 | .493 | 1.085 | 2.350 | 1.906 | 1.004 | -.005 |
| .400 | .088 | .414 | .846 | 2.400 | 1.755 | .991 | .026 | .400 | .119 | .545 | 1.001 | 2.400 | 1.956 | 1.004 | -.005 |
| .450 | .110 | .456 | .802 | 2.450 | 1.805 | .992 | .023 | .450 | .147 | .593 | .921 | 2.450 | 2.006 | 1.003 | -.005 |
| .500 | .134 | .495 | .758 | 2.500 | 1.854 | .993 | .020 | .500 | .176 | .637 | .845 | 2.500 | 2.057 | 1.003 | -.005 |
| .550 | .159 | .532 | .716 | 2.550 | 1.904 | .994 | .018 | .550 | .211 | .677 | .773 | 2.550 | 2.107 | 1.003 | -.005 |
| .600 | .187 | .566 | .675 | 2.600 | 1.954 | .995 | .016 | .600 | .246 | .714 | .705 | 2.600 | 2.157 | 1.003 | -.005 |
| .650 | .216 | .599 | .636 | 2.650 | 2.004 | .995 | .014 | .650 | .282 | .748 | .641 | 2.650 | 2.207 | 1.002 | -.004 |
| .700 | .247 | .630 | .597 | 2.700 | 2.053 | .996 | .012 | .700 | .321 | .779 | .581 | 2.700 | 2.257 | 1.002 | -.004 |
| .750 | .279 | .659 | .561 | 2.750 | 2.103 | .997 | .010 | .750 | .360 | .806 | .525 | 2.750 | 2.307 | 1.002 | -.004 |
| .800 | .312 | .686 | .525 | 2.800 | 2.153 | .997 | .009 | .800 | .401 | .831 | .472 | 2.800 | 2.357 | 1.002 | -.004 |
| .850 | .347 | .711 | .491 | 2.850 | 2.203 | .997 | .008 | .850 | .443 | .853 | .424 | 2.850 | 2.407 | 1.002 | -.003 |
| .900 | .384 | .735 | .459 | 2.900 | 2.253 | .998 | .007 | .900 | .487 | .874 | .379 | 2.900 | 2.457 | 1.001 | -.003 |
| .950 | .421 | .757 | .428 | 2.950 | 2.303 | .998 | .006 | .950 | .531 | .891 | .338 | 2.950 | 2.507 | 1.001 | -.003 |
| 1.000 | .459 | .778 | .398 | 3.000 | 2.353 | .998 | .005 | 1.000 | .576 | .907 | .300 | 3.000 | 2.557 | 1.001 | -.003 |
| 1.050 | .499 | .797 | .370 | 3.050 | 2.402 | .999 | .004 | 1.050 | .621 | .921 | .265 | 3.050 | 2.608 | 1.001 | -.002 |
| 1.100 | .539 | .815 | .343 | 3.100 | 2.452 | .999 | .004 | 1.100 | .668 | .934 | .233 | 3.100 | 2.658 | 1.001 | -.002 |
| 1.150 | .580 | .831 | .318 | 3.150 | 2.502 | .999 | .003 | 1.150 | .715 | .945 | .205 | 3.150 | 2.708 | 1.001 | -.002 |
| 1.200 | .622 | .847 | .294 | 3.200 | 2.552 | .999 | .003 | 1.200 | .762 | .954 | .179 | 3.200 | 2.758 | 1.001 | -.002 |
| 1.250 | .665 | .861 | .271 | 3.250 | 2.602 | .999 | .002 | 1.250 | .810 | .963 | .155 | 3.250 | 2.808 | 1.001 | -.002 |
| 1.300 | .708 | .874 | .250 | 3.300 | 2.652 | .999 | .002 | 1.300 | .858 | .970 | .134 | 3.300 | 2.858 | 1.000 | -.001 |
| 1.350 | .752 | .886 | .230 | 3.350 | 2.702 | 1.000 | .002 | 1.350 | .907 | .976 | .115 | 3.350 | 2.908 | 1.000 | -.001 |
| 1.400 | .797 | .897 | .211 | 3.400 | 2.752 | 1.000 | .001 | 1.400 | .956 | .981 | .098 | 3.400 | 2.958 | 1.000 | -.001 |
| 1.450 | .842 | .907 | .193 | 3.450 | 2.802 | 1.000 | .001 | 1.450 | 1.005 | .986 | .083 | 3.450 | 3.008 | 1.000 | -.001 |
| 1.500 | .887 | .916 | .177 | 3.500 | 2.852 | 1.000 | .001 | 1.500 | 1.055 | .990 | .070 | 3.500 | 3.058 | 1.000 | -.001 |
| 1.550 | .933 | .925 | .162 | 3.550 | 2.902 | 1.000 | .001 | 1.550 | 1.104 | .993 | .058 | 3.550 | 3.108 | 1.000 | -.001 |
| 1.600 | .980 | .932 | .147 | 3.600 | 2.952 | 1.000 | .001 | 1.600 | 1.154 | .996 | .048 | 3.600 | 3.158 | 1.000 | -.001 |
| 1.650 | 1.027 | .939 | .134 | 3.650 | 3.002 | 1.000 | .001 | 1.650 | 1.204 | .998 | .039 | 3.650 | 3.208 | 1.000 | -.001 |
| 1.700 | 1.074 | .946 | .122 | 3.700 | 3.052 | 1.000 | .001 | 1.700 | 1.254 | 1.000 | .031 | 3.700 | 3.258 | 1.000 | .000 |
| 1.750 | 1.121 | .952 | .110 | 3.750 | 3.102 | 1.000 | .000 | 1.750 | 1.304 | 1.001 | .025 | 3.750 | 3.308 | 1.000 | .000 |
| 1.800 | 1.169 | .957 | .100 | 3.800 | 3.152 | 1.000 | .000 | 1.800 | 1.354 | 1.002 | .019 | 3.800 | 3.358 | 1.000 | .000 |
| 1.850 | 1.217 | .962 | .090 | 3.850 | 3.202 | 1.000 | .000 | 1.850 | 1.404 | 1.003 | .014 | 3.850 | 3.408 | 1.000 | .000 |
| 1.900 | 1.265 | .966 | .081 | 3.900 | 3.252 | 1.000 | .000 | 1.900 | 1.454 | 1.004 | .010 | 3.900 | 3.458 | 1.000 | .000 |
| 1.950 | 1.313 | .970 | .073 | 3.950 | 3.302 | 1.000 | .000 | 1.950 | 1.504 | 1.004 | .007 | 3.950 | 3.508 | 1.000 | .000 |
| | | | | 4.000 | 3.352 | 1.000 | .000 | | | | | 4.000 | 3.558 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(11) $n = 1$ and $m = 4$ (12) $n = 1$ and $m = 6$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.590 | 2.000 | 1.784 | 1.026 | -0.050 | 0.000 | 0.000 | 0.000 | 3.300 | 2.000 | 1.928 | 1.032 | -0.070 |
| .050 | .003 | .124 | 2.390 | 2.050 | 1.836 | 1.023 | -.047 | .050 | .004 | .158 | 3.001 | 2.050 | 1.978 | 1.028 | -.064 |
| .100 | .012 | .239 | 2.193 | 2.100 | 1.887 | 1.021 | -.044 | .100 | .016 | .300 | 2.707 | 2.100 | 2.029 | 1.025 | -.059 |
| .150 | .027 | .344 | 2.001 | 2.150 | 1.938 | 1.019 | -.040 | .150 | .034 | .428 | 2.422 | 2.150 | 2.080 | 1.023 | -.053 |
| .200 | .047 | .439 | 1.815 | 2.200 | 1.989 | 1.017 | -.037 | .200 | .058 | .543 | 2.149 | 2.200 | 2.132 | 1.020 | -.048 |
| .250 | .071 | .526 | 1.637 | 2.250 | 2.039 | 1.015 | -.034 | .250 | .088 | .643 | 1.891 | 2.250 | 2.182 | 1.018 | -.044 |
| .300 | .099 | .603 | 1.468 | 2.300 | 2.090 | 1.014 | -.031 | .300 | .122 | .732 | 1.650 | 2.300 | 2.233 | 1.016 | -.039 |
| .350 | .131 | .672 | 1.308 | 2.350 | 2.141 | 1.012 | -.029 | .350 | .161 | .809 | 1.426 | 2.350 | 2.284 | 1.014 | -.035 |
| .400 | .166 | .734 | 1.159 | 2.400 | 2.191 | 1.011 | -.026 | .400 | .203 | .875 | 1.220 | 2.400 | 2.335 | 1.012 | -.032 |
| .450 | .204 | .788 | 1.020 | 2.450 | 2.242 | 1.010 | -.024 | .450 | .248 | .931 | 1.033 | 2.450 | 2.385 | 1.011 | -.028 |
| .500 | .245 | .836 | .891 | 2.500 | 2.292 | 1.008 | -.021 | .500 | .296 | .978 | .863 | 2.500 | 2.436 | 1.009 | -.025 |
| .550 | .288 | .878 | .773 | 2.550 | 2.343 | 1.007 | -.019 | .550 | .346 | 1.018 | .711 | 2.550 | 2.486 | 1.008 | -.022 |
| .600 | .332 | .914 | .665 | 2.600 | 2.393 | 1.007 | -.017 | .600 | .398 | 1.050 | .576 | 2.600 | 2.537 | 1.007 | -.020 |
| .650 | .379 | .944 | .567 | 2.650 | 2.443 | 1.006 | -.015 | .650 | .451 | 1.076 | .457 | 2.650 | 2.587 | 1.006 | -.017 |
| .700 | .427 | .971 | .479 | 2.700 | 2.494 | 1.005 | -.014 | .700 | .505 | 1.096 | .353 | 2.700 | 2.637 | 1.005 | -.015 |
| .750 | .476 | .992 | .400 | 2.750 | 2.544 | 1.004 | -.012 | .750 | .560 | 1.111 | .262 | 2.750 | 2.687 | 1.005 | -.013 |
| .800 | .526 | 1.011 | .329 | 2.800 | 2.594 | 1.004 | -.011 | .800 | .616 | 1.122 | .184 | 2.800 | 2.738 | 1.004 | -.012 |
| .850 | .577 | 1.026 | .267 | 2.850 | 2.644 | 1.003 | -.009 | .850 | .672 | 1.130 | .118 | 2.850 | 2.788 | 1.003 | -.010 |
| .900 | .628 | 1.037 | .212 | 2.900 | 2.694 | 1.003 | -.008 | .900 | .729 | 1.134 | .062 | 2.900 | 2.838 | 1.003 | -.009 |
| .950 | .681 | 1.047 | .164 | 2.950 | 2.744 | 1.002 | -.007 | .950 | .786 | 1.136 | .015 | 2.950 | 2.888 | 1.003 | -.008 |
| 1.000 | .733 | 1.054 | .122 | 3.000 | 2.795 | 1.002 | -.006 | 1.000 | .843 | 1.136 | -.023 | 3.000 | 2.938 | 1.002 | -.007 |
| 1.050 | .786 | 1.059 | .086 | 3.050 | 2.845 | 1.002 | -.006 | 1.050 | .899 | 1.134 | -.054 | 3.050 | 2.988 | 1.002 | -.006 |
| 1.100 | .839 | 1.063 | .053 | 3.100 | 2.895 | 1.002 | -.005 | 1.100 | .956 | 1.130 | -.079 | 3.100 | 3.038 | 1.002 | -.005 |
| 1.150 | .892 | 1.065 | .029 | 3.150 | 2.945 | 1.001 | -.004 | 1.150 | 1.012 | 1.126 | -.097 | 3.150 | 3.088 | 1.001 | -.004 |
| 1.200 | .945 | 1.066 | .007 | 3.200 | 2.995 | 1.001 | -.004 | 1.200 | 1.068 | 1.121 | -.111 | 3.200 | 3.139 | 1.001 | -.004 |
| 1.250 | .999 | 1.065 | -.011 | 3.250 | 3.045 | 1.001 | -.003 | 1.250 | 1.124 | 1.115 | -.121 | 3.250 | 3.189 | 1.001 | -.003 |
| 1.300 | 1.052 | 1.065 | -.025 | 3.300 | 3.095 | 1.001 | -.003 | 1.300 | 1.180 | 1.109 | -.128 | 3.300 | 3.239 | 1.001 | -.003 |
| 1.350 | 1.105 | 1.063 | -.037 | 3.350 | 3.145 | 1.001 | -.002 | 1.350 | 1.235 | 1.102 | -.131 | 3.350 | 3.289 | 1.001 | -.002 |
| 1.400 | 1.158 | 1.061 | -.046 | 3.400 | 3.195 | 1.001 | -.002 | 1.400 | 1.290 | 1.096 | -.132 | 3.400 | 3.339 | 1.001 | -.002 |
| 1.450 | 1.211 | 1.058 | -.053 | 3.450 | 3.245 | 1.000 | -.002 | 1.450 | 1.345 | 1.089 | -.131 | 3.450 | 3.389 | 1.000 | -.002 |
| 1.500 | 1.264 | 1.056 | -.058 | 3.500 | 3.295 | 1.000 | -.001 | 1.500 | 1.399 | 1.083 | -.129 | 3.500 | 3.439 | 1.000 | -.001 |
| 1.550 | 1.317 | 1.053 | -.061 | 3.550 | 3.345 | 1.000 | -.001 | 1.550 | 1.453 | 1.076 | -.125 | 3.550 | 3.489 | 1.000 | -.001 |
| 1.600 | 1.369 | 1.050 | -.063 | 3.600 | 3.395 | 1.000 | -.001 | 1.600 | 1.507 | 1.070 | -.120 | 3.600 | 3.539 | 1.000 | -.001 |
| 1.650 | 1.422 | 1.046 | -.064 | 3.650 | 3.445 | 1.000 | -.001 | 1.650 | 1.560 | 1.064 | -.115 | 3.650 | 3.589 | 1.000 | -.001 |
| 1.700 | 1.474 | 1.043 | -.063 | 3.700 | 3.495 | 1.000 | -.001 | 1.700 | 1.613 | 1.059 | -.109 | 3.700 | 3.639 | 1.000 | -.001 |
| 1.750 | 1.526 | 1.040 | -.062 | 3.750 | 3.545 | 1.000 | -.001 | 1.750 | 1.666 | 1.053 | -.102 | 3.750 | 3.689 | 1.000 | -.001 |
| 1.800 | 1.578 | 1.037 | -.060 | 3.800 | 3.595 | 1.000 | -.001 | 1.800 | 1.718 | 1.048 | -.096 | 3.800 | 3.739 | 1.000 | -.001 |
| 1.850 | 1.630 | 1.034 | -.058 | 3.850 | 3.645 | 1.000 | .000 | 1.850 | 1.771 | 1.044 | -.089 | 3.850 | 3.789 | 1.000 | .000 |
| 1.900 | 1.681 | 1.031 | -.056 | 3.900 | 3.695 | 1.000 | .000 | 1.900 | 1.823 | 1.039 | -.083 | 3.900 | 3.839 | 1.000 | .000 |
| 1.950 | 1.733 | 1.028 | -.053 | 3.950 | 3.745 | 1.000 | .000 | 1.950 | 1.875 | 1.035 | -.076 | 3.950 | 3.889 | 1.000 | .000 |
| | | | | 4.000 | 3.795 | 1.000 | .000 | | | | | 4.000 | 3.939 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^2$, $W = bx^2$)(13) $n = 1$ and $m = 8$ (14) $n = 1$ and $m = 10$

| η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.934 | 2.000 | 2.028 | 1.033 | -0.079 | 0.000 | 0.000 | 0.000 | 4.516 | 2.000 | 2.106 | 1.034 | -0.082 |
| .050 | .005 | .187 | 3.535 | 2.050 | 2.079 | 1.030 | -.071 | .050 | .005 | .213 | 4.018 | 2.050 | 2.157 | 1.030 | -.074 |
| .100 | .018 | .354 | 3.145 | 2.100 | 2.131 | 1.026 | -.064 | .100 | .021 | .402 | 3.532 | 2.100 | 2.209 | 1.026 | -.066 |
| .150 | .040 | .501 | 2.769 | 2.150 | 2.182 | 1.023 | -.058 | .150 | .045 | .567 | 3.066 | 2.150 | 2.260 | 1.023 | -.059 |
| .200 | .068 | .631 | 2.412 | 2.200 | 2.233 | 1.021 | -.052 | .200 | .077 | .709 | 2.628 | 2.200 | 2.311 | 1.020 | -.053 |
| .250 | .103 | .743 | 2.079 | 2.250 | 2.284 | 1.018 | -.047 | .250 | .116 | .830 | 2.222 | 2.250 | 2.362 | 1.018 | -.047 |
| .300 | .142 | .839 | 1.770 | 2.300 | 2.335 | 1.016 | -.042 | .300 | .160 | .932 | 1.851 | 2.300 | 2.413 | 1.016 | -.042 |
| .350 | .186 | .920 | 1.488 | 2.350 | 2.386 | 1.014 | -.037 | .350 | .209 | .016 | 1.516 | 2.350 | 2.464 | 1.014 | -.037 |
| .400 | .234 | .988 | 1.238 | 2.400 | 2.436 | 1.012 | -.033 | .400 | .261 | .084 | 1.217 | 2.400 | 2.514 | 1.012 | -.033 |
| .450 | .285 | 1.044 | 1.003 | 2.450 | 2.487 | 1.011 | -.029 | .450 | .317 | 1.138 | .954 | 2.450 | 2.565 | 1.010 | -.029 |
| .500 | .338 | 1.089 | .802 | 2.500 | 2.537 | 1.009 | -.026 | .500 | .375 | 1.180 | .725 | 2.500 | 2.615 | 1.009 | -.026 |
| .550 | .394 | 1.125 | .625 | 2.550 | 2.588 | 1.008 | -.023 | .550 | .435 | 1.211 | .527 | 2.550 | 2.666 | 1.008 | -.022 |
| .600 | .451 | 1.152 | .470 | 2.600 | 2.638 | 1.007 | -.020 | .600 | .496 | 1.233 | .359 | 2.600 | 2.716 | 1.007 | -.020 |
| .650 | .509 | 1.172 | .337 | 2.650 | 2.688 | 1.006 | -.018 | .650 | .558 | 1.248 | .218 | 2.650 | 2.766 | 1.006 | -.017 |
| .700 | .568 | 1.186 | .224 | 2.700 | 2.739 | 1.005 | -.015 | .700 | .620 | 1.255 | .101 | 2.700 | 2.817 | 1.005 | -.015 |
| .750 | .627 | 1.195 | .129 | 2.750 | 2.789 | 1.004 | -.013 | .750 | .683 | 1.258 | .005 | 2.750 | 2.867 | 1.004 | -.013 |
| .800 | .687 | 1.199 | .050 | 2.800 | 2.839 | 1.004 | -.012 | .800 | .746 | 1.256 | -.071 | 2.800 | 2.917 | 1.004 | -.011 |
| .850 | .747 | 1.200 | -.015 | 2.850 | 2.889 | 1.003 | -.010 | .850 | .809 | 1.251 | -.132 | 2.850 | 2.967 | 1.003 | -.010 |
| .900 | .807 | 1.198 | -.067 | 2.900 | 2.939 | 1.003 | -.009 | .900 | .871 | 1.243 | -.178 | 2.900 | 3.017 | 1.003 | -.009 |
| .950 | .867 | 1.194 | -.108 | 2.950 | 2.990 | 1.002 | -.008 | .950 | .933 | 1.234 | -.212 | 2.950 | 3.068 | 1.002 | -.007 |
| 1.000 | .926 | 1.187 | -.140 | 3.000 | 3.040 | 1.002 | -.007 | 1.000 | .995 | 1.222 | -.235 | 3.000 | 3.118 | 1.002 | -.006 |
| 1.050 | .986 | 1.180 | -.164 | 3.050 | 3.090 | 1.002 | -.006 | 1.050 | 1.055 | 1.210 | -.251 | 3.050 | 3.168 | 1.002 | -.006 |
| 1.100 | 1.044 | 1.171 | -.180 | 3.100 | 3.140 | 1.001 | -.005 | 1.100 | 1.116 | 1.197 | -.259 | 3.100 | 3.218 | 1.001 | -.005 |
| 1.150 | 1.103 | 1.162 | -.191 | 3.150 | 3.190 | 1.001 | -.004 | 1.150 | 1.175 | 1.184 | -.261 | 3.150 | 3.268 | 1.001 | -.004 |
| 1.200 | 1.161 | 1.152 | -.197 | 3.200 | 3.240 | 1.001 | -.004 | 1.200 | 1.234 | 1.171 | -.259 | 3.200 | 3.318 | 1.001 | -.003 |
| 1.250 | 1.218 | 1.142 | -.198 | 3.250 | 3.290 | 1.001 | -.003 | 1.250 | 1.292 | 1.158 | -.254 | 3.250 | 3.368 | 1.001 | -.003 |
| 1.300 | 1.275 | 1.132 | -.197 | 3.300 | 3.340 | 1.001 | -.003 | 1.300 | 1.350 | 1.146 | -.245 | 3.300 | 3.418 | 1.001 | -.003 |
| 1.350 | 1.331 | 1.123 | -.193 | 3.350 | 3.390 | 1.001 | -.002 | 1.350 | 1.407 | 1.134 | -.235 | 3.350 | 3.468 | 1.001 | -.002 |
| 1.400 | 1.387 | 1.113 | -.187 | 3.400 | 3.440 | 1.001 | -.002 | 1.400 | 1.469 | 1.122 | -.224 | 3.400 | 3.518 | 1.000 | -.002 |
| 1.450 | 1.443 | 1.104 | -.180 | 3.450 | 3.490 | 1.000 | -.002 | 1.450 | 1.519 | 1.112 | -.211 | 3.450 | 3.568 | 1.000 | -.002 |
| 1.500 | 1.498 | 1.095 | -.171 | 3.500 | 3.540 | 1.000 | -.001 | 1.500 | 1.574 | 1.101 | -.198 | 3.500 | 3.618 | 1.000 | -.001 |
| 1.550 | 1.552 | 1.087 | -.162 | 3.550 | 3.590 | 1.000 | -.001 | 1.550 | 1.629 | 1.092 | -.184 | 3.550 | 3.668 | 1.000 | -.001 |
| 1.600 | 1.606 | 1.079 | -.152 | 3.600 | 3.640 | 1.000 | -.001 | 1.600 | 1.684 | 1.083 | -.171 | 3.600 | 3.718 | 1.000 | -.001 |
| 1.650 | 1.660 | 1.072 | -.142 | 3.650 | 3.690 | 1.000 | -.001 | 1.650 | 1.738 | 1.075 | -.158 | 3.650 | 3.768 | 1.000 | -.001 |
| 1.700 | 1.713 | 1.063 | -.132 | 3.700 | 3.740 | 1.000 | -.001 | 1.700 | 1.791 | 1.067 | -.145 | 3.700 | 3.818 | 1.000 | -.001 |
| 1.750 | 1.766 | 1.058 | -.123 | 3.750 | 3.790 | 1.000 | -.001 | 1.750 | 1.844 | 1.060 | -.133 | 3.750 | 3.868 | 1.000 | -.001 |
| 1.800 | 1.819 | 1.052 | -.113 | 3.800 | 3.840 | 1.000 | -.001 | 1.800 | 1.897 | 1.054 | -.122 | 3.800 | 3.918 | 1.000 | -.001 |
| 1.850 | 1.872 | 1.047 | -.104 | 3.850 | 3.890 | 1.000 | .000 | 1.850 | 1.950 | 1.048 | -.111 | 3.850 | 3.968 | 1.000 | .000 |
| 1.900 | 1.924 | 1.042 | -.095 | 3.900 | 3.940 | 1.000 | .000 | 1.900 | 2.002 | 1.043 | -.100 | 3.900 | 4.018 | 1.000 | .000 |
| 1.950 | 1.976 | 1.038 | -.086 | 3.950 | 3.990 | 1.000 | .000 | 1.950 | 2.054 | 1.038 | -.091 | 3.950 | 4.068 | 1.000 | .000 |
| | | | | 4.000 | 4.040 | 1.000 | .000 | | | | | 4.000 | 4.118 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(15) $n = 2$ and $m = 0$ (16) $n = 2$ and $m = 1$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 0.716 | 2.000 | 1.192 | 0.960 | 0.111 | 0.000 | 0.000 | 0.000 | 1.265 | 2.000 | 1.395 | 0.984 | 0.049 |
| 0.050 | 0.001 | 0.036 | 0.716 | 2.050 | 1.240 | 0.965 | 0.099 | 0.050 | 0.002 | 0.062 | 1.215 | 2.050 | 1.445 | 0.987 | 0.042 |
| 0.100 | 0.004 | 0.072 | 0.716 | 2.100 | 1.289 | 0.970 | 0.087 | 0.100 | 0.006 | 0.122 | 1.169 | 2.100 | 1.494 | 0.989 | 0.037 |
| 0.150 | 0.008 | 0.107 | 0.715 | 2.150 | 1.337 | 0.974 | 0.077 | 0.150 | 0.014 | 0.179 | 1.116 | 2.150 | 1.543 | 0.990 | 0.032 |
| 0.200 | 0.014 | 0.143 | 0.714 | 2.200 | 1.386 | 0.978 | 0.068 | 0.200 | 0.024 | 0.233 | 1.067 | 2.200 | 1.593 | 0.992 | 0.028 |
| 0.250 | 0.022 | 0.179 | 0.712 | 2.250 | 1.435 | 0.981 | 0.060 | 0.250 | 0.037 | 0.285 | 1.018 | 2.250 | 1.643 | 0.993 | 0.024 |
| 0.300 | 0.032 | 0.214 | 0.709 | 2.300 | 1.484 | 0.984 | 0.052 | 0.300 | 0.052 | 0.335 | 0.970 | 2.300 | 1.692 | 0.994 | 0.020 |
| 0.350 | 0.044 | 0.250 | 0.704 | 2.350 | 1.533 | 0.986 | 0.045 | 0.350 | 0.070 | 0.382 | 0.922 | 2.350 | 1.742 | 0.995 | 0.017 |
| 0.400 | 0.057 | 0.285 | 0.699 | 2.400 | 1.583 | 0.988 | 0.039 | 0.400 | 0.091 | 0.427 | 0.876 | 2.400 | 1.792 | 0.996 | 0.015 |
| 0.450 | 0.072 | 0.319 | 0.692 | 2.450 | 1.632 | 0.990 | 0.034 | 0.450 | 0.113 | 0.470 | 0.830 | 2.450 | 1.842 | 0.997 | 0.013 |
| 0.500 | 0.089 | 0.354 | 0.684 | 2.500 | 1.682 | 0.991 | 0.029 | 0.500 | 0.138 | 0.510 | 0.785 | 2.500 | 1.891 | 0.997 | 0.011 |
| 0.550 | 0.108 | 0.388 | 0.674 | 2.550 | 1.731 | 0.993 | 0.025 | 0.550 | 0.164 | 0.548 | 0.741 | 2.550 | 1.941 | 0.998 | 0.009 |
| 0.600 | 0.128 | 0.421 | 0.663 | 2.600 | 1.781 | 0.994 | 0.021 | 0.600 | 0.192 | 0.584 | 0.698 | 2.600 | 1.991 | 0.998 | 0.008 |
| 0.650 | 0.150 | 0.454 | 0.650 | 2.650 | 1.831 | 0.995 | 0.018 | 0.650 | 0.222 | 0.618 | 0.657 | 2.650 | 2.041 | 0.998 | 0.006 |
| 0.700 | 0.173 | 0.486 | 0.636 | 2.700 | 1.881 | 0.996 | 0.015 | 0.700 | 0.254 | 0.650 | 0.616 | 2.700 | 2.091 | 0.999 | 0.005 |
| 0.750 | 0.198 | 0.518 | 0.620 | 2.750 | 1.930 | 0.997 | 0.013 | 0.750 | 0.287 | 0.680 | 0.577 | 2.750 | 2.141 | 0.999 | 0.004 |
| 0.800 | 0.225 | 0.548 | 0.603 | 2.800 | 1.980 | 0.997 | 0.011 | 0.800 | 0.322 | 0.708 | 0.539 | 2.800 | 2.191 | 0.999 | 0.004 |
| 0.850 | 0.253 | 0.578 | 0.585 | 2.850 | 2.030 | 0.998 | 0.009 | 0.850 | 0.358 | 0.734 | 0.503 | 2.850 | 2.241 | 0.999 | 0.003 |
| 0.900 | 0.283 | 0.607 | 0.565 | 2.900 | 2.080 | 0.998 | 0.008 | 0.900 | 0.395 | 0.758 | 0.468 | 2.900 | 2.291 | 0.999 | 0.002 |
| 0.950 | 0.314 | 0.635 | 0.545 | 2.950 | 2.130 | 0.998 | 0.006 | 0.950 | 0.434 | 0.780 | 0.434 | 2.950 | 2.341 | 1.000 | 0.002 |
| 1.000 | 0.346 | 0.661 | 0.523 | 3.000 | 2.180 | 0.999 | 0.005 | 1.000 | 0.473 | 0.801 | 0.402 | 3.000 | 2.391 | 1.000 | 0.002 |
| 1.050 | 0.380 | 0.687 | 0.501 | 3.050 | 2.230 | 0.999 | 0.004 | 1.050 | 0.514 | 0.821 | 0.371 | 3.050 | 2.441 | 1.000 | 0.001 |
| 1.100 | 0.415 | 0.711 | 0.478 | 3.100 | 2.280 | 0.999 | 0.004 | 1.100 | 0.555 | 0.838 | 0.342 | 3.100 | 2.491 | 1.000 | 0.001 |
| 1.150 | 0.451 | 0.735 | 0.454 | 3.150 | 2.330 | 0.999 | 0.003 | 1.150 | 0.598 | 0.855 | 0.314 | 3.150 | 2.541 | 1.000 | 0.001 |
| 1.200 | 0.488 | 0.757 | 0.430 | 3.200 | 2.380 | 0.999 | 0.002 | 1.200 | 0.641 | 0.870 | 0.288 | 3.200 | 2.591 | 1.000 | 0.001 |
| 1.250 | 0.527 | 0.778 | 0.406 | 3.250 | 2.430 | 1.000 | 0.002 | 1.250 | 0.685 | 0.884 | 0.263 | 3.250 | 2.641 | 1.000 | 0.001 |
| 1.300 | 0.566 | 0.797 | 0.382 | 3.300 | 2.480 | 1.000 | 0.002 | 1.300 | 0.729 | 0.896 | 0.240 | 3.300 | 2.691 | 1.000 | 0.000 |
| 1.350 | 0.606 | 0.816 | 0.358 | 3.350 | 2.530 | 1.000 | 0.001 | 1.350 | 0.774 | 0.908 | 0.218 | 3.350 | 2.741 | 1.000 | 0.000 |
| 1.400 | 0.648 | 0.833 | 0.334 | 3.400 | 2.580 | 1.000 | 0.001 | 1.400 | 0.820 | 0.918 | 0.198 | 3.400 | 2.791 | 1.000 | 0.000 |
| 1.450 | 0.690 | 0.849 | 0.311 | 3.450 | 2.630 | 1.000 | 0.001 | 1.450 | 0.866 | 0.928 | 0.179 | 3.450 | 2.841 | 1.000 | 0.000 |
| 1.500 | 0.733 | 0.864 | 0.289 | 3.500 | 2.680 | 1.000 | 0.001 | 1.500 | 0.913 | 0.936 | 0.161 | 3.500 | 2.891 | 1.000 | 0.000 |
| 1.550 | 0.776 | 0.878 | 0.267 | 3.550 | 2.730 | 1.000 | 0.001 | 1.550 | 0.960 | 0.944 | 0.145 | 3.550 | 2.941 | 1.000 | 0.000 |
| 1.600 | 0.820 | 0.891 | 0.245 | 3.600 | 2.780 | 1.000 | 0.000 | 1.600 | 1.007 | 0.951 | 0.130 | 3.600 | 2.991 | 1.000 | 0.000 |
| 1.650 | 0.865 | 0.903 | 0.225 | 3.650 | 2.830 | 1.000 | 0.000 | 1.650 | 1.055 | 0.957 | 0.116 | 3.650 | 3.041 | 1.000 | 0.000 |
| 1.700 | 0.911 | 0.913 | 0.206 | 3.700 | 2.880 | 1.000 | 0.000 | 1.700 | 1.103 | 0.962 | 0.104 | 3.700 | 3.091 | 1.000 | 0.000 |
| 1.750 | 0.956 | 0.923 | 0.187 | 3.750 | 2.930 | 1.000 | 0.000 | 1.750 | 1.151 | 0.967 | 0.092 | 3.750 | 3.141 | 1.000 | 0.000 |
| 1.800 | 1.003 | 0.932 | 0.170 | 3.800 | 2.980 | 1.000 | 0.000 | 1.800 | 1.200 | 0.971 | 0.082 | 3.800 | 3.191 | 1.000 | 0.000 |
| 1.850 | 1.050 | 0.940 | 0.153 | 3.850 | 3.030 | 1.000 | 0.000 | 1.850 | 1.248 | 0.975 | 0.072 | 3.850 | 3.241 | 1.000 | 0.000 |
| 1.900 | 1.097 | 0.948 | 0.138 | 3.900 | 3.080 | 1.000 | 0.000 | 1.900 | 1.297 | 0.979 | 0.063 | 3.900 | 3.291 | 1.000 | 0.000 |
| 1.950 | 1.144 | 0.954 | 0.124 | 3.950 | 3.130 | 1.000 | 0.000 | 1.950 | 1.346 | 0.982 | 0.056 | 3.950 | 3.341 | 1.000 | 0.000 |
| | | | | 4.000 | 3.180 | 1.000 | 0.000 | | | | | 4.000 | 3.391 | 1.000 | 0.000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)
 (17) $n = 2$ and $m = 2$ (18) $n = 2$ and $m = 4$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.715 | 2.000 | 1.525 | 0.995 | 0.018 | 0.000 | 0.000 | 0.000 | 2.465 | 2.000 | 1.689 | 1.003 | -0.009 |
| .050 | .002 | .083 | 1.615 | 2.050 | 1.575 | .996 | .015 | .050 | .003 | .118 | 2.265 | 2.050 | 1.739 | 1.003 | -0.008 |
| .100 | .008 | .162 | 1.516 | 2.100 | 1.624 | .997 | .013 | .100 | .012 | .227 | 2.069 | 2.100 | 1.789 | 1.003 | -0.007 |
| .150 | .018 | .235 | 1.419 | 2.150 | 1.674 | .997 | .011 | .150 | .025 | .325 | 1.878 | 2.150 | 1.839 | 1.002 | -0.007 |
| .200 | .032 | .303 | 1.324 | 2.200 | 1.724 | .998 | .009 | .200 | .044 | .415 | 1.695 | 2.200 | 1.889 | 1.002 | -0.006 |
| .250 | .048 | .367 | 1.231 | 2.250 | 1.774 | .998 | .007 | .250 | .067 | .495 | 1.521 | 2.250 | 1.940 | 1.002 | -0.005 |
| .300 | .068 | .427 | 1.142 | 2.300 | 1.824 | .998 | .006 | .300 | .093 | .567 | 1.357 | 2.300 | 1.990 | 1.001 | -0.005 |
| .350 | .091 | .482 | 1.056 | 2.350 | 1.874 | .999 | .005 | .350 | .123 | .631 | 1.204 | 2.350 | 2.040 | 1.001 | -0.004 |
| .400 | .116 | .532 | .974 | 2.400 | 1.924 | .999 | .004 | .400 | .156 | .687 | 1.062 | 2.400 | 2.090 | 1.001 | -0.003 |
| .450 | .144 | .579 | .896 | 2.450 | 1.974 | .999 | .004 | .450 | .192 | .737 | .932 | 2.450 | 2.140 | 1.001 | -0.003 |
| .500 | .174 | .622 | .821 | 2.500 | 2.024 | .999 | .003 | .500 | .230 | .781 | .813 | 2.500 | 2.190 | 1.001 | -0.003 |
| .550 | .206 | .661 | .751 | 2.550 | 2.074 | .999 | .002 | .550 | .270 | .819 | .705 | 2.550 | 2.240 | 1.001 | -0.002 |
| .600 | .240 | .697 | .686 | 2.600 | 2.124 | 1.000 | .002 | .600 | .312 | .851 | .607 | 2.600 | 2.290 | 1.000 | -0.002 |
| .650 | .276 | .730 | .624 | 2.650 | 2.174 | 1.000 | .002 | .650 | .355 | .879 | .520 | 2.650 | 2.340 | 1.000 | -0.002 |
| .700 | .313 | .760 | .566 | 2.700 | 2.224 | 1.000 | .001 | .700 | .400 | .903 | .442 | 2.700 | 2.390 | 1.000 | -0.001 |
| .750 | .352 | .787 | .513 | 2.750 | 2.274 | 1.000 | .001 | .750 | .445 | .924 | .373 | 2.750 | 2.440 | 1.000 | -0.001 |
| .800 | .392 | .811 | .463 | 2.800 | 2.324 | 1.000 | .001 | .800 | .492 | .941 | .313 | 2.800 | 2.490 | 1.000 | -0.001 |
| .850 | .433 | .833 | .417 | 2.850 | 2.374 | 1.000 | .001 | .850 | .539 | .955 | .260 | 2.850 | 2.540 | 1.000 | -0.001 |
| .900 | .475 | .853 | .375 | 2.900 | 2.424 | 1.000 | .001 | .900 | .587 | .967 | .214 | 2.900 | 2.590 | 1.000 | -0.001 |
| .950 | .518 | .870 | .336 | 2.950 | 2.474 | 1.000 | .000 | .950 | .636 | .977 | .174 | 2.950 | 2.640 | 1.000 | -0.001 |
| 1.000 | .562 | .886 | .300 | 3.000 | 2.524 | 1.000 | .000 | 1.000 | .685 | .985 | .140 | 3.000 | 2.690 | 1.000 | .000 |
| 1.050 | .607 | .900 | .267 | 3.050 | 2.574 | 1.000 | .000 | 1.050 | .734 | .991 | .111 | 3.050 | 2.740 | 1.000 | .000 |
| 1.100 | .652 | .913 | .238 | 3.100 | 2.624 | 1.000 | .000 | 1.100 | .784 | .996 | .087 | 3.100 | 2.790 | 1.000 | .000 |
| 1.150 | .698 | .924 | .211 | 3.150 | 2.674 | 1.000 | .000 | 1.150 | .834 | 1.000 | .066 | 3.150 | 2.840 | 1.000 | .000 |
| 1.200 | .745 | .934 | .186 | 3.200 | 2.724 | 1.000 | .000 | 1.200 | .884 | 1.003 | .049 | 3.200 | 2.890 | 1.000 | .000 |
| 1.250 | .791 | .943 | .164 | 3.250 | 2.774 | 1.000 | .000 | 1.250 | .934 | 1.005 | .035 | 3.250 | 2.940 | 1.000 | .000 |
| 1.300 | .839 | .951 | .145 | 3.300 | 2.824 | 1.000 | .000 | 1.300 | .985 | 1.006 | .024 | 3.300 | 2.990 | 1.000 | .000 |
| 1.350 | .886 | .957 | .127 | 3.350 | 2.874 | 1.000 | .000 | 1.350 | 1.035 | 1.007 | .015 | 3.350 | 3.040 | 1.000 | .000 |
| 1.400 | .935 | .963 | .111 | 3.400 | 2.924 | 1.000 | .000 | 1.400 | 1.085 | 1.008 | .008 | 3.400 | 3.090 | 1.000 | .000 |
| 1.450 | .983 | .969 | .097 | 3.450 | 2.974 | 1.000 | .000 | 1.450 | 1.136 | 1.008 | .002 | 3.450 | 3.140 | 1.000 | .000 |
| 1.500 | 1.031 | .973 | .084 | 3.500 | 3.024 | 1.000 | .000 | 1.500 | 1.186 | 1.008 | -.002 | 3.500 | 3.190 | 1.000 | .000 |
| 1.550 | 1.080 | .977 | .073 | 3.550 | 3.074 | 1.000 | .000 | 1.550 | 1.236 | 1.008 | -.005 | 3.550 | 3.240 | 1.000 | .000 |
| 1.600 | 1.129 | .980 | .063 | 3.600 | 3.124 | 1.000 | .000 | 1.600 | 1.287 | 1.007 | -.008 | 3.600 | 3.290 | 1.000 | .000 |
| 1.650 | 1.178 | .983 | .055 | 3.650 | 3.174 | 1.000 | .000 | 1.650 | 1.337 | 1.007 | -.009 | 3.650 | 3.340 | 1.000 | .000 |
| 1.700 | 1.227 | .986 | .047 | 3.700 | 3.224 | 1.000 | .000 | 1.700 | 1.387 | 1.006 | -.010 | 3.700 | 3.390 | 1.000 | .000 |
| 1.750 | 1.277 | .988 | .040 | 3.750 | 3.274 | 1.000 | .000 | 1.750 | 1.438 | 1.006 | -.010 | 3.750 | 3.440 | 1.000 | .000 |
| 1.800 | 1.326 | .990 | .035 | 3.800 | 3.324 | 1.000 | .000 | 1.800 | 1.488 | 1.005 | -.011 | 3.800 | 3.490 | 1.000 | .000 |
| 1.850 | 1.376 | .992 | .030 | 3.850 | 3.374 | 1.000 | .000 | 1.850 | 1.538 | 1.005 | -.010 | 3.850 | 3.540 | 1.000 | .000 |
| 1.900 | 1.425 | .993 | .025 | 3.900 | 3.424 | 1.000 | .000 | 1.900 | 1.589 | 1.004 | -.010 | 3.900 | 3.590 | 1.000 | .000 |
| 1.950 | 1.475 | .994 | .021 | 3.950 | 3.474 | 1.000 | .000 | 1.950 | 1.639 | 1.004 | -.009 | 3.950 | 3.640 | 1.000 | .000 |
| | | | | 4.000 | 3.524 | 1.000 | .000 | | | | | 4.000 | 3.690 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(19) $n = 2$ and $m = 6$ (20) $n = 2$ and $m = 8$

| η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.103 | 2.000 | 1.794 | 1.006 | -0.018 | 0.000 | 0.000 | 0.000 | 3.674 | 2.000 | 1.870 | 1.007 | -0.022 |
| .050 | .004 | .148 | 2.804 | 2.050 | 1.844 | 1.003 | -.016 | .050 | .004 | .174 | 3.276 | 2.050 | 1.920 | 1.006 | -.019 |
| .100 | .015 | .281 | 2.511 | 2.100 | 1.894 | 1.004 | -.014 | .100 | .017 | .328 | 2.888 | 2.100 | 1.970 | 1.005 | -.016 |
| .150 | .032 | .399 | 2.230 | 2.150 | 1.945 | 1.004 | -.012 | .150 | .037 | .463 | 2.517 | 2.150 | 2.021 | 1.004 | -.014 |
| .200 | .054 | .504 | 1.963 | 2.200 | 1.995 | 1.003 | -.011 | .200 | .063 | .580 | 2.169 | 2.200 | 2.071 | 1.003 | -.012 |
| .250 | .082 | .596 | 1.713 | 2.250 | 2.045 | 1.003 | -.009 | .250 | .095 | .680 | 1.848 | 2.250 | 2.121 | 1.003 | -.010 |
| .300 | .114 | .675 | 1.482 | 2.300 | 2.095 | 1.002 | -.008 | .300 | .131 | .765 | 1.556 | 2.300 | 2.171 | 1.002 | -.009 |
| .350 | .149 | .744 | 1.271 | 2.350 | 2.145 | 1.002 | -.007 | .350 | .171 | .836 | 1.294 | 2.350 | 2.221 | 1.002 | -.007 |
| .400 | .188 | .803 | 1.079 | 2.400 | 2.195 | 1.001 | -.006 | .400 | .214 | .895 | 1.061 | 2.400 | 2.271 | 1.002 | -.006 |
| .450 | .229 | .852 | .908 | 2.450 | 2.245 | 1.001 | -.005 | .450 | .260 | .943 | .856 | 2.450 | 2.321 | 1.001 | -.005 |
| .500 | .273 | .894 | .756 | 2.500 | 2.295 | 1.001 | -.004 | .500 | .308 | .981 | .678 | 2.500 | 2.371 | 1.001 | -.004 |
| .550 | .318 | .928 | .621 | 2.550 | 2.345 | 1.001 | -.003 | .550 | .358 | 1.011 | .526 | 2.550 | 2.421 | 1.001 | -.003 |
| .600 | .366 | .956 | .504 | 2.600 | 2.395 | 1.001 | -.003 | .600 | .409 | 1.034 | .396 | 2.600 | 2.471 | 1.001 | -.003 |
| .650 | .414 | .979 | .403 | 2.650 | 2.445 | 1.001 | -.002 | .650 | .461 | 1.051 | .287 | 2.650 | 2.522 | 1.001 | -.002 |
| .700 | .463 | .997 | .316 | 2.700 | 2.496 | 1.000 | -.002 | .700 | .514 | 1.063 | .197 | 2.700 | 2.572 | 1.000 | -.002 |
| .750 | .514 | 1.011 | .242 | 2.750 | 2.546 | 1.000 | -.002 | .750 | .568 | 1.071 | .123 | 2.750 | 2.622 | 1.000 | -.002 |
| .800 | .564 | 1.021 | .179 | 2.800 | 2.596 | 1.000 | -.001 | .800 | .621 | 1.076 | .064 | 2.800 | 2.672 | 1.000 | -.001 |
| .850 | .616 | 1.029 | .127 | 2.850 | 2.646 | 1.000 | -.001 | .850 | .673 | 1.078 | .017 | 2.850 | 2.722 | 1.000 | -.001 |
| .900 | .667 | 1.034 | .085 | 2.900 | 2.696 | 1.000 | -.001 | .900 | .729 | 1.077 | -.020 | 2.900 | 2.772 | 1.000 | -.001 |
| .950 | .719 | 1.037 | .050 | 2.950 | 2.746 | 1.000 | -.001 | .950 | .783 | 1.076 | -.048 | 2.950 | 2.822 | 1.000 | -.001 |
| 1.000 | .771 | 1.039 | .022 | 3.000 | 2.796 | 1.000 | -.001 | 1.000 | .837 | 1.073 | -.068 | 3.000 | 2.872 | 1.000 | -.001 |
| 1.050 | .823 | 1.040 | .000 | 3.050 | 2.846 | 1.000 | .000 | 1.050 | .890 | 1.069 | -.082 | 3.050 | 2.922 | 1.000 | .000 |
| 1.100 | .875 | 1.039 | -.016 | 3.100 | 2.896 | 1.000 | .000 | 1.100 | .944 | 1.065 | -.090 | 3.100 | 2.972 | 1.000 | .000 |
| 1.150 | .927 | 1.038 | -.029 | 3.150 | 2.946 | 1.000 | .000 | 1.150 | .997 | 1.060 | -.095 | 3.150 | 3.022 | 1.000 | .000 |
| 1.200 | .979 | 1.036 | -.038 | 3.200 | 2.996 | 1.000 | .000 | 1.200 | 1.050 | 1.055 | -.097 | 3.200 | 3.072 | 1.000 | .000 |
| 1.250 | 1.030 | 1.034 | -.044 | 3.250 | 3.046 | 1.000 | .000 | 1.250 | 1.102 | 1.050 | -.096 | 3.250 | 3.122 | 1.000 | .000 |
| 1.300 | 1.082 | 1.032 | -.048 | 3.300 | 3.096 | 1.000 | .000 | 1.300 | 1.155 | 1.046 | -.093 | 3.300 | 3.172 | 1.000 | .000 |
| 1.350 | 1.134 | 1.030 | -.049 | 3.350 | 3.146 | 1.000 | .000 | 1.350 | 1.207 | 1.041 | -.089 | 3.350 | 3.222 | 1.000 | .000 |
| 1.400 | 1.185 | 1.027 | -.050 | 3.400 | 3.196 | 1.000 | .000 | 1.400 | 1.259 | 1.037 | -.084 | 3.400 | 3.272 | 1.000 | .000 |
| 1.450 | 1.236 | 1.025 | -.049 | 3.450 | 3.246 | 1.000 | .000 | 1.450 | 1.310 | 1.033 | -.078 | 3.450 | 3.322 | 1.000 | .000 |
| 1.500 | 1.288 | 1.022 | -.047 | 3.500 | 3.296 | 1.000 | .000 | 1.500 | 1.362 | 1.029 | -.072 | 3.500 | 3.372 | 1.000 | .000 |
| 1.550 | 1.339 | 1.020 | -.045 | 3.550 | 3.346 | 1.000 | .000 | 1.550 | 1.413 | 1.025 | -.066 | 3.550 | 3.422 | 1.000 | .000 |
| 1.600 | 1.390 | 1.018 | -.042 | 3.600 | 3.396 | 1.000 | .000 | 1.600 | 1.465 | 1.022 | -.060 | 3.600 | 3.472 | 1.000 | .000 |
| 1.650 | 1.440 | 1.016 | -.039 | 3.650 | 3.446 | 1.000 | .000 | 1.650 | 1.516 | 1.019 | -.054 | 3.650 | 3.522 | 1.000 | .000 |
| 1.700 | 1.491 | 1.014 | -.036 | 3.700 | 3.496 | 1.000 | .000 | 1.700 | 1.567 | 1.017 | -.049 | 3.700 | 3.572 | 1.000 | .000 |
| 1.750 | 1.542 | 1.012 | -.033 | 3.750 | 3.546 | 1.000 | .000 | 1.750 | 1.617 | 1.015 | -.043 | 3.750 | 3.622 | 1.000 | .000 |
| 1.800 | 1.592 | 1.011 | -.030 | 3.800 | 3.596 | 1.000 | .000 | 1.800 | 1.668 | 1.013 | -.038 | 3.800 | 3.672 | 1.000 | .000 |
| 1.850 | 1.643 | 1.009 | -.026 | 3.850 | 3.646 | 1.000 | .000 | 1.850 | 1.719 | 1.011 | -.034 | 3.850 | 3.722 | 1.000 | .000 |
| 1.900 | 1.693 | 1.008 | -.024 | 3.900 | 3.696 | 1.000 | .000 | 1.900 | 1.769 | 1.009 | -.029 | 3.900 | 3.772 | 1.000 | .000 |
| 1.950 | 1.744 | 1.007 | -.021 | 3.950 | 3.746 | 1.000 | .000 | 1.950 | 1.819 | 1.008 | -.026 | 3.950 | 3.822 | 1.000 | .000 |
| | | | | 4.000 | 3.796 | 1.000 | .000 | | | | | 4.000 | 3.872 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(21) $n = 2$ and $m = 10$ (22) $n = 4$ and $m = 0$

| (21) $n = 2$ and $m = 10$ | | | | (22) $n = 4$ and $m = 0$ | | | | | | | | | | | |
|---------------------------|-----------|------------|-------------|--------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ |
| 0.000 | 0.000 | 0.000 | 4.199 | 2.000 | 1.929 | 1.007 | -0.024 | 0.000 | 0.000 | 0.000 | 0.939 | 1.500 | 0.884 | 0.955 | 0.158 |
| .050 | .005 | .197 | 3.702 | 2.050 | 1.979 | 1.006 | -.020 | .050 | .001 | .047 | .939 | 1.550 | .932 | .962 | .136 |
| .100 | .019 | .370 | 3.219 | 2.100 | 2.029 | 1.005 | -.017 | .100 | .005 | .094 | .938 | 1.600 | .980 | .969 | .117 |
| .150 | .042 | .520 | 2.761 | 2.150 | 2.079 | 1.004 | -.015 | .150 | .011 | .141 | .936 | 1.650 | 1.029 | .974 | .100 |
| .200 | .071 | .647 | 2.335 | 2.200 | 2.130 | 1.003 | -.012 | .200 | .019 | .187 | .932 | 1.700 | 1.078 | .979 | .084 |
| .250 | .106 | .754 | 1.947 | 2.250 | 2.180 | 1.003 | -.010 | .250 | .029 | .234 | .926 | 1.750 | 1.127 | .983 | .071 |
| .300 | .146 | .842 | 1.599 | 2.300 | 2.230 | 1.002 | -.009 | .300 | .042 | .280 | .917 | 1.800 | 1.176 | .986 | .059 |
| .350 | .190 | .914 | 1.290 | 2.350 | 2.280 | 1.002 | -.007 | .350 | .057 | .326 | .905 | 1.850 | 1.225 | .989 | .049 |
| .400 | .237 | .972 | 1.021 | 2.400 | 2.330 | 1.002 | -.006 | .400 | .075 | .370 | .890 | 1.900 | 1.275 | .991 | .041 |
| .450 | .287 | 1.017 | .789 | 2.450 | 2.380 | 1.001 | -.005 | .450 | .094 | .414 | .871 | 1.950 | 1.324 | .993 | .033 |
| .500 | .339 | 1.052 | .592 | 2.500 | 2.430 | 1.001 | -.004 | .500 | .116 | .457 | .849 | 2.000 | 1.374 | .994 | .027 |
| .550 | .392 | 1.077 | .426 | 2.550 | 2.480 | 1.001 | -.003 | .550 | .140 | .499 | .824 | 2.050 | 1.424 | .995 | .022 |
| .600 | .446 | 1.095 | .290 | 2.600 | 2.530 | 1.001 | -.003 | .600 | .166 | .540 | .795 | 2.100 | 1.474 | .996 | .018 |
| .650 | .501 | 1.106 | .178 | 2.650 | 2.580 | 1.001 | -.002 | .650 | .194 | .579 | .764 | 2.150 | 1.523 | .997 | .014 |
| .700 | .557 | 1.113 | .088 | 2.700 | 2.630 | 1.000 | -.002 | .700 | .224 | .616 | .730 | 2.200 | 1.573 | .998 | .011 |
| .750 | .613 | 1.115 | -.018 | 2.750 | 2.680 | 1.000 | -.002 | .750 | .256 | .652 | .693 | 2.250 | 1.623 | .998 | .009 |
| .800 | .668 | 1.115 | -.036 | 2.800 | 2.730 | 1.000 | -.001 | .800 | .289 | .685 | .655 | 2.300 | 1.673 | .999 | .007 |
| .850 | .724 | 1.112 | -.077 | 2.850 | 2.780 | 1.000 | -.001 | .850 | .324 | .717 | .615 | 2.350 | 1.723 | .999 | .005 |
| .900 | .780 | 1.107 | -.106 | 2.900 | 2.830 | 1.000 | -.001 | .900 | .361 | .747 | .575 | 2.400 | 1.773 | .999 | .004 |
| .950 | .835 | 1.102 | -.125 | 2.950 | 2.880 | 1.000 | -.001 | .950 | .399 | .775 | .534 | 2.450 | 1.823 | .999 | .003 |
| 1.000 | .890 | 1.095 | -.138 | 3.000 | 2.930 | 1.000 | -.001 | 1.000 | .438 | .800 | .492 | 2.500 | 1.873 | 1.000 | .003 |
| 1.050 | .944 | 1.088 | -.144 | 3.050 | 2.980 | 1.000 | .000 | 1.050 | .479 | .824 | .452 | 2.550 | 1.923 | 1.000 | .002 |
| 1.100 | .999 | 1.081 | -.145 | 3.100 | 3.030 | 1.000 | .000 | 1.100 | .521 | .846 | .412 | 2.600 | 1.973 | 1.000 | .001 |
| 1.150 | 1.052 | 1.074 | -.143 | 3.150 | 3.080 | 1.000 | .000 | 1.150 | .563 | .865 | .373 | 2.650 | 2.023 | 1.000 | .001 |
| 1.200 | 1.106 | 1.066 | -.138 | 3.200 | 3.130 | 1.000 | .000 | 1.200 | .607 | .883 | .336 | 2.700 | 2.073 | 1.000 | .001 |
| 1.250 | 1.159 | 1.060 | -.132 | 3.250 | 3.180 | 1.000 | .000 | 1.250 | .652 | .899 | .301 | 2.750 | 2.123 | 1.000 | .001 |
| 1.300 | 1.212 | 1.053 | -.124 | 3.300 | 3.230 | 1.000 | .000 | 1.300 | .697 | .913 | .268 | 2.800 | 2.173 | 1.000 | .000 |
| 1.350 | 1.264 | 1.047 | -.115 | 3.350 | 3.280 | 1.000 | .000 | 1.350 | .743 | .926 | .237 | 2.850 | 2.223 | 1.000 | .000 |
| 1.400 | 1.317 | 1.042 | -.106 | 3.400 | 3.330 | 1.000 | .000 | 1.400 | .789 | .937 | .208 | 2.900 | 2.273 | 1.000 | .000 |
| 1.450 | 1.369 | 1.037 | -.096 | 3.450 | 3.380 | 1.000 | .000 | 1.450 | .836 | .947 | .182 | 2.950 | 2.323 | 1.000 | .000 |
| 1.500 | 1.420 | 1.032 | -.087 | 3.500 | 3.430 | 1.000 | .000 | | | | | 3.000 | 2.373 | 1.000 | .000 |
| 1.550 | 1.472 | 1.028 | -.079 | 3.550 | 3.480 | 1.000 | .000 | | | | | | | | |
| 1.600 | 1.523 | 1.024 | -.070 | 3.600 | 3.530 | 1.000 | .000 | | | | | | | | |
| 1.650 | 1.574 | 1.021 | -.062 | 3.650 | 3.580 | 1.000 | .000 | | | | | | | | |
| 1.700 | 1.625 | 1.018 | -.055 | 3.700 | 3.630 | 1.000 | .000 | | | | | | | | |
| 1.750 | 1.676 | 1.016 | -.048 | 3.750 | 3.680 | 1.000 | .000 | | | | | | | | |
| 1.800 | 1.727 | 1.013 | -.042 | 3.800 | 3.730 | 1.000 | .000 | | | | | | | | |
| 1.850 | 1.777 | 1.011 | -.037 | 3.850 | 3.780 | 1.000 | .000 | | | | | | | | |
| 1.900 | 1.828 | 1.010 | -.032 | 3.900 | 3.830 | 1.000 | .000 | | | | | | | | |
| 1.950 | 1.878 | 1.008 | -.028 | 3.950 | 3.880 | 1.000 | .000 | | | | | | | | |
| | | | | 4.000 | 3.930 | 1.000 | .000 | | | | | | | | |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)

(23) $n = 4$ and $m = 1$

(24) $n = 4$ and $m = 2$

| η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.375 | 1.500 | 0.982 | 0.973 | 0.100 | 0.000 | 0.000 | 0.000 | 1.753 | 1.500 | 1.054 | 0.984 | 0.064 |
| .050 | .002 | .068 | 1.325 | 1.550 | 1.031 | .978 | .085 | .050 | .002 | .085 | 1.654 | 1.550 | 1.104 | .987 | .053 |
| .100 | .007 | .132 | 1.275 | 1.600 | 1.080 | .982 | .072 | .100 | .008 | .165 | 1.554 | 1.600 | 1.153 | .989 | .044 |
| .150 | .015 | .193 | 1.224 | 1.650 | 1.129 | .985 | .061 | .150 | .019 | .241 | 1.457 | 1.650 | 1.203 | .992 | .037 |
| .200 | .026 | .253 | 1.173 | 1.700 | 1.178 | .988 | .051 | .200 | .032 | .311 | 1.361 | 1.700 | 1.252 | .993 | .030 |
| .250 | .040 | .312 | 1.122 | 1.750 | 1.228 | .990 | .042 | .250 | .050 | .377 | 1.267 | 1.750 | 1.302 | .995 | .025 |
| .300 | .057 | .367 | 1.070 | 1.800 | 1.277 | .992 | .035 | .300 | .070 | .438 | 1.177 | 1.800 | 1.352 | .996 | .020 |
| .350 | .077 | .419 | 1.018 | 1.850 | 1.327 | .994 | .028 | .350 | .093 | .494 | 1.089 | 1.850 | 1.401 | .997 | .016 |
| .400 | .099 | .469 | .965 | 1.900 | 1.377 | .995 | .023 | .400 | .119 | .547 | 1.004 | 1.900 | 1.451 | .997 | .013 |
| .450 | .124 | .516 | .913 | 1.950 | 1.426 | .996 | .019 | .450 | .148 | .595 | .924 | 1.950 | 1.501 | .998 | .010 |
| .500 | .151 | .560 | .860 | 2.000 | 1.476 | .997 | .015 | .500 | .179 | .639 | .846 | 2.000 | 1.551 | .998 | .008 |
| .550 | .180 | .602 | .807 | 2.050 | 1.526 | .998 | .012 | .550 | .212 | .680 | .773 | 2.050 | 1.601 | .999 | .007 |
| .600 | .211 | .641 | .755 | 2.100 | 1.576 | .998 | .010 | .600 | .247 | .717 | .704 | 2.100 | 1.651 | .999 | .005 |
| .650 | .244 | .677 | .703 | 2.150 | 1.626 | .999 | .008 | .650 | .283 | .750 | .638 | 2.150 | 1.701 | .999 | .004 |
| .700 | .279 | .711 | .652 | 2.200 | 1.676 | .999 | .006 | .700 | .322 | .780 | .577 | 2.200 | 1.751 | .999 | .003 |
| .750 | .315 | .742 | .602 | 2.250 | 1.726 | .999 | .005 | .750 | .361 | .808 | .519 | 2.250 | 1.801 | 1.000 | .002 |
| .800 | .353 | .771 | .554 | 2.300 | 1.776 | .999 | .004 | .800 | .402 | .832 | .465 | 2.300 | 1.851 | 1.000 | .002 |
| .850 | .392 | .798 | .507 | 2.350 | 1.826 | .999 | .003 | .850 | .445 | .854 | .416 | 2.350 | 1.901 | 1.000 | .001 |
| .900 | .433 | .822 | .461 | 2.400 | 1.876 | 1.000 | .002 | .900 | .488 | .874 | .370 | 2.400 | 1.951 | 1.000 | .001 |
| .950 | .474 | .844 | .418 | 2.450 | 1.926 | 1.000 | .002 | .950 | .532 | .891 | .327 | 2.450 | 2.001 | 1.000 | .001 |
| 1.000 | .517 | .864 | .377 | 2.500 | 1.976 | 1.000 | .001 | 1.000 | .577 | .907 | .289 | 2.500 | 2.051 | 1.000 | .001 |
| 1.050 | .561 | .882 | .339 | 2.550 | 2.026 | 1.000 | .001 | 1.050 | .623 | .920 | .253 | 2.550 | 2.101 | 1.000 | .000 |
| 1.100 | .605 | .898 | .302 | 2.600 | 2.076 | 1.000 | .001 | 1.100 | .669 | .932 | .222 | 2.600 | 2.151 | 1.000 | .000 |
| 1.150 | .650 | .912 | .268 | 2.650 | 2.126 | 1.000 | .001 | 1.150 | .716 | .943 | .193 | 2.650 | 2.201 | 1.000 | .000 |
| 1.200 | .696 | .925 | .237 | 2.700 | 2.176 | 1.000 | .000 | 1.200 | .763 | .952 | .167 | 2.700 | 2.251 | 1.000 | .000 |
| 1.250 | .743 | .936 | .208 | 2.750 | 2.226 | 1.000 | .000 | 1.250 | .811 | .959 | .144 | 2.750 | 2.301 | 1.000 | .000 |
| 1.300 | .790 | .946 | .182 | 2.800 | 2.276 | 1.000 | .000 | 1.300 | .859 | .966 | .123 | 2.800 | 2.351 | 1.000 | .000 |
| 1.350 | .837 | .954 | .158 | 2.850 | 2.326 | 1.000 | .000 | 1.350 | .908 | .972 | .105 | 2.850 | 2.401 | 1.000 | .000 |
| 1.400 | .885 | .961 | .137 | 2.900 | 2.376 | 1.000 | .000 | 1.400 | .956 | .977 | .089 | 2.900 | 2.451 | 1.000 | .000 |
| 1.450 | .933 | .968 | .118 | 2.950 | 2.426 | 1.000 | .000 | 1.450 | 1.005 | .981 | .076 | 2.950 | 2.501 | 1.000 | .000 |
| | | | | 3.000 | 2.476 | 1.000 | .000 | | | | | 3.000 | 2.551 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(25) $n = 4$ and $m = 4$ (26) $n = 4$ and $m = 6$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.406 | 1.500 | 1.157 | 0.996 | 0.021 | 0.000 | 0.000 | 0.000 | 2.971 | 1.500 | 1.228 | 1.001 | -0.001 |
| .050 | .003 | .115 | 2.206 | 1.550 | 1.207 | .997 | .017 | .050 | .004 | .141 | 2.673 | 1.550 | 1.278 | 1.001 | -.001 |
| .100 | .011 | .221 | 2.010 | 1.600 | 1.256 | .997 | .013 | .100 | .014 | .267 | 2.381 | 1.600 | 1.328 | 1.001 | -.002 |
| .150 | .025 | .316 | 1.821 | 1.650 | 1.306 | .998 | .010 | .150 | .030 | .379 | 2.103 | 1.650 | 1.378 | 1.001 | -.002 |
| .200 | .043 | .403 | 1.640 | 1.700 | 1.356 | .998 | .008 | .200 | .052 | .478 | 1.841 | 1.700 | 1.428 | 1.001 | -.002 |
| .250 | .065 | .481 | 1.469 | 1.750 | 1.406 | .999 | .006 | .250 | .078 | .564 | 1.599 | 1.750 | 1.478 | 1.001 | -.002 |
| .300 | .091 | .550 | 1.309 | 1.800 | 1.456 | .999 | .005 | .300 | .108 | .638 | 1.378 | 1.800 | 1.528 | 1.000 | -.002 |
| .350 | .120 | .612 | 1.160 | 1.850 | 1.506 | .999 | .004 | .350 | .141 | .702 | 1.179 | 1.850 | 1.578 | 1.000 | -.002 |
| .400 | .152 | .666 | 1.024 | 1.900 | 1.556 | .999 | .003 | .400 | .178 | .756 | 1.000 | 1.900 | 1.628 | 1.000 | -.001 |
| .450 | .186 | .714 | .899 | 1.950 | 1.606 | 1.000 | .002 | .450 | .217 | .802 | .843 | 1.950 | 1.678 | 1.000 | -.001 |
| .500 | .223 | .756 | .786 | 2.000 | 1.656 | 1.000 | .002 | .500 | .258 | .841 | .705 | 2.000 | 1.728 | 1.000 | -.001 |
| .550 | .262 | .799 | .684 | 2.050 | 1.706 | 1.000 | .001 | .550 | .301 | .879 | .585 | 2.050 | 1.778 | 1.000 | -.001 |
| .600 | .302 | .825 | .592 | 2.100 | 1.756 | 1.000 | .001 | .600 | .345 | .900 | .481 | 2.100 | 1.828 | 1.000 | -.001 |
| .650 | .344 | .852 | .511 | 2.150 | 1.806 | 1.000 | .001 | .650 | .391 | .922 | .399 | 2.150 | 1.878 | 1.000 | -.001 |
| .700 | .388 | .876 | .439 | 2.200 | 1.856 | 1.000 | .001 | .700 | .437 | .939 | .318 | 2.200 | 1.928 | 1.000 | .000 |
| .750 | .432 | .896 | .375 | 2.250 | 1.906 | 1.000 | .000 | .750 | .485 | .954 | .255 | 2.250 | 1.978 | 1.000 | .000 |
| .800 | .477 | .914 | .319 | 2.300 | 1.956 | 1.000 | .000 | .800 | .533 | .965 | .203 | 2.300 | 2.028 | 1.000 | .000 |
| .850 | .523 | .928 | .271 | 2.350 | 2.006 | 1.000 | .000 | .850 | .581 | .974 | .160 | 2.350 | 2.078 | 1.000 | .000 |
| .900 | .570 | .941 | .228 | 2.400 | 2.056 | 1.000 | .000 | .900 | .630 | .981 | .124 | 2.400 | 2.128 | 1.000 | .000 |
| .950 | .617 | .951 | .192 | 2.450 | 2.106 | 1.000 | .000 | .950 | .679 | .987 | .096 | 2.450 | 2.178 | 1.000 | .000 |
| 1.000 | .665 | .960 | .161 | 2.500 | 2.156 | 1.000 | .000 | 1.000 | .729 | .991 | .072 | 2.500 | 2.228 | 1.000 | .000 |
| 1.050 | .713 | .967 | .134 | 2.550 | 2.206 | 1.000 | .000 | 1.050 | .778 | .994 | .054 | 2.550 | 2.278 | 1.000 | .000 |
| 1.100 | .762 | .974 | .111 | 2.600 | 2.256 | 1.000 | .000 | 1.100 | .828 | .996 | .040 | 2.600 | 2.328 | 1.000 | .000 |
| 1.150 | .811 | .979 | .092 | 2.650 | 2.306 | 1.000 | .000 | 1.150 | .878 | .998 | .028 | 2.650 | 2.378 | 1.000 | .000 |
| 1.200 | .860 | .983 | .075 | 2.700 | 2.356 | 1.000 | .000 | 1.200 | .928 | .999 | .020 | 2.700 | 2.428 | 1.000 | .000 |
| 1.250 | .909 | .986 | .062 | 2.750 | 2.406 | 1.000 | .000 | 1.250 | .978 | 1.000 | .013 | 2.750 | 2.478 | 1.000 | .000 |
| 1.300 | .958 | .989 | .050 | 2.800 | 2.456 | 1.000 | .000 | 1.300 | 1.028 | 1.000 | .008 | 2.800 | 2.528 | 1.000 | .000 |
| 1.350 | 1.008 | .991 | .041 | 2.850 | 2.506 | 1.000 | .000 | 1.350 | 1.078 | 1.001 | .005 | 2.850 | 2.578 | 1.000 | .000 |
| 1.400 | 1.057 | .993 | .033 | 2.900 | 2.556 | 1.000 | .000 | 1.400 | 1.128 | 1.001 | .002 | 2.900 | 2.628 | 1.000 | .000 |
| 1.450 | 1.107 | .995 | .026 | 2.950 | 2.606 | 1.000 | .000 | 1.450 | 1.178 | 1.001 | .000 | 2.950 | 2.678 | 1.000 | .000 |
| | | | | 3.000 | 2.656 | 1.000 | .000 | | | | | 3.000 | 2.728 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(27) $n = 4$ and $m = 8$ (28) $n = 4$ and $m = 10$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.481 | 1.500 | 1.282 | 1.004 | -0.013 | 0.000 | 0.000 | 0.000 | 3.952 | 1.500 | 1.324 | 1.005 | -0.020 |
| .050 | .004 | .164 | 3.083 | 1.550 | 1.332 | 1.003 | -.011 | .050 | .005 | .185 | 3.455 | 1.550 | 1.374 | 1.004 | -.017 |
| .100 | .016 | .309 | 2.698 | 1.600 | 1.382 | 1.002 | -.010 | .100 | .018 | .346 | 2.975 | 1.600 | 1.425 | 1.003 | -.014 |
| .150 | .035 | .434 | 2.333 | 1.650 | 1.432 | 1.002 | -.008 | .150 | .039 | .489 | 2.526 | 1.650 | 1.475 | 1.003 | -.012 |
| .200 | .059 | .542 | 1.995 | 1.700 | 1.482 | 1.002 | -.007 | .200 | .066 | .599 | 2.115 | 1.700 | 1.525 | 1.002 | -.010 |
| .250 | .089 | .634 | 1.687 | 1.750 | 1.532 | 1.001 | -.006 | .250 | .098 | .695 | 1.746 | 1.750 | 1.575 | 1.002 | -.008 |
| .300 | .122 | .711 | 1.411 | 1.800 | 1.582 | 1.001 | -.005 | .300 | .135 | .774 | 1.421 | 1.800 | 1.625 | 1.001 | -.006 |
| .350 | .160 | .776 | 1.168 | 1.850 | 1.632 | 1.001 | -.004 | .350 | .176 | .838 | 1.139 | 1.850 | 1.675 | 1.001 | -.005 |
| .400 | .200 | .829 | .955 | 1.900 | 1.682 | 1.001 | -.003 | .400 | .219 | .889 | .898 | 1.900 | 1.725 | 1.001 | -.004 |
| .450 | .242 | .872 | .773 | 1.950 | 1.732 | 1.001 | -.003 | .450 | .264 | .929 | .696 | 1.950 | 1.775 | 1.001 | -.003 |
| .500 | .287 | .906 | .617 | 2.000 | 1.782 | 1.000 | -.002 | .500 | .312 | .959 | .528 | 2.000 | 1.825 | 1.000 | -.003 |
| .550 | .333 | .934 | .486 | 2.050 | 1.832 | 1.000 | -.002 | .550 | .360 | .982 | .390 | 2.050 | 1.875 | 1.000 | -.002 |
| .600 | .380 | .955 | .377 | 2.100 | 1.882 | 1.000 | -.001 | .600 | .410 | .998 | .279 | 2.100 | 1.925 | 1.000 | -.002 |
| .650 | .428 | .972 | .287 | 2.150 | 1.932 | 1.000 | -.001 | .650 | .460 | 1.010 | .191 | 2.150 | 1.975 | 1.000 | -.001 |
| .700 | .477 | .984 | .214 | 2.200 | 1.982 | 1.000 | -.001 | .700 | .511 | 1.018 | .123 | 2.200 | 2.025 | 1.000 | -.001 |
| .750 | .527 | .994 | .155 | 2.250 | 2.032 | 1.000 | -.001 | .750 | .562 | 1.023 | .070 | 2.250 | 2.075 | 1.000 | -.001 |
| .800 | .577 | 1.000 | .109 | 2.300 | 2.082 | 1.000 | .000 | .800 | .613 | 1.025 | .031 | 2.300 | 2.125 | 1.000 | -.001 |
| .850 | .627 | 1.005 | .073 | 2.350 | 2.132 | 1.000 | .000 | .850 | .664 | 1.026 | .003 | 2.350 | 2.175 | 1.000 | .000 |
| .900 | .677 | 1.008 | .045 | 2.400 | 2.182 | 1.000 | .000 | .900 | .715 | 1.026 | -.017 | 2.400 | 2.225 | 1.000 | .000 |
| .950 | .727 | 1.009 | .024 | 2.450 | 2.232 | 1.000 | .000 | .950 | .767 | 1.024 | -.031 | 2.450 | 2.275 | 1.000 | .000 |
| 1.000 | .778 | 1.010 | .009 | 2.500 | 2.282 | 1.000 | .000 | 1.000 | .818 | 1.023 | -.039 | 2.500 | 2.325 | 1.000 | .000 |
| 1.050 | .828 | 1.010 | -.002 | 2.550 | 2.332 | 1.000 | .000 | 1.050 | .869 | 1.021 | -.043 | 2.550 | 2.375 | 1.000 | .000 |
| 1.100 | .879 | 1.010 | -.009 | 2.600 | 2.382 | 1.000 | .000 | 1.100 | .920 | 1.018 | -.044 | 2.600 | 2.425 | 1.000 | .000 |
| 1.150 | .929 | 1.009 | -.014 | 2.650 | 2.432 | 1.000 | .000 | 1.150 | .971 | 1.016 | -.043 | 2.650 | 2.475 | 1.000 | .000 |
| 1.200 | .980 | 1.009 | -.017 | 2.700 | 2.482 | 1.000 | .000 | 1.200 | 1.022 | 1.014 | -.041 | 2.700 | 2.525 | 1.000 | .000 |
| 1.250 | 1.030 | 1.008 | -.018 | 2.750 | 2.532 | 1.000 | .000 | 1.250 | 1.072 | 1.012 | -.038 | 2.750 | 2.575 | 1.000 | .000 |
| 1.300 | 1.081 | 1.007 | -.018 | 2.800 | 2.582 | 1.000 | .000 | 1.300 | 1.123 | 1.010 | -.034 | 2.800 | 2.625 | 1.000 | .000 |
| 1.350 | 1.131 | 1.006 | -.017 | 2.850 | 2.632 | 1.000 | .000 | 1.350 | 1.173 | 1.009 | -.031 | 2.850 | 2.675 | 1.000 | .000 |
| 1.400 | 1.181 | 1.005 | -.016 | 2.900 | 2.682 | 1.000 | .000 | 1.400 | 1.224 | 1.007 | -.027 | 2.900 | 2.725 | 1.000 | .000 |
| 1.450 | 1.231 | 1.004 | -.014 | 2.950 | 2.732 | 1.000 | .000 | 1.450 | 1.274 | 1.006 | -.023 | 2.950 | 2.775 | 1.000 | .000 |
| | | | | 3.000 | 2.782 | 1.000 | .000 | | | | | 3.000 | 2.825 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(29) $n = 6$ and $m = 0$ (30) $n = 6$ and $m = 1$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.118 | 1.500 | 0.975 | 0.985 | 0.075 | 0.000 | 0.000 | 0.000 | 1.491 | 1.500 | 1.038 | 0.990 | 0.052 |
| .050 | .001 | .056 | 1.117 | 1.550 | 1.025 | .988 | .060 | .050 | .002 | .073 | 1.441 | 1.550 | 1.088 | .992 | .041 |
| .100 | .006 | .112 | 1.116 | 1.600 | 1.074 | .991 | .048 | .100 | .007 | .144 | 1.390 | 1.600 | 1.137 | .994 | .033 |
| .150 | .013 | .167 | 1.112 | 1.650 | 1.124 | .993 | .038 | .150 | .016 | .212 | 1.338 | 1.650 | 1.187 | .995 | .025 |
| .200 | .022 | .223 | 1.104 | 1.700 | 1.173 | .995 | .030 | .200 | .028 | .278 | 1.284 | 1.700 | 1.237 | .997 | .020 |
| .250 | .035 | .278 | 1.092 | 1.750 | 1.223 | .996 | .023 | .250 | .044 | .341 | 1.228 | 1.750 | 1.287 | .997 | .015 |
| .300 | .050 | .332 | 1.074 | 1.800 | 1.273 | .997 | .018 | .300 | .063 | .401 | 1.170 | 1.800 | 1.337 | .998 | .012 |
| .350 | .068 | .385 | 1.052 | 1.850 | 1.323 | .998 | .014 | .350 | .084 | .458 | 1.110 | 1.850 | 1.387 | .999 | .009 |
| .400 | .089 | .437 | 1.023 | 1.900 | 1.373 | .998 | .010 | .400 | .108 | .512 | 1.048 | 1.900 | 1.436 | .999 | .007 |
| .450 | .112 | .487 | .989 | 1.950 | 1.423 | .999 | .008 | .450 | .135 | .562 | .984 | 1.950 | 1.486 | .999 | .005 |
| .500 | .137 | .536 | .949 | 2.000 | 1.473 | .999 | .006 | .500 | .164 | .610 | .919 | 2.000 | 1.536 | .999 | .004 |
| .550 | .165 | .582 | .904 | 2.050 | 1.523 | .999 | .004 | .550 | .196 | .654 | .853 | 2.050 | 1.586 | 1.000 | .003 |
| .600 | .195 | .626 | .855 | 2.100 | 1.573 | 1.000 | .003 | .600 | .230 | .695 | .787 | 2.100 | 1.636 | 1.000 | .002 |
| .650 | .228 | .668 | .803 | 2.150 | 1.623 | 1.000 | .002 | .650 | .266 | .733 | .721 | 2.150 | 1.686 | 1.000 | .001 |
| .700 | .262 | .706 | .747 | 2.200 | 1.673 | 1.000 | .002 | .700 | .303 | .767 | .656 | 2.200 | 1.736 | 1.000 | .001 |
| .750 | .298 | .742 | .690 | 2.250 | 1.723 | 1.000 | .001 | .750 | .342 | .799 | .593 | 2.250 | 1.786 | 1.000 | .001 |
| .800 | .336 | .775 | .632 | 2.300 | 1.773 | 1.000 | .001 | .800 | .383 | .827 | .533 | 2.300 | 1.836 | 1.000 | .000 |
| .850 | .376 | .806 | .574 | 2.350 | 1.823 | 1.000 | .001 | .850 | .425 | .852 | .475 | 2.350 | 1.886 | 1.000 | .000 |
| .900 | .417 | .833 | .517 | 2.400 | 1.873 | 1.000 | .000 | .900 | .468 | .874 | .420 | 2.400 | 1.936 | 1.000 | .000 |
| .950 | .459 | .857 | .462 | 2.450 | 1.923 | 1.000 | .000 | .950 | .512 | .894 | .368 | 2.450 | 1.986 | 1.000 | .000 |
| 1.000 | .503 | .879 | .409 | 2.500 | 1.973 | 1.000 | .000 | 1.000 | .557 | .911 | .321 | 2.500 | 2.036 | 1.000 | .000 |
| 1.050 | .547 | .898 | .359 | 2.550 | 2.023 | 1.000 | .000 | 1.050 | .603 | .926 | .277 | 2.550 | 2.086 | 1.000 | .000 |
| 1.100 | .592 | .915 | .312 | 2.600 | 2.073 | 1.000 | .000 | 1.100 | .650 | .939 | .238 | 2.600 | 2.136 | 1.000 | .000 |
| 1.150 | .638 | .930 | .270 | 2.650 | 2.123 | 1.000 | .000 | 1.150 | .697 | .950 | .202 | 2.650 | 2.186 | 1.000 | .000 |
| 1.200 | .685 | .942 | .231 | 2.700 | 2.173 | 1.000 | .000 | 1.200 | .745 | .959 | .170 | 2.700 | 2.236 | 1.000 | .000 |
| 1.250 | .733 | .953 | .195 | 2.750 | 2.223 | 1.000 | .000 | 1.250 | .793 | .967 | .143 | 2.750 | 2.286 | 1.000 | .000 |
| 1.300 | .780 | .962 | .164 | 2.800 | 2.273 | 1.000 | .000 | 1.300 | .842 | .974 | .118 | 2.800 | 2.336 | 1.000 | .000 |
| 1.350 | .829 | .969 | .137 | 2.850 | 2.323 | 1.000 | .000 | 1.350 | .890 | .979 | .097 | 2.850 | 2.386 | 1.000 | .000 |
| 1.400 | .877 | .975 | .113 | 2.900 | 2.373 | 1.000 | .000 | 1.400 | .939 | .983 | .080 | 2.900 | 2.436 | 1.000 | .000 |
| 1.450 | .926 | .980 | .093 | 2.950 | 2.423 | 1.000 | .000 | 1.450 | .989 | .987 | .064 | 2.950 | 2.486 | 1.000 | .000 |
| | | | | 3.000 | 2.473 | 1.000 | .000 | | | | | 3.000 | 2.536 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(31) $n = 8$ and $m = 2$ (32) $n = 8$ and $m = 4$

| η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.826 | 1.500 | 1.088 | 0.993 | 0.036 | 0.000 | 0.000 | 0.000 | 2.417 | 1.500 | 1.163 | 0.997 | 0.016 |
| .050 | .002 | .089 | 1.726 | 1.550 | 1.137 | .995 | .028 | .050 | .003 | .116 | 2.218 | 1.550 | 1.212 | .998 | .012 |
| .100 | .009 | .173 | 1.627 | 1.600 | 1.187 | .996 | .022 | .100 | .011 | .222 | 2.022 | 1.600 | 1.262 | .998 | .010 |
| .150 | .019 | .251 | 1.528 | 1.650 | 1.237 | .997 | .017 | .150 | .025 | .318 | 1.833 | 1.650 | 1.312 | .999 | .007 |
| .200 | .034 | .325 | 1.430 | 1.700 | 1.287 | .998 | .013 | .200 | .043 | .405 | 1.681 | 1.700 | 1.362 | .999 | .005 |
| .250 | .052 | .394 | 1.333 | 1.750 | 1.337 | .998 | .010 | .250 | .065 | .483 | 1.480 | 1.750 | 1.412 | .999 | .004 |
| .300 | .073 | .459 | 1.238 | 1.800 | 1.387 | .999 | .008 | .300 | .091 | .553 | 1.319 | 1.800 | 1.462 | 1.000 | .003 |
| .350 | .098 | .518 | 1.145 | 1.850 | 1.437 | .999 | .006 | .350 | .121 | .616 | 1.170 | 1.850 | 1.512 | 1.000 | .002 |
| .400 | .125 | .573 | 1.054 | 1.900 | 1.487 | .999 | .004 | .400 | .153 | .671 | 1.033 | 1.900 | 1.562 | 1.000 | .002 |
| .450 | .155 | .624 | .966 | 1.950 | 1.537 | 1.000 | .003 | .450 | .188 | .719 | .907 | 1.950 | 1.612 | 1.000 | .001 |
| .500 | .187 | .670 | .880 | 2.000 | 1.587 | 1.000 | .002 | .500 | .225 | .762 | .792 | 2.000 | 1.662 | 1.000 | .001 |
| .550 | .222 | .712 | .798 | 2.050 | 1.637 | 1.000 | .002 | .550 | .264 | .799 | .689 | 2.050 | 1.712 | 1.000 | .001 |
| .600 | .258 | .750 | .720 | 2.100 | 1.687 | 1.000 | .001 | .600 | .304 | .831 | .596 | 2.100 | 1.762 | 1.000 | .000 |
| .650 | .297 | .784 | .646 | 2.150 | 1.737 | 1.000 | .001 | .650 | .347 | .858 | .513 | 2.150 | 1.812 | 1.000 | .000 |
| .700 | .337 | .814 | .576 | 2.200 | 1.787 | 1.000 | .001 | .700 | .390 | .882 | .439 | 2.200 | 1.862 | 1.000 | .000 |
| .750 | .378 | .842 | .510 | 2.250 | 1.837 | 1.000 | .000 | .750 | .435 | .902 | .374 | 2.250 | 1.912 | 1.000 | .000 |
| .800 | .421 | .865 | .449 | 2.300 | 1.887 | 1.000 | .000 | .800 | .480 | .920 | .316 | 2.300 | 1.962 | 1.000 | .000 |
| .850 | .465 | .887 | .393 | 2.350 | 1.937 | 1.000 | .000 | .850 | .527 | .934 | .266 | 2.350 | 2.012 | 1.000 | .000 |
| .900 | .509 | .905 | .341 | 2.400 | 1.987 | 1.000 | .000 | .900 | .574 | .946 | .223 | 2.400 | 2.062 | 1.000 | .000 |
| .950 | .555 | .921 | .295 | 2.450 | 2.037 | 1.000 | .000 | .950 | .621 | .956 | .186 | 2.450 | 2.112 | 1.000 | .000 |
| 1.000 | .601 | .934 | .252 | 2.500 | 2.087 | 1.000 | .000 | 1.000 | .669 | .965 | .154 | 2.500 | 2.162 | 1.000 | .000 |
| 1.050 | .648 | .946 | .213 | 2.550 | 2.137 | 1.000 | .000 | 1.050 | .718 | .972 | .126 | 2.550 | 2.212 | 1.000 | .000 |
| 1.100 | .696 | .956 | .181 | 2.600 | 2.187 | 1.000 | .000 | 1.100 | .766 | .978 | .103 | 2.600 | 2.262 | 1.000 | .000 |
| 1.150 | .744 | .964 | .152 | 2.650 | 2.237 | 1.000 | .000 | 1.150 | .815 | .982 | .084 | 2.650 | 2.312 | 1.000 | .000 |
| 1.200 | .792 | .971 | .126 | 2.700 | 2.287 | 1.000 | .000 | 1.200 | .865 | .986 | .068 | 2.700 | 2.362 | 1.000 | .000 |
| 1.250 | .841 | .977 | .104 | 2.750 | 2.337 | 1.000 | .000 | 1.250 | .914 | .989 | .054 | 2.750 | 2.412 | 1.000 | .000 |
| 1.300 | .890 | .982 | .086 | 2.800 | 2.387 | 1.000 | .000 | 1.300 | .964 | .992 | .043 | 2.800 | 2.462 | 1.000 | .000 |
| 1.350 | .939 | .986 | .070 | 2.850 | 2.437 | 1.000 | .000 | 1.350 | 1.013 | .994 | .034 | 2.850 | 2.512 | 1.000 | .000 |
| 1.400 | .989 | .989 | .056 | 2.900 | 2.487 | 1.000 | .000 | 1.400 | 1.063 | .995 | .027 | 2.900 | 2.562 | 1.000 | .000 |
| 1.450 | 1.038 | .991 | .045 | 2.950 | 2.537 | 1.000 | .000 | 1.450 | 1.113 | .996 | .021 | 2.950 | 2.612 | 1.000 | .000 |
| | | | | 3.000 | 2.587 | 1.000 | .000 | | | | | 3.000 | 2.662 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(33) $n = 6$ and $m = 6$ (34) $n = 6$ and $m = 8$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.938 | 1.500 | 1.217 | 0.999 | 0.006 | 0.000 | 0.000 | 0.000 | 3.412 | 1.500 | 1.260 | 1.000 | 0.000 |
| .050 | .004 | .139 | 2.640 | 1.550 | 1.267 | .999 | .004 | .050 | .004 | .161 | 3.014 | 1.550 | 1.310 | 1.000 | .000 |
| .100 | .014 | .264 | 2.349 | 1.600 | 1.317 | 1.000 | .003 | .100 | .016 | .302 | 2.630 | 1.600 | 1.360 | 1.000 | .000 |
| .150 | .030 | .375 | 2.072 | 1.650 | 1.367 | 1.000 | .002 | .150 | .034 | .424 | 2.268 | 1.650 | 1.410 | 1.000 | .000 |
| .200 | .051 | .472 | 1.813 | 1.700 | 1.417 | 1.000 | .002 | .200 | .058 | .529 | 1.935 | 1.700 | 1.460 | 1.000 | .000 |
| .250 | .077 | .556 | 1.574 | 1.750 | 1.467 | 1.000 | .001 | .250 | .087 | .618 | 1.634 | 1.750 | 1.510 | 1.000 | .000 |
| .300 | .106 | .629 | 1.356 | 1.800 | 1.517 | 1.000 | .001 | .300 | .119 | .693 | 1.366 | 1.800 | 1.560 | 1.000 | .000 |
| .350 | .139 | .692 | 1.161 | 1.850 | 1.567 | 1.000 | .001 | .350 | .156 | .755 | 1.131 | 1.850 | 1.610 | 1.000 | .000 |
| .400 | .173 | .746 | .987 | 1.900 | 1.617 | 1.000 | .000 | .400 | .195 | .806 | .928 | 1.900 | 1.660 | 1.000 | .000 |
| .450 | .214 | .791 | .834 | 1.950 | 1.667 | 1.000 | .000 | .450 | .236 | .848 | .755 | 1.950 | 1.710 | 1.000 | .000 |
| .500 | .254 | .829 | .700 | 2.000 | 1.717 | 1.000 | .000 | .500 | .279 | .882 | .608 | 2.000 | 1.760 | 1.000 | .000 |
| .550 | .297 | .861 | .584 | 2.050 | 1.767 | 1.000 | .000 | .550 | .324 | .910 | .485 | 2.050 | 1.810 | 1.000 | .000 |
| .600 | .340 | .888 | .484 | 2.100 | 1.817 | 1.000 | .000 | .600 | .370 | .931 | .384 | 2.100 | 1.860 | 1.000 | .000 |
| .650 | .385 | .910 | .399 | 2.150 | 1.867 | 1.000 | .000 | .650 | .417 | .948 | .300 | 2.150 | 1.910 | 1.000 | .000 |
| .700 | .431 | .928 | .327 | 2.200 | 1.917 | 1.000 | .000 | .700 | .465 | .962 | .233 | 2.200 | 1.960 | 1.000 | .000 |
| .750 | .478 | .943 | .266 | 2.250 | 1.967 | 1.000 | .000 | .750 | .513 | .972 | .178 | 2.250 | 2.010 | 1.000 | .000 |
| .800 | .526 | .955 | .215 | 2.300 | 2.017 | 1.000 | .000 | .800 | .562 | .980 | .135 | 2.300 | 2.060 | 1.000 | .000 |
| .850 | .574 | .965 | .173 | 2.350 | 2.067 | 1.000 | .000 | .850 | .611 | .985 | .101 | 2.350 | 2.110 | 1.000 | .000 |
| .900 | .622 | .972 | .138 | 2.400 | 2.117 | 1.000 | .000 | .900 | .661 | .990 | .075 | 2.400 | 2.160 | 1.000 | .000 |
| .950 | .671 | .979 | .110 | 2.450 | 2.167 | 1.000 | .000 | .950 | .710 | .993 | .053 | 2.450 | 2.210 | 1.000 | .000 |
| 1.000 | .720 | .983 | .087 | 2.500 | 2.217 | 1.000 | .000 | 1.000 | .760 | .995 | .039 | 2.500 | 2.260 | 1.000 | .000 |
| 1.050 | .769 | .987 | .068 | 2.550 | 2.267 | 1.000 | .000 | 1.050 | .810 | .997 | .028 | 2.550 | 2.310 | 1.000 | .000 |
| 1.100 | .819 | .990 | .053 | 2.600 | 2.317 | 1.000 | .000 | 1.100 | .860 | .998 | .019 | 2.600 | 2.360 | 1.000 | .000 |
| 1.150 | .868 | .993 | .041 | 2.650 | 2.367 | 1.000 | .000 | 1.150 | .910 | .999 | .013 | 2.650 | 2.410 | 1.000 | .000 |
| 1.200 | .918 | .994 | .032 | 2.700 | 2.417 | 1.000 | .000 | 1.200 | .960 | .999 | .008 | 2.700 | 2.460 | 1.000 | .000 |
| 1.250 | .968 | .996 | .024 | 2.750 | 2.467 | 1.000 | .000 | 1.250 | 1.010 | 1.000 | .005 | 2.750 | 2.510 | 1.000 | .000 |
| 1.300 | 1.018 | .997 | .018 | 2.800 | 2.517 | 1.000 | .000 | 1.300 | 1.060 | 1.000 | .003 | 2.800 | 2.560 | 1.000 | .000 |
| 1.350 | 1.067 | .998 | .014 | 2.850 | 2.567 | 1.000 | .000 | 1.350 | 1.110 | 1.000 | .002 | 2.850 | 2.610 | 1.000 | .000 |
| 1.400 | 1.117 | .998 | .010 | 2.900 | 2.617 | 1.000 | .000 | 1.400 | 1.160 | 1.000 | .001 | 2.900 | 2.660 | 1.000 | .000 |
| 1.450 | 1.167 | .999 | .008 | 2.950 | 2.667 | 1.000 | .000 | 1.450 | 1.210 | 1.000 | .000 | 2.950 | 2.710 | 1.000 | .000 |
| | | | | 3.000 | 2.717 | 1.000 | .000 | | | | | 3.000 | 2.760 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)
 (35) $n = 6$ and $m = 10$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.850 | 1.500 | 1.294 | 1.001 | -0.004 |
| .050 | .005 | .180 | 3.354 | 1.550 | 1.344 | 1.001 | -.003 |
| .100 | .018 | .336 | 2.877 | 1.600 | 1.394 | 1.000 | -.002 |
| .150 | .038 | .468 | 2.432 | 1.650 | 1.444 | 1.000 | -.002 |
| .200 | .064 | .580 | 2.029 | 1.700 | 1.494 | 1.000 | -.002 |
| .250 | .095 | .672 | 1.670 | 1.750 | 1.544 | 1.000 | -.001 |
| .300 | .131 | .747 | 1.358 | 1.800 | 1.594 | 1.000 | -.001 |
| .350 | .170 | .808 | 1.089 | 1.850 | 1.644 | 1.000 | -.001 |
| .400 | .212 | .857 | .863 | 1.900 | 1.694 | 1.000 | .000 |
| .450 | .255 | .895 | .674 | 1.950 | 1.744 | 1.000 | .000 |
| .500 | .301 | .925 | .519 | 2.000 | 1.794 | 1.000 | .000 |
| .550 | .348 | .948 | .394 | 2.050 | 1.844 | 1.000 | .000 |
| .600 | .396 | .965 | .294 | 2.100 | 1.894 | 1.000 | .000 |
| .650 | .444 | .977 | .215 | 2.150 | 1.944 | 1.000 | .000 |
| .700 | .493 | .987 | .153 | 2.200 | 1.994 | 1.000 | .000 |
| .750 | .543 | .993 | .106 | 2.250 | 2.044 | 1.000 | .000 |
| .800 | .593 | .997 | .071 | 2.300 | 2.094 | 1.000 | .000 |
| .850 | .643 | 1.000 | .045 | 2.350 | 2.144 | 1.000 | .000 |
| .900 | .693 | 1.002 | .026 | 2.400 | 2.194 | 1.000 | .000 |
| .950 | .743 | 1.003 | .013 | 2.450 | 2.244 | 1.000 | .000 |
| 1.000 | .793 | 1.003 | .004 | 2.500 | 2.294 | 1.000 | .000 |
| 1.050 | .843 | 1.003 | -.002 | 2.550 | 2.344 | 1.000 | .000 |
| 1.100 | .893 | 1.003 | -.005 | 2.600 | 2.394 | 1.000 | .000 |
| 1.150 | .943 | 1.003 | -.007 | 2.650 | 2.444 | 1.000 | .000 |
| 1.200 | .994 | 1.003 | -.007 | 2.700 | 2.494 | 1.000 | .000 |
| 1.250 | 1.044 | 1.002 | -.007 | 2.750 | 2.544 | 1.000 | .000 |
| 1.300 | 1.094 | 1.002 | -.007 | 2.800 | 2.594 | 1.000 | .000 |
| 1.350 | 1.144 | 1.002 | -.006 | 2.850 | 2.644 | 1.000 | .000 |
| 1.400 | 1.194 | 1.001 | -.005 | 2.900 | 2.694 | 1.000 | .000 |
| 1.450 | 1.244 | 1.001 | -.005 | 2.950 | 2.744 | 1.000 | .000 |
| | | | | 3.000 | 2.794 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)
(36) $n = 8$ and $m = 0$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.271 | 1.000 | 0.551 | 0.926 | 0.319 | 2.000 | 1.536 | 1.000 | 0.001 |
| .025 | .000 | .032 | 1.271 | 1.025 | .574 | .933 | .292 | 2.025 | 1.561 | 1.000 | .001 |
| .050 | .002 | .064 | 1.271 | 1.050 | .598 | .940 | .267 | 2.050 | 1.586 | 1.000 | .001 |
| .075 | .004 | .095 | 1.270 | 1.075 | .621 | .947 | .244 | 2.075 | 1.611 | 1.000 | .001 |
| .100 | .006 | .127 | 1.268 | 1.100 | .645 | .953 | .222 | 2.100 | 1.636 | 1.000 | .001 |
| .125 | .010 | .159 | 1.265 | 1.125 | .669 | .958 | .201 | 2.125 | 1.661 | 1.000 | .000 |
| .150 | .014 | .190 | 1.261 | 1.150 | .693 | .963 | .182 | 2.150 | 1.686 | 1.000 | .000 |
| .175 | .019 | .222 | 1.256 | 1.175 | .717 | .967 | .164 | 2.175 | 1.711 | 1.000 | .000 |
| .200 | .025 | .253 | 1.248 | 1.200 | .741 | .971 | .148 | 2.200 | 1.736 | 1.000 | .000 |
| .225 | .032 | .284 | 1.239 | 1.225 | .765 | .974 | .132 | 2.225 | 1.761 | 1.000 | .000 |
| .250 | .040 | .315 | 1.229 | 1.250 | .790 | .978 | .118 | 2.250 | 1.786 | 1.000 | .000 |
| .275 | .048 | .346 | 1.216 | 1.275 | .814 | .980 | .106 | 2.275 | 1.811 | 1.000 | .000 |
| .300 | .057 | .376 | 1.201 | 1.300 | .839 | .983 | .094 | 2.300 | 1.836 | 1.000 | .000 |
| .325 | .067 | .406 | 1.184 | 1.325 | .863 | .985 | .083 | 2.325 | 1.861 | 1.000 | .000 |
| .350 | .077 | .435 | 1.165 | 1.350 | .888 | .987 | .074 | 2.350 | 1.886 | 1.000 | .000 |
| .375 | .088 | .464 | 1.143 | 1.375 | .913 | .989 | .065 | 2.375 | 1.911 | 1.000 | .000 |
| .400 | .100 | .492 | 1.120 | 1.400 | .938 | .990 | .057 | 2.400 | 1.936 | 1.000 | .000 |
| .425 | .113 | .520 | 1.095 | 1.425 | .962 | .992 | .050 | 2.425 | 1.961 | 1.000 | .000 |
| .450 | .126 | .547 | 1.067 | 1.450 | .987 | .993 | .044 | 2.450 | 1.986 | 1.000 | .000 |
| .475 | .140 | .573 | 1.038 | 1.475 | 1.012 | .994 | .038 | 2.475 | 2.011 | 1.000 | .000 |
| .500 | .155 | .599 | 1.008 | 1.500 | 1.037 | .995 | .033 | 2.500 | 2.036 | 1.000 | .000 |
| .525 | .170 | .624 | .976 | 1.525 | 1.062 | .995 | .029 | 2.525 | 2.061 | 1.000 | .000 |
| .550 | .186 | .647 | .942 | 1.550 | 1.087 | .996 | .025 | 2.550 | 2.086 | 1.000 | .000 |
| .575 | .203 | .671 | .908 | 1.575 | 1.111 | .997 | .022 | 2.575 | 2.111 | 1.000 | .000 |
| .600 | .220 | .693 | .872 | 1.600 | 1.136 | .997 | .018 | 2.600 | 2.136 | 1.000 | .000 |
| .625 | .237 | .714 | .836 | 1.625 | 1.161 | .998 | .016 | 2.625 | 2.161 | 1.000 | .000 |
| .650 | .255 | .735 | .799 | 1.650 | 1.186 | .998 | .014 | 2.650 | 2.186 | 1.000 | .000 |
| .675 | .274 | .754 | .761 | 1.675 | 1.211 | .998 | .012 | 2.675 | 2.211 | 1.000 | .000 |
| .700 | .293 | .773 | .724 | 1.700 | 1.236 | .999 | .010 | 2.700 | 2.236 | 1.000 | .000 |
| .725 | .313 | .790 | .686 | 1.725 | 1.261 | .999 | .008 | 2.725 | 2.261 | 1.000 | .000 |
| .750 | .333 | .807 | .649 | 1.750 | 1.286 | .999 | .007 | 2.750 | 2.286 | 1.000 | .000 |
| .775 | .353 | .823 | .612 | 1.775 | 1.311 | .999 | .006 | 2.775 | 2.311 | 1.000 | .000 |
| .800 | .374 | .838 | .575 | 1.800 | 1.336 | .999 | .005 | 2.800 | 2.336 | 1.000 | .000 |
| .825 | .395 | .852 | .540 | 1.825 | 1.361 | .999 | .004 | 2.825 | 2.361 | 1.000 | .000 |
| .850 | .416 | .865 | .505 | 1.850 | 1.386 | 1.000 | .004 | 2.850 | 2.386 | 1.000 | .000 |
| .875 | .438 | .877 | .471 | 1.875 | 1.411 | 1.000 | .003 | 2.875 | 2.411 | 1.000 | .000 |
| .900 | .460 | .888 | .438 | 1.900 | 1.436 | 1.000 | .002 | 2.900 | 2.436 | 1.000 | .000 |
| .925 | .482 | .899 | .406 | 1.925 | 1.461 | 1.000 | .002 | 2.925 | 2.461 | 1.000 | .000 |
| .950 | .505 | .908 | .376 | 1.950 | 1.486 | 1.000 | .002 | 2.950 | 2.486 | 1.000 | .000 |
| .975 | .528 | .917 | .347 | 1.975 | 1.511 | 1.000 | .001 | 2.975 | 2.511 | 1.000 | .000 |
| | | | | | | | | 3.000 | 2.536 | 1.000 | .000 |

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TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(57) $n = 8$ and $m = 1$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.604 | 1.000 | 0.592 | 0.943 | 0.256 | 2.000 | 1.581 | 1.000 | 0.001 |
| .025 | .000 | .040 | 1.579 | 1.025 | .615 | .949 | .233 | 2.025 | 1.606 | 1.000 | .001 |
| .050 | .002 | .079 | 1.553 | 1.050 | .639 | .955 | .212 | 2.050 | 1.631 | 1.000 | .001 |
| .075 | .004 | .117 | 1.528 | 1.075 | .663 | .960 | .192 | 2.075 | 1.656 | 1.000 | .000 |
| .100 | .008 | .155 | 1.502 | 1.100 | .687 | .964 | .174 | 2.100 | 1.681 | 1.000 | .000 |
| .125 | .012 | .193 | 1.475 | 1.125 | .711 | .968 | .157 | 2.125 | 1.706 | 1.000 | .000 |
| .150 | .017 | .229 | 1.447 | 1.150 | .735 | .972 | .141 | 2.150 | 1.731 | 1.000 | .000 |
| .175 | .024 | .265 | 1.419 | 1.175 | .760 | .975 | .127 | 2.175 | 1.756 | 1.000 | .000 |
| .200 | .031 | .300 | 1.389 | 1.200 | .784 | .978 | .113 | 2.200 | 1.781 | 1.000 | .000 |
| .225 | .039 | .334 | 1.358 | 1.225 | .809 | .981 | .101 | 2.225 | 1.806 | 1.000 | .000 |
| .250 | .047 | .368 | 1.327 | 1.250 | .833 | .983 | .090 | 2.250 | 1.831 | 1.000 | .000 |
| .275 | .057 | .401 | 1.294 | 1.275 | .858 | .986 | .080 | 2.275 | 1.856 | 1.000 | .000 |
| .300 | .067 | .433 | 1.260 | 1.300 | .883 | .987 | .071 | 2.300 | 1.881 | 1.000 | .000 |
| .325 | .079 | .464 | 1.225 | 1.325 | .907 | .989 | .062 | 2.325 | 1.906 | 1.000 | .000 |
| .350 | .091 | .494 | 1.189 | 1.350 | .932 | .991 | .055 | 2.350 | 1.931 | 1.000 | .000 |
| .375 | .103 | .523 | 1.153 | 1.375 | .957 | .992 | .048 | 2.375 | 1.956 | 1.000 | .000 |
| .400 | .117 | .551 | 1.115 | 1.400 | .982 | .993 | .042 | 2.400 | 1.981 | 1.000 | .000 |
| .425 | .131 | .579 | 1.076 | 1.425 | 1.006 | .994 | .037 | 2.425 | 2.006 | 1.000 | .000 |
| .450 | .146 | .605 | 1.037 | 1.450 | 1.031 | .995 | .032 | 2.450 | 2.031 | 1.000 | .000 |
| .475 | .161 | .631 | .997 | 1.475 | 1.056 | .996 | .028 | 2.475 | 2.056 | 1.000 | .000 |
| .500 | .177 | .655 | .957 | 1.500 | 1.081 | .996 | .024 | 2.500 | 2.081 | 1.000 | .000 |
| .525 | .194 | .679 | .916 | 1.525 | 1.106 | .997 | .021 | 2.525 | 2.106 | 1.000 | .000 |
| .550 | .211 | .701 | .875 | 1.550 | 1.131 | .997 | .018 | 2.550 | 2.131 | 1.000 | .000 |
| .575 | .229 | .722 | .834 | 1.575 | 1.156 | .998 | .015 | 2.575 | 2.156 | 1.000 | .000 |
| .600 | .247 | .743 | .794 | 1.600 | 1.181 | .998 | .013 | 2.600 | 2.181 | 1.000 | .000 |
| .625 | .266 | .762 | .753 | 1.625 | 1.206 | .998 | .011 | 2.625 | 2.206 | 1.000 | .000 |
| .650 | .285 | .780 | .713 | 1.650 | 1.231 | .999 | .010 | 2.650 | 2.231 | 1.000 | .000 |
| .675 | .305 | .798 | .674 | 1.675 | 1.256 | .999 | .008 | 2.675 | 2.256 | 1.000 | .000 |
| .700 | .325 | .814 | .635 | 1.700 | 1.281 | .999 | .007 | 2.700 | 2.281 | 1.000 | .000 |
| .725 | .346 | .829 | .597 | 1.725 | 1.306 | .999 | .006 | 2.725 | 2.306 | 1.000 | .000 |
| .750 | .367 | .844 | .560 | 1.750 | 1.331 | .999 | .005 | 2.750 | 2.331 | 1.000 | .000 |
| .775 | .388 | .857 | .523 | 1.775 | 1.356 | .999 | .004 | 2.775 | 2.356 | 1.000 | .000 |
| .800 | .410 | .870 | .488 | 1.800 | 1.381 | 1.000 | .003 | 2.800 | 2.381 | 1.000 | .000 |
| .825 | .431 | .882 | .454 | 1.825 | 1.406 | 1.000 | .003 | 2.825 | 2.406 | 1.000 | .000 |
| .850 | .454 | .893 | .422 | 1.850 | 1.431 | 1.000 | .002 | 2.850 | 2.431 | 1.000 | .000 |
| .875 | .476 | .903 | .391 | 1.875 | 1.456 | 1.000 | .002 | 2.875 | 2.456 | 1.000 | .000 |
| .900 | .499 | .912 | .361 | 1.900 | 1.481 | 1.000 | .002 | 2.900 | 2.481 | 1.000 | .000 |
| .925 | .522 | .921 | .332 | 1.925 | 1.506 | 1.000 | .001 | 2.925 | 2.506 | 1.000 | .000 |
| .950 | .545 | .929 | .305 | 1.950 | 1.531 | 1.000 | .001 | 2.950 | 2.531 | 1.000 | .000 |
| .975 | .568 | .936 | .280 | 1.975 | 1.556 | 1.000 | .001 | 2.975 | 2.556 | 1.000 | .000 |
| | | | | | | | | 3.000 | 2.581 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)
(38) $n = 8$ and $m = 2$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.908 | 1.000 | 0.626 | 0.956 | 0.206 | 2.000 | 1.617 | 1.000 | 0.001 |
| .025 | .001 | .047 | 1.858 | 1.025 | .650 | .961 | .187 | 2.025 | 1.642 | 1.000 | .000 |
| .050 | .002 | .093 | 1.807 | 1.050 | .674 | .965 | .169 | 2.050 | 1.667 | 1.000 | .000 |
| .075 | .005 | .137 | 1.757 | 1.075 | .698 | .969 | .152 | 2.075 | 1.692 | 1.000 | .000 |
| .100 | .009 | .181 | 1.707 | 1.100 | .722 | .973 | .137 | 2.100 | 1.717 | 1.000 | .000 |
| .125 | .014 | .223 | 1.657 | 1.125 | .746 | .976 | .123 | 2.125 | 1.742 | 1.000 | .000 |
| .150 | .020 | .264 | 1.606 | 1.150 | .771 | .979 | .110 | 2.150 | 1.767 | 1.000 | .000 |
| .175 | .027 | .303 | 1.556 | 1.175 | .795 | .982 | .098 | 2.175 | 1.792 | 1.000 | .000 |
| .200 | .035 | .341 | 1.505 | 1.200 | .820 | .984 | .087 | 2.200 | 1.817 | 1.000 | .000 |
| .225 | .044 | .378 | 1.454 | 1.225 | .845 | .986 | .077 | 2.225 | 1.842 | 1.000 | .000 |
| .250 | .054 | .414 | 1.403 | 1.250 | .869 | .988 | .069 | 2.250 | 1.867 | 1.000 | .000 |
| .275 | .065 | .449 | 1.352 | 1.275 | .894 | .989 | .061 | 2.275 | 1.892 | 1.000 | .000 |
| .300 | .077 | .482 | 1.302 | 1.300 | .919 | .991 | .053 | 2.300 | 1.917 | 1.000 | .000 |
| .325 | .089 | .514 | 1.251 | 1.325 | .943 | .992 | .047 | 2.325 | 1.942 | 1.000 | .000 |
| .350 | .102 | .544 | 1.200 | 1.350 | .968 | .993 | .041 | 2.350 | 1.967 | 1.000 | .000 |
| .375 | .116 | .574 | 1.150 | 1.375 | .993 | .994 | .036 | 2.375 | 1.992 | 1.000 | .000 |
| .400 | .131 | .602 | 1.100 | 1.400 | 1.018 | .995 | .031 | 2.400 | 2.017 | 1.000 | .000 |
| .425 | .147 | .629 | 1.050 | 1.425 | 1.043 | .996 | .027 | 2.425 | 2.042 | 1.000 | .000 |
| .450 | .163 | .654 | 1.001 | 1.450 | 1.068 | .996 | .024 | 2.450 | 2.067 | 1.000 | .000 |
| .475 | .179 | .679 | .953 | 1.475 | 1.093 | .997 | .020 | 2.475 | 2.092 | 1.000 | .000 |
| .500 | .196 | .702 | .905 | 1.500 | 1.118 | .997 | .018 | 2.500 | 2.117 | 1.000 | .000 |
| .525 | .214 | .724 | .858 | 1.525 | 1.143 | .998 | .015 | 2.525 | 2.142 | 1.000 | .000 |
| .550 | .233 | .745 | .811 | 1.550 | 1.168 | .998 | .013 | 2.550 | 2.167 | 1.000 | .000 |
| .575 | .252 | .765 | .766 | 1.575 | 1.192 | .998 | .011 | 2.575 | 2.192 | 1.000 | .000 |
| .600 | .271 | .783 | .722 | 1.600 | 1.217 | .999 | .009 | 2.600 | 2.217 | 1.000 | .000 |
| .625 | .291 | .801 | .679 | 1.625 | 1.242 | .999 | .008 | 2.625 | 2.242 | 1.000 | .000 |
| .650 | .311 | .817 | .637 | 1.650 | 1.267 | .999 | .007 | 2.650 | 2.267 | 1.000 | .000 |
| .675 | .332 | .832 | .597 | 1.675 | 1.292 | .999 | .006 | 2.675 | 2.292 | 1.000 | .000 |
| .700 | .353 | .847 | .557 | 1.700 | 1.317 | .999 | .005 | 2.700 | 2.317 | 1.000 | .000 |
| .725 | .374 | .860 | .520 | 1.725 | 1.342 | .999 | .004 | 2.725 | 2.342 | 1.000 | .000 |
| .750 | .396 | .873 | .483 | 1.750 | 1.367 | 1.000 | .003 | 2.750 | 2.367 | 1.000 | .000 |
| .775 | .418 | .885 | .449 | 1.775 | 1.392 | 1.000 | .003 | 2.775 | 2.392 | 1.000 | .000 |
| .800 | .440 | .895 | .415 | 1.800 | 1.417 | 1.000 | .002 | 2.800 | 2.417 | 1.000 | .000 |
| .825 | .462 | .905 | .384 | 1.825 | 1.442 | 1.000 | .002 | 2.825 | 2.442 | 1.000 | .000 |
| .850 | .485 | .915 | .354 | 1.850 | 1.467 | 1.000 | .002 | 2.850 | 2.467 | 1.000 | .000 |
| .875 | .508 | .923 | .325 | 1.875 | 1.492 | 1.000 | .001 | 2.875 | 2.492 | 1.000 | .000 |
| .900 | .531 | .931 | .298 | 1.900 | 1.517 | 1.000 | .001 | 2.900 | 2.517 | 1.000 | .000 |
| .925 | .555 | .938 | .273 | 1.925 | 1.542 | 1.000 | .001 | 2.925 | 2.542 | 1.000 | .000 |
| .950 | .578 | .944 | .249 | 1.950 | 1.567 | 1.000 | .001 | 2.950 | 2.567 | 1.000 | .000 |
| .975 | .602 | .950 | .227 | 1.975 | 1.592 | 1.000 | .001 | 2.975 | 2.592 | 1.000 | .000 |
| | | | | | | | | 3.000 | 2.617 | 1.000 | .000 |

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CJ-6 back

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)

| (39) $n = 8$ and $m = 4$ | | | | | | | | (40) $n = 8$ and $m = 8$ | | | | | | | |
|--------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|--------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|
| η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ | η | $a(\eta)$ | $a'(\eta)$ | $a''(\eta)$ |
| 0.000 | 0.000 | 0.000 | 2.454 | 1.000 | 0.680 | 0.974 | 0.133 | 0.000 | 0.000 | 0.000 | 2.942 | 1.000 | 0.721 | 0.985 | 0.083 |
| 0.025 | 0.01 | 0.060 | 2.354 | 1.025 | 0.704 | 0.977 | 0.119 | 0.025 | 0.001 | 0.072 | 2.792 | 1.025 | 0.746 | 0.987 | 0.073 |
| 0.050 | 0.03 | 0.118 | 2.254 | 1.050 | 0.729 | 0.980 | 0.106 | 0.050 | 0.004 | 0.140 | 2.643 | 1.050 | 0.771 | 0.989 | 0.065 |
| 0.075 | 0.07 | 0.173 | 2.156 | 1.075 | 0.753 | 0.982 | 0.095 | 0.075 | 0.008 | 0.204 | 2.496 | 1.075 | 0.796 | 0.990 | 0.057 |
| 0.100 | 0.12 | 0.225 | 2.058 | 1.100 | 0.778 | 0.984 | 0.084 | 0.100 | 0.014 | 0.264 | 2.353 | 1.100 | 0.820 | 0.992 | 0.050 |
| 0.125 | 0.16 | 0.276 | 1.962 | 1.125 | 0.802 | 0.986 | 0.075 | 0.125 | 0.021 | 0.322 | 2.212 | 1.125 | 0.845 | 0.993 | 0.043 |
| 0.150 | 0.22 | 0.324 | 1.868 | 1.150 | 0.827 | 0.988 | 0.066 | 0.150 | 0.030 | 0.375 | 2.076 | 1.150 | 0.870 | 0.994 | 0.038 |
| 0.175 | 0.24 | 0.369 | 1.775 | 1.175 | 0.852 | 0.990 | 0.058 | 0.175 | 0.040 | 0.425 | 1.944 | 1.175 | 0.895 | 0.995 | 0.033 |
| 0.200 | 0.24 | 0.412 | 1.685 | 1.200 | 0.876 | 0.991 | 0.051 | 0.200 | 0.051 | 0.472 | 1.817 | 1.200 | 0.920 | 0.995 | 0.029 |
| 0.225 | 0.25 | 0.453 | 1.597 | 1.225 | 0.901 | 0.992 | 0.045 | 0.225 | 0.063 | 0.516 | 1.695 | 1.225 | 0.945 | 0.996 | 0.025 |
| 0.250 | 0.26 | 0.492 | 1.511 | 1.250 | 0.926 | 0.993 | 0.040 | 0.250 | 0.077 | 0.557 | 1.578 | 1.250 | 0.969 | 0.997 | 0.022 |
| 0.275 | 0.27 | 0.529 | 1.428 | 1.275 | 0.951 | 0.994 | 0.035 | 0.275 | 0.091 | 0.595 | 1.467 | 1.275 | 0.994 | 0.997 | 0.019 |
| 0.300 | 0.29 | 0.564 | 1.347 | 1.300 | 0.976 | 0.995 | 0.030 | 0.300 | 0.107 | 0.630 | 1.361 | 1.300 | 1.019 | 0.998 | 0.016 |
| 0.325 | 0.30 | 0.596 | 1.269 | 1.325 | 1.001 | 0.996 | 0.026 | 0.325 | 0.123 | 0.663 | 1.260 | 1.325 | 1.044 | 0.998 | 0.014 |
| 0.350 | 0.32 | 0.627 | 1.194 | 1.350 | 1.026 | 0.996 | 0.023 | 0.350 | 0.140 | 0.694 | 1.165 | 1.350 | 1.069 | 0.998 | 0.012 |
| 0.375 | 0.33 | 0.656 | 1.122 | 1.375 | 1.050 | 0.997 | 0.020 | 0.375 | 0.157 | 0.722 | 1.076 | 1.375 | 1.094 | 0.999 | 0.010 |
| 0.400 | 0.35 | 0.683 | 1.052 | 1.400 | 1.075 | 0.997 | 0.017 | 0.400 | 0.176 | 0.747 | 0.991 | 1.400 | 1.119 | 0.999 | 0.009 |
| 0.425 | 0.37 | 0.709 | 0.985 | 1.425 | 1.100 | 0.998 | 0.015 | 0.425 | 0.195 | 0.771 | 0.912 | 1.425 | 1.144 | 0.999 | 0.007 |
| 0.450 | 0.39 | 0.733 | 0.921 | 1.450 | 1.125 | 0.998 | 0.013 | 0.450 | 0.214 | 0.793 | 0.837 | 1.450 | 1.169 | 0.999 | 0.006 |
| 0.475 | 0.41 | 0.755 | 0.860 | 1.475 | 1.150 | 0.998 | 0.011 | 0.475 | 0.234 | 0.815 | 0.768 | 1.475 | 1.194 | 0.999 | 0.005 |
| 0.500 | 0.42 | 0.776 | 0.802 | 1.500 | 1.175 | 0.999 | 0.009 | 0.500 | 0.255 | 0.831 | 0.703 | 1.500 | 1.219 | 0.999 | 0.004 |
| 0.525 | 0.44 | 0.795 | 0.746 | 1.525 | 1.200 | 0.999 | 0.008 | 0.525 | 0.276 | 0.848 | 0.642 | 1.525 | 1.244 | 0.999 | 0.004 |
| 0.550 | 0.46 | 0.813 | 0.693 | 1.550 | 1.225 | 0.999 | 0.007 | 0.550 | 0.297 | 0.864 | 0.586 | 1.550 | 1.269 | 1.000 | 0.003 |
| 0.575 | 0.48 | 0.830 | 0.643 | 1.575 | 1.250 | 0.999 | 0.006 | 0.575 | 0.319 | 0.878 | 0.534 | 1.575 | 1.294 | 1.000 | 0.003 |
| 0.600 | 0.50 | 0.845 | 0.595 | 1.600 | 1.275 | 0.999 | 0.005 | 0.600 | 0.341 | 0.890 | 0.485 | 1.600 | 1.319 | 1.000 | 0.002 |
| 0.625 | 0.51 | 0.859 | 0.550 | 1.625 | 1.300 | 0.999 | 0.004 | 0.625 | 0.364 | 0.902 | 0.441 | 1.625 | 1.344 | 1.000 | 0.002 |
| 0.650 | 0.53 | 0.873 | 0.507 | 1.650 | 1.325 | 1.000 | 0.003 | 0.650 | 0.386 | 0.912 | 0.399 | 1.650 | 1.369 | 1.000 | 0.002 |
| 0.675 | 0.55 | 0.885 | 0.467 | 1.675 | 1.350 | 1.000 | 0.003 | 0.675 | 0.409 | 0.922 | 0.361 | 1.675 | 1.394 | 1.000 | 0.001 |
| 0.700 | 0.57 | 0.896 | 0.429 | 1.700 | 1.375 | 1.000 | 0.002 | 0.700 | 0.432 | 0.930 | 0.326 | 1.700 | 1.419 | 1.000 | 0.001 |
| 0.725 | 0.59 | 0.906 | 0.394 | 1.725 | 1.400 | 1.000 | 0.002 | 0.725 | 0.456 | 0.938 | 0.294 | 1.725 | 1.444 | 1.000 | 0.001 |
| 0.750 | 0.62 | 0.916 | 0.360 | 1.750 | 1.425 | 1.000 | 0.002 | 0.750 | 0.479 | 0.945 | 0.265 | 1.750 | 1.469 | 1.000 | 0.001 |
| 0.775 | 0.65 | 0.924 | 0.329 | 1.775 | 1.450 | 1.000 | 0.001 | 0.775 | 0.503 | 0.951 | 0.238 | 1.775 | 1.494 | 1.000 | 0.001 |
| 0.800 | 0.68 | 0.932 | 0.300 | 1.800 | 1.475 | 1.000 | 0.001 | 0.800 | 0.527 | 0.957 | 0.213 | 1.800 | 1.519 | 1.000 | 0.000 |
| 0.825 | 0.71 | 0.939 | 0.273 | 1.825 | 1.500 | 1.000 | 0.001 | 0.825 | 0.551 | 0.962 | 0.191 | 1.825 | 1.544 | 1.000 | 0.000 |
| 0.850 | 0.74 | 0.946 | 0.248 | 1.850 | 1.525 | 1.000 | 0.001 | 0.850 | 0.575 | 0.967 | 0.170 | 1.850 | 1.569 | 1.000 | 0.000 |
| 0.875 | 0.77 | 0.952 | 0.225 | 1.875 | 1.550 | 1.000 | 0.001 | 0.875 | 0.599 | 0.972 | 0.152 | 1.875 | 1.594 | 1.000 | 0.000 |
| 0.900 | 0.80 | 0.957 | 0.203 | 1.900 | 1.575 | 1.000 | 0.001 | 0.900 | 0.623 | 0.974 | 0.138 | 1.900 | 1.619 | 1.000 | 0.000 |
| 0.925 | 0.83 | 0.962 | 0.184 | 1.925 | 1.600 | 1.000 | 0.000 | 0.925 | 0.648 | 0.977 | 0.126 | 1.925 | 1.644 | 1.000 | 0.000 |
| 0.950 | 0.86 | 0.966 | 0.165 | 1.950 | 1.625 | 1.000 | 0.000 | 0.950 | 0.672 | 0.980 | 0.117 | 1.950 | 1.669 | 1.000 | 0.000 |
| 0.975 | 0.89 | 0.970 | 0.149 | 1.975 | 1.650 | 1.000 | 0.000 | 0.975 | 0.697 | 0.983 | 0.094 | 1.975 | 1.694 | 1.000 | 0.000 |
| 2.000 | 1.675 | 1.000 | 0.000 | 2.000 | 1.675 | 1.000 | 0.000 | 2.000 | 1.675 | 1.000 | 0.000 | 2.000 | 1.719 | 1.000 | 0.000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(41) $n = 8$ and $m = 8$ (42) $n = 8$ and $m = 10$

| η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.388 | 1.000 | 0.755 | 0.993 | 0.048 | 0.000 | 0.000 | 0.000 | 3.804 | 1.000 | 0.783 | 0.998 | 0.022 |
| .025 | .001 | .082 | 3.189 | 1.025 | .780 | .994 | .041 | .025 | .001 | .092 | 3.554 | 1.025 | .808 | .998 | .018 |
| .050 | .004 | .159 | 2.991 | 1.050 | .805 | .995 | .035 | .050 | .005 | .178 | 3.308 | 1.050 | .833 | .999 | .014 |
| .075 | .009 | .232 | 2.797 | 1.075 | .830 | .995 | .030 | .075 | .010 | .257 | 3.066 | 1.075 | .858 | .999 | .012 |
| .100 | .016 | .299 | 2.607 | 1.100 | .855 | .996 | .026 | .100 | .017 | .331 | 2.832 | 1.100 | .883 | .999 | .009 |
| .125 | .024 | .362 | 2.424 | 1.125 | .879 | .997 | .022 | .125 | .027 | .399 | 2.606 | 1.125 | .908 | .999 | .007 |
| .150 | .034 | .421 | 2.247 | 1.150 | .904 | .997 | .019 | .150 | .037 | .461 | 2.390 | 1.150 | .933 | 1.000 | .006 |
| .175 | .045 | .475 | 2.077 | 1.175 | .929 | .998 | .016 | .175 | .050 | .519 | 2.185 | 1.175 | .958 | 1.000 | .005 |
| .200 | .057 | .524 | 1.916 | 1.200 | .954 | .998 | .014 | .200 | .063 | .571 | 1.992 | 1.200 | .983 | 1.000 | .004 |
| .225 | .071 | .570 | 1.763 | 1.225 | .979 | .998 | .012 | .225 | .078 | .618 | 1.809 | 1.225 | 1.008 | 1.000 | .003 |
| .250 | .086 | .613 | 1.618 | 1.250 | 1.004 | .999 | .010 | .250 | .094 | .661 | 1.639 | 1.250 | 1.033 | 1.000 | .002 |
| .275 | .102 | .651 | 1.482 | 1.275 | 1.029 | .999 | .008 | .275 | .111 | .700 | 1.480 | 1.275 | 1.058 | 1.000 | .002 |
| .300 | .118 | .687 | 1.354 | 1.300 | 1.054 | .999 | .007 | .300 | .129 | .736 | 1.333 | 1.300 | 1.083 | 1.000 | .001 |
| .325 | .136 | .719 | 1.234 | 1.325 | 1.079 | .999 | .006 | .325 | .148 | .767 | 1.197 | 1.325 | 1.108 | 1.000 | .001 |
| .350 | .154 | .749 | 1.123 | 1.350 | 1.104 | .999 | .005 | .350 | .167 | .795 | 1.072 | 1.350 | 1.133 | 1.000 | .001 |
| .375 | .173 | .775 | 1.019 | 1.375 | 1.129 | .999 | .004 | .375 | .188 | .821 | .958 | 1.375 | 1.158 | 1.000 | .000 |
| .400 | .193 | .800 | .924 | 1.400 | 1.154 | 1.000 | .003 | .400 | .208 | .843 | .853 | 1.400 | 1.183 | 1.000 | .000 |
| .425 | .213 | .822 | .835 | 1.425 | 1.179 | 1.000 | .003 | .425 | .230 | .864 | .758 | 1.425 | 1.208 | 1.000 | .000 |
| .450 | .234 | .841 | .753 | 1.450 | 1.204 | 1.000 | .002 | .450 | .252 | .881 | .671 | 1.450 | 1.233 | 1.000 | .000 |
| .475 | .255 | .859 | .678 | 1.475 | 1.229 | 1.000 | .002 | .475 | .274 | .897 | .593 | 1.475 | 1.258 | 1.000 | .000 |
| .500 | .277 | .875 | .610 | 1.500 | 1.254 | 1.000 | .002 | .500 | .296 | .911 | .522 | 1.500 | 1.283 | 1.000 | .000 |
| .525 | .299 | .890 | .547 | 1.525 | 1.279 | 1.000 | .001 | .525 | .319 | .923 | .459 | 1.525 | 1.308 | 1.000 | .000 |
| .550 | .322 | .903 | .489 | 1.550 | 1.304 | 1.000 | .001 | .550 | .343 | .934 | .402 | 1.550 | 1.333 | 1.000 | .000 |
| .575 | .344 | .914 | .437 | 1.575 | 1.329 | 1.000 | .001 | .575 | .366 | .944 | .351 | 1.575 | 1.358 | 1.000 | .000 |
| .600 | .367 | .925 | .390 | 1.600 | 1.354 | 1.000 | .001 | .600 | .390 | .952 | .306 | 1.600 | 1.383 | 1.000 | .000 |
| .625 | .391 | .934 | .347 | 1.625 | 1.379 | 1.000 | .001 | .625 | .414 | .959 | .266 | 1.625 | 1.408 | 1.000 | .000 |
| .650 | .414 | .942 | .308 | 1.650 | 1.404 | 1.000 | .000 | .650 | .438 | .965 | .230 | 1.650 | 1.433 | 1.000 | .000 |
| .675 | .438 | .949 | .273 | 1.675 | 1.429 | 1.000 | .000 | .675 | .462 | .970 | .199 | 1.675 | 1.458 | 1.000 | .000 |
| .700 | .461 | .956 | .242 | 1.700 | 1.454 | 1.000 | .000 | .700 | .486 | .975 | .171 | 1.700 | 1.483 | 1.000 | .000 |
| .725 | .485 | .962 | .214 | 1.725 | 1.479 | 1.000 | .000 | .725 | .511 | .979 | .147 | 1.725 | 1.508 | 1.000 | .000 |
| .750 | .510 | .967 | .188 | 1.750 | 1.504 | 1.000 | .000 | .750 | .535 | .982 | .126 | 1.750 | 1.533 | 1.000 | .000 |
| .775 | .534 | .971 | .166 | 1.775 | 1.529 | 1.000 | .000 | .775 | .560 | .985 | .107 | 1.775 | 1.558 | 1.000 | .000 |
| .800 | .558 | .975 | .145 | 1.800 | 1.554 | 1.000 | .000 | .800 | .584 | .988 | .091 | 1.800 | 1.583 | 1.000 | .000 |
| .825 | .582 | .978 | .127 | 1.825 | 1.579 | 1.000 | .000 | .825 | .609 | .990 | .077 | 1.825 | 1.608 | 1.000 | .000 |
| .850 | .607 | .981 | .111 | 1.850 | 1.604 | 1.000 | .000 | .850 | .634 | .992 | .065 | 1.850 | 1.633 | 1.000 | .000 |
| .875 | .632 | .984 | .097 | 1.875 | 1.629 | 1.000 | .000 | .875 | .659 | .993 | .055 | 1.875 | 1.658 | 1.000 | .000 |
| .900 | .656 | .986 | .085 | 1.900 | 1.654 | 1.000 | .000 | .900 | .684 | .994 | .046 | 1.900 | 1.683 | 1.000 | .000 |
| .925 | .681 | .988 | .074 | 1.925 | 1.679 | 1.000 | .000 | .925 | .708 | .995 | .038 | 1.925 | 1.708 | 1.000 | .000 |
| .950 | .706 | .990 | .064 | 1.950 | 1.704 | 1.000 | .000 | .950 | .733 | .996 | .032 | 1.950 | 1.733 | 1.000 | .000 |
| .975 | .730 | .991 | .055 | 1.975 | 1.729 | 1.000 | .000 | .975 | .758 | .997 | .026 | 1.975 | 1.758 | 1.000 | .000 |
| | | | | 2.000 | 1.754 | 1.000 | .000 | | | | | 2.000 | 1.783 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(43) $n = 10$ and $m = 0$ (44) $n = 10$ and $m = 1$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.408 | 1.000 | .589 | .954 | .239 | 0.000 | 0.000 | 0.000 | 1.710 | 1.000 | 0.620 | 0.964 | 0.196 |
| .025 | .000 | .035 | 1.408 | 1.025 | .613 | .960 | .214 | .025 | .001 | .042 | 1.685 | 1.025 | .644 | .968 | .175 |
| .050 | .002 | .070 | 1.407 | 1.050 | .637 | .965 | .191 | .050 | .002 | .084 | 1.660 | 1.050 | .669 | .972 | .155 |
| .075 | .004 | .106 | 1.406 | 1.075 | .661 | .969 | .171 | .075 | .005 | .125 | 1.634 | 1.075 | .693 | .976 | .138 |
| .100 | .007 | .141 | 1.403 | 1.100 | .685 | .973 | .151 | .100 | .008 | .166 | 1.607 | 1.100 | .717 | .979 | .122 |
| .125 | .011 | .176 | 1.399 | 1.125 | .710 | .977 | .134 | .125 | .013 | .206 | 1.579 | 1.125 | .742 | .982 | .107 |
| .150 | .016 | .211 | 1.393 | 1.150 | .734 | .980 | .118 | .150 | .019 | .245 | 1.550 | 1.150 | .767 | .985 | .094 |
| .175 | .022 | .245 | 1.385 | 1.175 | .759 | .983 | .104 | .175 | .025 | .283 | 1.519 | 1.175 | .791 | .987 | .082 |
| .200 | .028 | .280 | 1.374 | 1.200 | .783 | .985 | .091 | .200 | .033 | .321 | 1.486 | 1.200 | .816 | .989 | .072 |
| .225 | .036 | .314 | 1.361 | 1.225 | .808 | .987 | .079 | .225 | .041 | .358 | 1.452 | 1.225 | .841 | .990 | .062 |
| .250 | .044 | .348 | 1.345 | 1.250 | .833 | .989 | .069 | .250 | .051 | .393 | 1.416 | 1.250 | .865 | .992 | .054 |
| .275 | .053 | .381 | 1.327 | 1.275 | .857 | .991 | .060 | .275 | .061 | .428 | 1.379 | 1.275 | .890 | .993 | .047 |
| .300 | .063 | .414 | 1.305 | 1.300 | .882 | .992 | .052 | .300 | .072 | .462 | 1.339 | 1.300 | .915 | .994 | .040 |
| .325 | .074 | .447 | 1.280 | 1.325 | .907 | .993 | .044 | .325 | .084 | .495 | 1.298 | 1.325 | .940 | .995 | .034 |
| .350 | .085 | .478 | 1.253 | 1.350 | .932 | .995 | .038 | .350 | .097 | .527 | 1.256 | 1.350 | .965 | .996 | .029 |
| .375 | .098 | .509 | 1.223 | 1.375 | .957 | .995 | .033 | .375 | .110 | .558 | 1.212 | 1.375 | .990 | .997 | .025 |
| .400 | .111 | .539 | 1.191 | 1.400 | .982 | .996 | .028 | .400 | .125 | .588 | 1.167 | 1.400 | 1.015 | .997 | .021 |
| .425 | .124 | .569 | 1.155 | 1.425 | 1.006 | .997 | .023 | .425 | .140 | .616 | 1.120 | 1.425 | 1.040 | .998 | .018 |
| .450 | .139 | .597 | 1.118 | 1.450 | 1.031 | .997 | .020 | .450 | .156 | .644 | 1.073 | 1.450 | 1.065 | .998 | .015 |
| .475 | .154 | .625 | 1.079 | 1.475 | 1.056 | .998 | .017 | .475 | .172 | .670 | 1.025 | 1.475 | 1.089 | .998 | .013 |
| .500 | .170 | .651 | 1.037 | 1.500 | 1.081 | .998 | .014 | .500 | .189 | .695 | .976 | 1.500 | 1.114 | .999 | .011 |
| .525 | .187 | .676 | .995 | 1.525 | 1.106 | .998 | .012 | .525 | .207 | .719 | .927 | 1.525 | 1.139 | .999 | .009 |
| .550 | .204 | .701 | .951 | 1.550 | 1.131 | .999 | .010 | .550 | .225 | .741 | .878 | 1.550 | 1.164 | .999 | .007 |
| .575 | .222 | .724 | .906 | 1.575 | 1.156 | .999 | .008 | .575 | .244 | .763 | .829 | 1.575 | 1.189 | .999 | .006 |
| .600 | .240 | .746 | .860 | 1.600 | 1.181 | .999 | .007 | .600 | .263 | .783 | .781 | 1.600 | 1.214 | .999 | .005 |
| .625 | .259 | .767 | .814 | 1.625 | 1.206 | .999 | .006 | .625 | .283 | .802 | .733 | 1.625 | 1.239 | 1.000 | .004 |
| .650 | .279 | .787 | .768 | 1.650 | 1.231 | .999 | .005 | .650 | .303 | .820 | .686 | 1.650 | 1.264 | 1.000 | .003 |
| .675 | .298 | .805 | .722 | 1.675 | 1.256 | 1.000 | .004 | .675 | .324 | .836 | .641 | 1.675 | 1.289 | 1.000 | .003 |
| .700 | .319 | .823 | .677 | 1.700 | 1.281 | 1.000 | .003 | .700 | .345 | .852 | .596 | 1.700 | 1.314 | 1.000 | .002 |
| .725 | .340 | .839 | .632 | 1.725 | 1.306 | 1.000 | .003 | .725 | .366 | .866 | .553 | 1.725 | 1.339 | 1.000 | .002 |
| .750 | .361 | .854 | .589 | 1.750 | 1.331 | 1.000 | .002 | .750 | .388 | .879 | .511 | 1.750 | 1.364 | 1.000 | .001 |
| .775 | .382 | .869 | .546 | 1.775 | 1.356 | 1.000 | .002 | .775 | .410 | .892 | .471 | 1.775 | 1.389 | 1.000 | .001 |
| .800 | .404 | .882 | .505 | 1.800 | 1.381 | 1.000 | .001 | .800 | .433 | .903 | .433 | 1.800 | 1.414 | 1.000 | .001 |
| .825 | .426 | .894 | .465 | 1.825 | 1.406 | 1.000 | .001 | .825 | .456 | .913 | .396 | 1.825 | 1.439 | 1.000 | .001 |
| .850 | .449 | .905 | .428 | 1.850 | 1.431 | 1.000 | .001 | .850 | .479 | .923 | .362 | 1.850 | 1.464 | 1.000 | .001 |
| .875 | .472 | .915 | .391 | 1.875 | 1.456 | 1.000 | .001 | .875 | .502 | .931 | .329 | 1.875 | 1.489 | 1.000 | .000 |
| .900 | .495 | .925 | .357 | 1.900 | 1.481 | 1.000 | .001 | .900 | .525 | .939 | .299 | 1.900 | 1.514 | 1.000 | .000 |
| .925 | .518 | .933 | .325 | 1.925 | 1.506 | 1.000 | .000 | .925 | .549 | .946 | .270 | 1.925 | 1.539 | 1.000 | .000 |
| .950 | .541 | .941 | .294 | 1.950 | 1.531 | 1.000 | .000 | .950 | .572 | .953 | .242 | 1.950 | 1.564 | 1.000 | .000 |
| .975 | .565 | .948 | .265 | 1.975 | 1.556 | 1.000 | .000 | .975 | .596 | .958 | .218 | 1.975 | 1.589 | 1.000 | .000 |
| | | | | 2.000 | 1.581 | 1.000 | .000 | | | | | 2.000 | 1.614 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(45) $n = 10$ and $m = 2$ (46) $n = 10$ and $m = 4$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.991 | 1.000 | 0.647 | 0.971 | 0.161 | 0.000 | 0.000 | 0.000 | 2.502 | 1.000 | 0.692 | 0.981 | 0.109 |
| .025 | .001 | .049 | 1.941 | 1.025 | .672 | .975 | .143 | .025 | .001 | .061 | 2.402 | 1.025 | .716 | .984 | .095 |
| .050 | .002 | .097 | 1.891 | 1.050 | .696 | .978 | .126 | .050 | .003 | .120 | 2.302 | 1.050 | .741 | .986 | .084 |
| .075 | .005 | .144 | 1.840 | 1.075 | .721 | .981 | .111 | .075 | .007 | .176 | 2.203 | 1.075 | .766 | .988 | .073 |
| .100 | .010 | .189 | 1.789 | 1.100 | .745 | .984 | .098 | .100 | .012 | .230 | 2.105 | 1.100 | .790 | .990 | .064 |
| .125 | .015 | .233 | 1.738 | 1.125 | .770 | .986 | .086 | .125 | .018 | .282 | 2.008 | 1.125 | .815 | .991 | .055 |
| .150 | .021 | .276 | 1.686 | 1.150 | .794 | .988 | .075 | .150 | .026 | .331 | 1.913 | 1.150 | .840 | .993 | .048 |
| .175 | .029 | .317 | 1.633 | 1.175 | .819 | .990 | .065 | .175 | .035 | .377 | 1.819 | 1.175 | .865 | .994 | .041 |
| .200 | .037 | .358 | 1.580 | 1.200 | .844 | .991 | .057 | .200 | .045 | .422 | 1.727 | 1.200 | .890 | .995 | .036 |
| .225 | .047 | .396 | 1.526 | 1.225 | .869 | .993 | .049 | .225 | .056 | .464 | 1.637 | 1.225 | .914 | .996 | .031 |
| .250 | .057 | .434 | 1.472 | 1.250 | .894 | .994 | .042 | .250 | .068 | .504 | 1.550 | 1.250 | .939 | .996 | .026 |
| .275 | .068 | .470 | 1.417 | 1.275 | .918 | .995 | .036 | .275 | .081 | .541 | 1.464 | 1.275 | .964 | .997 | .022 |
| .300 | .080 | .505 | 1.362 | 1.300 | .943 | .996 | .031 | .300 | .095 | .577 | 1.381 | 1.300 | .989 | .997 | .019 |
| .325 | .093 | .538 | 1.306 | 1.325 | .968 | .996 | .027 | .325 | .110 | .610 | 1.300 | 1.325 | 1.014 | .998 | .016 |
| .350 | .107 | .570 | 1.250 | 1.350 | .993 | .997 | .023 | .350 | .125 | .642 | 1.221 | 1.350 | 1.039 | .998 | .014 |
| .375 | .122 | .601 | 1.194 | 1.375 | 1.018 | .997 | .019 | .375 | .142 | .671 | 1.145 | 1.375 | 1.064 | .998 | .011 |
| .400 | .137 | .630 | 1.138 | 1.400 | 1.043 | .998 | .016 | .400 | .159 | .699 | 1.072 | 1.400 | 1.089 | .999 | .010 |
| .425 | .153 | .658 | 1.082 | 1.425 | 1.068 | .998 | .014 | .425 | .177 | .725 | 1.001 | 1.425 | 1.114 | .999 | .008 |
| .450 | .170 | .684 | 1.026 | 1.450 | 1.093 | .999 | .012 | .450 | .195 | .749 | .934 | 1.450 | 1.139 | .999 | .007 |
| .475 | .188 | .709 | .971 | 1.475 | 1.118 | .999 | .010 | .475 | .214 | .772 | .869 | 1.475 | 1.164 | .999 | .006 |
| .500 | .205 | .732 | .917 | 1.500 | 1.143 | .999 | .008 | .500 | .234 | .793 | .806 | 1.500 | 1.189 | .999 | .005 |
| .525 | .224 | .755 | .864 | 1.525 | 1.168 | .999 | .007 | .525 | .254 | .812 | .747 | 1.525 | 1.214 | 1.000 | .004 |
| .550 | .243 | .776 | .811 | 1.550 | 1.193 | .999 | .006 | .550 | .274 | .830 | .690 | 1.550 | 1.239 | 1.000 | .003 |
| .575 | .263 | .795 | .760 | 1.575 | 1.218 | .999 | .005 | .575 | .295 | .847 | .637 | 1.575 | 1.264 | 1.000 | .003 |
| .600 | .283 | .814 | .710 | 1.600 | 1.243 | 1.000 | .004 | .600 | .317 | .862 | .586 | 1.600 | 1.289 | 1.000 | .002 |
| .625 | .304 | .831 | .661 | 1.625 | 1.268 | 1.000 | .003 | .625 | .338 | .876 | .537 | 1.625 | 1.314 | 1.000 | .002 |
| .650 | .325 | .847 | .614 | 1.650 | 1.293 | 1.000 | .003 | .650 | .361 | .889 | .492 | 1.650 | 1.339 | 1.000 | .001 |
| .675 | .346 | .861 | .569 | 1.675 | 1.318 | 1.000 | .002 | .675 | .383 | .900 | .449 | 1.675 | 1.364 | 1.000 | .001 |
| .700 | .368 | .875 | .526 | 1.700 | 1.343 | 1.000 | .002 | .700 | .406 | .911 | .409 | 1.700 | 1.389 | 1.000 | .001 |
| .725 | .390 | .888 | .484 | 1.725 | 1.368 | 1.000 | .001 | .725 | .428 | .921 | .372 | 1.725 | 1.414 | 1.000 | .001 |
| .750 | .412 | .899 | .445 | 1.750 | 1.393 | 1.000 | .001 | .750 | .452 | .930 | .337 | 1.750 | 1.439 | 1.000 | .001 |
| .775 | .435 | .910 | .407 | 1.775 | 1.418 | 1.000 | .001 | .775 | .475 | .938 | .305 | 1.775 | 1.464 | 1.000 | .000 |
| .800 | .458 | .920 | .372 | 1.800 | 1.443 | 1.000 | .001 | .800 | .498 | .945 | .275 | 1.800 | 1.489 | 1.000 | .000 |
| .825 | .481 | .929 | .338 | 1.825 | 1.468 | 1.000 | .001 | .825 | .522 | .952 | .247 | 1.825 | 1.514 | 1.000 | .000 |
| .850 | .504 | .937 | .307 | 1.850 | 1.493 | 1.000 | .000 | .850 | .546 | .957 | .222 | 1.850 | 1.539 | 1.000 | .000 |
| .875 | .528 | .944 | .278 | 1.875 | 1.518 | 1.000 | .000 | .875 | .570 | .963 | .198 | 1.875 | 1.564 | 1.000 | .000 |
| .900 | .551 | .951 | .251 | 1.900 | 1.543 | 1.000 | .000 | .900 | .594 | .967 | .177 | 1.900 | 1.589 | 1.000 | .000 |
| .925 | .575 | .957 | .225 | 1.925 | 1.568 | 1.000 | .000 | .925 | .618 | .972 | .157 | 1.925 | 1.614 | 1.000 | .000 |
| .950 | .599 | .962 | .202 | 1.950 | 1.593 | 1.000 | .000 | .950 | .643 | .975 | .139 | 1.950 | 1.639 | 1.000 | .000 |
| .975 | .623 | .967 | .180 | 1.975 | 1.618 | 1.000 | .000 | .975 | .667 | .979 | .123 | 1.975 | 1.664 | 1.000 | .000 |
| | | | | 2.000 | 1.643 | 1.000 | .000 | | | | | 2.000 | 1.689 | 1.000 | .000 |

TABLE I. - Continued. NUMERICAL SOLUTION TO CASE I ($U = ax^n$, $W = bx^m$)(47) $n = 10$ and $m = 6$ (48) $n = 10$ and $m = 8$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.963 | 1.000 | 0.727 | 0.988 | 0.072 | 0.000 | 0.000 | 0.000 | 3.388 | 1.000 | 0.756 | 0.993 | 0.046 |
| .025 | .001 | .072 | 2.813 | 1.025 | .752 | .990 | .063 | .025 | .001 | .082 | 3.188 | 1.025 | .781 | .994 | .039 |
| .050 | .004 | .141 | 2.664 | 1.050 | .776 | .992 | .054 | .050 | .004 | .159 | 2.991 | 1.050 | .805 | .995 | .034 |
| .075 | .008 | .205 | 2.518 | 1.075 | .801 | .993 | .047 | .075 | .009 | .232 | 2.796 | 1.075 | .830 | .996 | .029 |
| .100 | .014 | .267 | 2.374 | 1.100 | .826 | .994 | .041 | .100 | .016 | .299 | 2.607 | 1.100 | .855 | .997 | .024 |
| .125 | .021 | .324 | 2.233 | 1.125 | .851 | .995 | .035 | .125 | .024 | .362 | 2.424 | 1.125 | .880 | .997 | .021 |
| .150 | .030 | .378 | 2.096 | 1.150 | .876 | .996 | .030 | .150 | .034 | .421 | 2.247 | 1.150 | .905 | .998 | .018 |
| .175 | .040 | .429 | 1.964 | 1.175 | .901 | .996 | .026 | .175 | .045 | .475 | 2.078 | 1.175 | .930 | .998 | .015 |
| .200 | .051 | .476 | 1.836 | 1.200 | .926 | .997 | .022 | .200 | .057 | .525 | 1.917 | 1.200 | .955 | .998 | .013 |
| .225 | .064 | .521 | 1.713 | 1.225 | .950 | .997 | .019 | .225 | .071 | .571 | 1.764 | 1.225 | .980 | .999 | .011 |
| .250 | .077 | .562 | 1.596 | 1.250 | .975 | .998 | .016 | .250 | .086 | .613 | 1.620 | 1.250 | 1.005 | .999 | .009 |
| .275 | .092 | .601 | 1.483 | 1.275 | 1.000 | .998 | .013 | .275 | .102 | .652 | 1.484 | 1.275 | 1.030 | .999 | .007 |
| .300 | .107 | .636 | 1.376 | 1.300 | 1.025 | .999 | .011 | .300 | .118 | .687 | 1.356 | 1.300 | 1.055 | .999 | .006 |
| .325 | .124 | .669 | 1.274 | 1.325 | 1.050 | .999 | .009 | .325 | .136 | .719 | 1.237 | 1.325 | 1.080 | .999 | .005 |
| .350 | .141 | .700 | 1.178 | 1.350 | 1.075 | .999 | .008 | .350 | .154 | .749 | 1.126 | 1.350 | 1.105 | .999 | .004 |
| .375 | .159 | .728 | 1.086 | 1.375 | 1.100 | .999 | .007 | .375 | .173 | .776 | 1.022 | 1.375 | 1.130 | 1.000 | .003 |
| .400 | .177 | .754 | 1.000 | 1.400 | 1.125 | .999 | .005 | .400 | .193 | .800 | .926 | 1.400 | 1.155 | 1.000 | .003 |
| .425 | .196 | .778 | .919 | 1.425 | 1.150 | .999 | .005 | .425 | .213 | .822 | .838 | 1.425 | 1.180 | 1.000 | .002 |
| .450 | .216 | .800 | .843 | 1.450 | 1.175 | 1.000 | .004 | .450 | .234 | .842 | .756 | 1.450 | 1.205 | 1.000 | .002 |
| .475 | .236 | .821 | .772 | 1.475 | 1.200 | 1.000 | .003 | .475 | .256 | .860 | .681 | 1.475 | 1.230 | 1.000 | .002 |
| .500 | .257 | .839 | .705 | 1.500 | 1.225 | 1.000 | .003 | .500 | .277 | .876 | .612 | 1.500 | 1.255 | 1.000 | .001 |
| .525 | .278 | .856 | .643 | 1.525 | 1.250 | 1.000 | .002 | .525 | .299 | .891 | .549 | 1.525 | 1.280 | 1.000 | .001 |
| .550 | .300 | .871 | .585 | 1.550 | 1.275 | 1.000 | .002 | .550 | .322 | .904 | .491 | 1.550 | 1.305 | 1.000 | .001 |
| .575 | .322 | .885 | .533 | 1.575 | 1.300 | 1.000 | .001 | .575 | .344 | .915 | .439 | 1.575 | 1.330 | 1.000 | .001 |
| .600 | .344 | .898 | .481 | 1.600 | 1.325 | 1.000 | .001 | .600 | .368 | .926 | .391 | 1.600 | 1.355 | 1.000 | .001 |
| .625 | .367 | .909 | .435 | 1.625 | 1.350 | 1.000 | .001 | .625 | .391 | .935 | .348 | 1.625 | 1.380 | 1.000 | .000 |
| .650 | .390 | .920 | .392 | 1.650 | 1.375 | 1.000 | .001 | .650 | .414 | .943 | .309 | 1.650 | 1.405 | 1.000 | .000 |
| .675 | .413 | .929 | .353 | 1.675 | 1.400 | 1.000 | .001 | .675 | .438 | .950 | .273 | 1.675 | 1.430 | 1.000 | .000 |
| .700 | .436 | .937 | .317 | 1.700 | 1.425 | 1.000 | .000 | .700 | .462 | .957 | .242 | 1.700 | 1.455 | 1.000 | .000 |
| .725 | .460 | .945 | .284 | 1.725 | 1.450 | 1.000 | .000 | .725 | .486 | .962 | .213 | 1.725 | 1.480 | 1.000 | .000 |
| .750 | .483 | .952 | .254 | 1.750 | 1.475 | 1.000 | .000 | .750 | .510 | .967 | .188 | 1.750 | 1.505 | 1.000 | .000 |
| .775 | .507 | .958 | .226 | 1.775 | 1.500 | 1.000 | .000 | .775 | .534 | .972 | .165 | 1.775 | 1.530 | 1.000 | .000 |
| .800 | .531 | .963 | .201 | 1.800 | 1.525 | 1.000 | .000 | .800 | .558 | .976 | .144 | 1.800 | 1.555 | 1.000 | .000 |
| .825 | .555 | .968 | .179 | 1.825 | 1.550 | 1.000 | .000 | .825 | .583 | .979 | .126 | 1.825 | 1.580 | 1.000 | .000 |
| .850 | .580 | .972 | .158 | 1.850 | 1.575 | 1.000 | .000 | .850 | .607 | .982 | .110 | 1.850 | 1.605 | 1.000 | .000 |
| .875 | .604 | .976 | .140 | 1.875 | 1.600 | 1.000 | .000 | .875 | .632 | .985 | .096 | 1.875 | 1.630 | 1.000 | .000 |
| .900 | .628 | .979 | .123 | 1.900 | 1.625 | 1.000 | .000 | .900 | .657 | .987 | .083 | 1.900 | 1.655 | 1.000 | .000 |
| .925 | .653 | .982 | .108 | 1.925 | 1.650 | 1.000 | .000 | .925 | .681 | .989 | .072 | 1.925 | 1.680 | 1.000 | .000 |
| .950 | .677 | .984 | .095 | 1.950 | 1.675 | 1.000 | .000 | .950 | .706 | .990 | .062 | 1.950 | 1.705 | 1.000 | .000 |
| .975 | .702 | .986 | .083 | 1.975 | 1.700 | 1.000 | .000 | .975 | .731 | .992 | .053 | 1.975 | 1.730 | 1.000 | .000 |
| | | | | 2.000 | 1.725 | 1.000 | .000 | | | | | 2.000 | 1.755 | 1.000 | .000 |

TABLE I. - Concluded. NUMERICAL SOLUTION TO CASE I ($U = ax^n, W = bx^m$)
 (49) $n = 10$ and $m = 10$

| η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.785 | 1.000 | 0.780 | 0.996 | 0.027 |
| .025 | .001 | .092 | 3.536 | 1.025 | .805 | .997 | .022 |
| .050 | .005 | .177 | 3.289 | 1.050 | .830 | .998 | .019 |
| .075 | .010 | .256 | 3.048 | 1.075 | .855 | .998 | .016 |
| .100 | .017 | .329 | 2.814 | 1.100 | .880 | .998 | .013 |
| .125 | .026 | .397 | 2.589 | 1.125 | .905 | .999 | .011 |
| .150 | .037 | .459 | 2.374 | 1.150 | .930 | .999 | .009 |
| .175 | .049 | .516 | 2.170 | 1.175 | .955 | .999 | .007 |
| .200 | .063 | .567 | 1.978 | 1.200 | .980 | .999 | .006 |
| .225 | .078 | .615 | 1.797 | 1.225 | 1.005 | .999 | .005 |
| .250 | .093 | .657 | 1.629 | 1.250 | 1.030 | 1.000 | .004 |
| .275 | .110 | .696 | 1.472 | 1.275 | 1.055 | 1.000 | .003 |
| .300 | .128 | .731 | 1.326 | 1.300 | 1.080 | 1.000 | .003 |
| .325 | .147 | .763 | 1.192 | 1.325 | 1.105 | 1.000 | .002 |
| .350 | .166 | .791 | 1.068 | 1.350 | 1.130 | 1.000 | .002 |
| .375 | .186 | .816 | .955 | 1.375 | 1.155 | 1.000 | .001 |
| .400 | .207 | .839 | .852 | 1.400 | 1.180 | 1.000 | .001 |
| .425 | .228 | .859 | .758 | 1.425 | 1.205 | 1.000 | .001 |
| .450 | .250 | .877 | .673 | 1.450 | 1.230 | 1.000 | .001 |
| .475 | .272 | .892 | .596 | 1.475 | 1.255 | 1.000 | .001 |
| .500 | .295 | .906 | .527 | 1.500 | 1.280 | 1.000 | .000 |
| .525 | .317 | .919 | .464 | 1.525 | 1.305 | 1.000 | .000 |
| .550 | .341 | .930 | .408 | 1.550 | 1.330 | 1.000 | .000 |
| .575 | .364 | .939 | .358 | 1.575 | 1.355 | 1.000 | .000 |
| .600 | .388 | .948 | .313 | 1.600 | 1.380 | 1.000 | .000 |
| .625 | .411 | .955 | .273 | 1.625 | 1.405 | 1.000 | .000 |
| .650 | .435 | .961 | .238 | 1.650 | 1.430 | 1.000 | .000 |
| .675 | .459 | .967 | .207 | 1.675 | 1.455 | 1.000 | .000 |
| .700 | .484 | .972 | .179 | 1.700 | 1.480 | 1.000 | .000 |
| .725 | .508 | .976 | .155 | 1.725 | 1.505 | 1.000 | .000 |
| .750 | .532 | .980 | .134 | 1.750 | 1.530 | 1.000 | .000 |
| .775 | .557 | .983 | .115 | 1.775 | 1.555 | 1.000 | .000 |
| .800 | .582 | .985 | .099 | 1.800 | 1.580 | 1.000 | .000 |
| .825 | .606 | .988 | .085 | 1.825 | 1.605 | 1.000 | .000 |
| .850 | .631 | .990 | .072 | 1.850 | 1.630 | 1.000 | .000 |
| .875 | .656 | .991 | .062 | 1.875 | 1.655 | 1.000 | .000 |
| .900 | .680 | .993 | .052 | 1.900 | 1.680 | 1.000 | .000 |
| .925 | .705 | .994 | .044 | 1.925 | 1.705 | 1.000 | .000 |
| .950 | .730 | .995 | .038 | 1.950 | 1.730 | 1.000 | .000 |
| .975 | .755 | .996 | .032 | 1.975 | 1.755 | 1.000 | .000 |
| | | | | 2.000 | 1.780 | 1.000 | .000 |

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TABLE II. - NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}z^{m-1}$, $W = bx^{n-1}z^m$)

| (1) $p = 1$ and $m + n = 1$ | | | | | | | | (2) $p = 1$ and $m + n = 2$ | | | | | | | |
|-----------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|-----------------------------|-----------|------------|-------------|--------|-----------|------------|-------------|
| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
| 0.000 | 0.000 | 0.000 | 0.575 | 2.000 | 1.042 | 0.909 | 0.195 | 0.000 | 0.000 | 0.000 | 1.312 | 2.000 | 1.433 | 0.992 | 0.031 |
| .050 | .001 | .029 | .575 | 2.050 | 1.088 | .918 | .178 | .050 | .002 | .064 | 1.262 | 2.050 | 1.488 | .993 | .026 |
| .100 | .003 | .058 | .575 | 2.100 | 1.134 | .927 | .164 | .100 | .006 | .126 | 1.212 | 2.100 | 1.532 | .995 | .022 |
| .150 | .006 | .086 | .575 | 2.150 | 1.180 | .935 | .150 | .150 | .014 | .186 | 1.162 | 2.150 | 1.582 | .996 | .018 |
| .200 | .012 | .115 | .574 | 2.200 | 1.227 | .942 | .137 | .200 | .025 | .242 | 1.112 | 2.200 | 1.632 | .996 | .015 |
| .250 | .018 | .144 | .574 | 2.250 | 1.275 | .949 | .125 | .250 | .038 | .297 | 1.062 | 2.250 | 1.682 | .997 | .013 |
| .300 | .026 | .172 | .573 | 2.300 | 1.322 | .954 | .113 | .300 | .059 | .349 | 1.013 | 2.300 | 1.732 | .998 | .010 |
| .350 | .035 | .201 | .572 | 2.350 | 1.370 | .960 | .102 | .350 | .073 | .398 | .963 | 2.350 | 1.782 | .998 | .008 |
| .400 | .046 | .230 | .570 | 2.400 | 1.418 | .965 | .092 | .400 | .094 | .445 | .915 | 2.400 | 1.831 | .998 | .007 |
| .450 | .058 | .258 | .568 | 2.450 | 1.467 | .969 | .083 | .450 | .118 | .489 | .866 | 2.450 | 1.881 | .999 | .006 |
| .500 | .072 | .286 | .565 | 2.500 | 1.515 | .973 | .074 | .500 | .143 | .532 | .818 | 2.500 | 1.931 | .999 | .005 |
| .550 | .087 | .314 | .562 | 2.550 | 1.564 | .977 | .066 | .550 | .171 | .571 | .771 | 2.550 | 1.981 | .999 | .004 |
| .600 | .103 | .342 | .558 | 2.600 | 1.613 | .980 | .059 | .600 | .200 | .609 | .725 | 2.600 | 2.031 | .999 | .003 |
| .650 | .121 | .370 | .553 | 2.650 | 1.662 | .982 | .052 | .650 | .232 | .644 | .679 | 2.650 | 2.081 | 1.000 | .002 |
| .700 | .140 | .398 | .548 | 2.700 | 1.711 | .985 | .046 | .700 | .265 | .677 | .635 | 2.700 | 2.131 | 1.000 | .002 |
| .750 | .161 | .425 | .541 | 2.750 | 1.760 | .987 | .040 | .750 | .299 | .707 | .591 | 2.750 | 2.181 | 1.000 | .001 |
| .800 | .183 | .452 | .534 | 2.800 | 1.810 | .989 | .035 | .800 | .335 | .736 | .549 | 2.800 | 2.231 | 1.000 | .001 |
| .850 | .206 | .478 | .527 | 2.850 | 1.859 | .990 | .031 | .850 | .373 | .762 | .509 | 2.850 | 2.281 | 1.000 | .001 |
| .900 | .231 | .504 | .518 | 2.900 | 1.909 | .992 | .027 | .900 | .412 | .787 | .469 | 2.900 | 2.331 | 1.000 | .001 |
| .950 | .256 | .530 | .509 | 2.950 | 1.958 | .993 | .023 | .950 | .451 | .809 | .432 | 2.950 | 2.381 | 1.000 | .001 |
| 1.000 | .284 | .555 | .499 | 3.000 | 2.008 | .994 | .020 | 1.000 | .492 | .830 | .396 | 3.000 | 2.431 | 1.000 | .000 |
| 1.050 | .312 | .580 | .488 | 3.050 | 2.058 | .995 | .017 | 1.050 | .534 | .849 | .362 | 3.050 | 2.481 | 1.000 | .000 |
| 1.100 | .342 | .604 | .476 | 3.100 | 2.108 | .996 | .015 | 1.100 | .577 | .866 | .329 | 3.100 | 2.531 | 1.000 | .000 |
| 1.150 | .372 | .628 | .463 | 3.150 | 2.157 | .997 | .012 | 1.150 | .621 | .882 | .299 | 3.150 | 2.581 | 1.000 | .000 |
| 1.200 | .404 | .650 | .450 | 3.200 | 2.207 | .997 | .011 | 1.200 | .665 | .896 | .270 | 3.200 | 2.631 | 1.000 | .000 |
| 1.250 | .437 | .673 | .436 | 3.250 | 2.257 | .998 | .009 | 1.250 | .711 | .909 | .243 | 3.250 | 2.681 | 1.000 | .000 |
| 1.300 | .472 | .694 | .421 | 3.300 | 2.307 | .998 | .007 | 1.300 | .756 | .920 | .218 | 3.300 | 2.731 | 1.000 | .000 |
| 1.350 | .507 | .715 | .406 | 3.350 | 2.357 | .998 | .006 | 1.350 | .803 | .931 | .195 | 3.350 | 2.781 | 1.000 | .000 |
| 1.400 | .543 | .735 | .391 | 3.400 | 2.407 | .999 | .005 | 1.400 | .849 | .940 | .173 | 3.400 | 2.831 | 1.000 | .000 |
| 1.450 | .580 | .754 | .374 | 3.450 | 2.457 | .999 | .004 | 1.450 | .897 | .948 | .154 | 3.450 | 2.881 | 1.000 | .000 |
| 1.500 | .618 | .772 | .358 | 3.500 | 2.507 | .999 | .004 | 1.500 | .944 | .955 | .136 | 3.500 | 2.931 | 1.000 | .000 |
| 1.550 | .657 | .790 | .341 | 3.550 | 2.557 | .999 | .003 | 1.550 | .992 | .962 | .119 | 3.550 | 2.981 | 1.000 | .000 |
| 1.600 | .697 | .806 | .324 | 3.600 | 2.607 | .999 | .002 | 1.600 | 1.040 | .967 | .104 | 3.600 | 3.031 | 1.000 | .000 |
| 1.650 | .738 | .822 | .307 | 3.650 | 2.657 | 1.000 | .002 | 1.650 | 1.089 | .972 | .091 | 3.650 | 3.081 | 1.000 | .000 |
| 1.700 | .779 | .837 | .290 | 3.700 | 2.707 | 1.000 | .002 | 1.700 | 1.137 | .976 | .079 | 3.700 | 3.131 | 1.000 | .000 |
| 1.750 | .822 | .851 | .273 | 3.750 | 2.757 | 1.000 | .001 | 1.750 | 1.186 | .980 | .068 | 3.750 | 3.181 | 1.000 | .000 |
| 1.800 | .865 | .864 | .257 | 3.800 | 2.807 | 1.000 | .001 | 1.800 | 1.235 | .983 | .059 | 3.800 | 3.231 | 1.000 | .000 |
| 1.850 | .908 | .877 | .240 | 3.850 | 2.857 | 1.000 | .001 | 1.850 | 1.285 | .986 | .050 | 3.850 | 3.281 | 1.000 | .000 |
| 1.900 | .952 | .888 | .224 | 3.900 | 2.907 | 1.000 | .001 | 1.900 | 1.334 | .988 | .043 | 3.900 | 3.331 | 1.000 | .000 |
| 1.950 | .997 | .899 | .208 | 3.950 | 2.957 | 1.000 | .001 | 1.950 | 1.383 | .990 | .037 | 3.950 | 3.381 | 1.000 | .000 |
| | | | | 4.000 | 3.007 | 1.000 | .000 | | | | | 4.000 | 3.431 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n_2}z^{m-1}$, $W = bx^{n-1}z^m$)(3) $p = 1$ and $m + n = 3$ (4) $p = 1$ and $m + n = 4$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.771 | 2.000 | 1.358 | 0.999 | 0.007 | 0.000 | 0.000 | 0.000 | 2.135 | 1.500 | 1.127 | 0.995 | 0.027 |
| .050 | .002 | .086 | 1.671 | 2.050 | 1.608 | .999 | .006 | .050 | .003 | .103 | 1.985 | 1.550 | 1.177 | .996 | .022 |
| .100 | .009 | .167 | 1.572 | 2.100 | 1.658 | .999 | .005 | .100 | .010 | .199 | 1.837 | 1.600 | 1.227 | .997 | .017 |
| .150 | .019 | .243 | 1.474 | 2.150 | 1.708 | .999 | .004 | .150 | .022 | .287 | 1.692 | 1.650 | 1.276 | .998 | .013 |
| .200 | .033 | .315 | 1.377 | 2.200 | 1.758 | .999 | .003 | .200 | .039 | .368 | 1.551 | 1.700 | 1.326 | .998 | .010 |
| .250 | .050 | .381 | 1.282 | 2.250 | 1.808 | 1.000 | .002 | .250 | .059 | .442 | 1.415 | 1.750 | 1.376 | .999 | .008 |
| .300 | .071 | .443 | 1.190 | 2.300 | 1.858 | 1.000 | .002 | .300 | .083 | .509 | 1.284 | 1.800 | 1.426 | .999 | .006 |
| .350 | .094 | .500 | 1.101 | 2.350 | 1.908 | 1.000 | .001 | .350 | .110 | .570 | 1.161 | 1.850 | 1.476 | .999 | .005 |
| .400 | .121 | .553 | 1.014 | 2.400 | 1.958 | 1.000 | .001 | .400 | .140 | .626 | 1.044 | 1.900 | 1.526 | .999 | .004 |
| .450 | .150 | .602 | .931 | 2.450 | 2.008 | 1.000 | .001 | .450 | .172 | .675 | .934 | 1.950 | 1.576 | 1.000 | .003 |
| .500 | .181 | .646 | .852 | 2.500 | 2.058 | 1.000 | .001 | .500 | .207 | .719 | .832 | 2.000 | 1.626 | 1.000 | .002 |
| .550 | .214 | .687 | .776 | 2.550 | 2.108 | 1.000 | .000 | .550 | .244 | .758 | .738 | 2.050 | 1.676 | 1.000 | .002 |
| .600 | .249 | .724 | .705 | 2.600 | 2.158 | 1.000 | .000 | .600 | .283 | .793 | .651 | 2.100 | 1.726 | 1.000 | .001 |
| .650 | .286 | .757 | .637 | 2.650 | 2.208 | 1.000 | .000 | .650 | .323 | .824 | .571 | 2.150 | 1.776 | 1.000 | .001 |
| .700 | .325 | .788 | .574 | 2.700 | 2.258 | 1.000 | .000 | .700 | .365 | .850 | .499 | 2.200 | 1.826 | 1.000 | .001 |
| .750 | .365 | .815 | .515 | 2.750 | 2.308 | 1.000 | .000 | .750 | .408 | .874 | .433 | 2.250 | 1.876 | 1.000 | .000 |
| .800 | .407 | .839 | .460 | 2.800 | 2.358 | 1.000 | .000 | .800 | .453 | .894 | .375 | 2.300 | 1.926 | 1.000 | .000 |
| .850 | .449 | .861 | .409 | 2.850 | 2.408 | 1.000 | .000 | .850 | .498 | .911 | .322 | 2.350 | 1.976 | 1.000 | .000 |
| .900 | .493 | .880 | .362 | 2.900 | 2.458 | 1.000 | .000 | .900 | .544 | .926 | .275 | 2.400 | 2.026 | 1.000 | .000 |
| .950 | .537 | .897 | .319 | 2.950 | 2.508 | 1.000 | .000 | .950 | .590 | .939 | .234 | 2.450 | 2.076 | 1.000 | .000 |
| 1.000 | .582 | .912 | .280 | 3.000 | 2.558 | 1.000 | .000 | 1.000 | .637 | .950 | .198 | 2.500 | 2.126 | 1.000 | .000 |
| 1.050 | .628 | .925 | .245 | 3.050 | 2.608 | 1.000 | .000 | 1.050 | .685 | .959 | .167 | 2.550 | 2.176 | 1.000 | .000 |
| 1.100 | .675 | .937 | .213 | 3.100 | 2.658 | 1.000 | .000 | 1.100 | .733 | .966 | .139 | 2.600 | 2.226 | 1.000 | .000 |
| 1.150 | .722 | .947 | .184 | 3.150 | 2.708 | 1.000 | .000 | 1.150 | .782 | .973 | .116 | 2.650 | 2.276 | 1.000 | .000 |
| 1.200 | .769 | .955 | .159 | 3.200 | 2.758 | 1.000 | .000 | 1.200 | .831 | .978 | .096 | 2.700 | 2.326 | 1.000 | .000 |
| 1.250 | .817 | .962 | .136 | 3.250 | 2.808 | 1.000 | .000 | 1.250 | .880 | .982 | .079 | 2.750 | 2.376 | 1.000 | .000 |
| 1.300 | .866 | .969 | .116 | 3.300 | 2.858 | 1.000 | .000 | 1.300 | .929 | .986 | .065 | 2.800 | 2.426 | 1.000 | .000 |
| 1.350 | .914 | .974 | .099 | 3.350 | 2.908 | 1.000 | .000 | 1.350 | .978 | .989 | .052 | 2.850 | 2.476 | 1.000 | .000 |
| 1.400 | .963 | .979 | .083 | 3.400 | 2.958 | 1.000 | .000 | 1.400 | 1.028 | .991 | .042 | 2.900 | 2.526 | 1.000 | .000 |
| 1.450 | 1.012 | .982 | .070 | 3.450 | 3.008 | 1.000 | .000 | 1.450 | 1.077 | .993 | .034 | 2.950 | 2.576 | 1.000 | .000 |
| 1.500 | 1.061 | .986 | .059 | 3.500 | 3.058 | 1.000 | .000 | | | | | 3.000 | 2.626 | 1.000 | .000 |
| 1.550 | 1.111 | .988 | .049 | 3.550 | 3.108 | 1.000 | .000 | | | | | | | | |
| 1.600 | 1.160 | .991 | .040 | 3.600 | 3.158 | 1.000 | .000 | | | | | | | | |
| 1.650 | 1.210 | .992 | .033 | 3.650 | 3.208 | 1.000 | .000 | | | | | | | | |
| 1.700 | 1.259 | .994 | .027 | 3.700 | 3.258 | 1.000 | .000 | | | | | | | | |
| 1.750 | 1.309 | .995 | .022 | 3.750 | 3.308 | 1.000 | .000 | | | | | | | | |
| 1.800 | 1.359 | .996 | .018 | 3.800 | 3.358 | 1.000 | .000 | | | | | | | | |
| 1.850 | 1.409 | .997 | .014 | 3.850 | 3.408 | 1.000 | .000 | | | | | | | | |
| 1.900 | 1.459 | .998 | .012 | 3.900 | 3.458 | 1.000 | .000 | | | | | | | | |
| 1.950 | 1.508 | .998 | .009 | 3.950 | 3.508 | 1.000 | .000 | | | | | | | | |
| | | | | 4.000 | 3.558 | 1.000 | .000 | | | | | | | | |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}$, $W = bx^{n-1}z^m$)(5) $p = 1$ and $m + n = 5$ (6) $p = 1$ and $m + n = 6$

| η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ | η | $Q(\eta)$ | $Q'(\eta)$ | $Q''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.445 | 1.500 | 1.170 | 0.998 | 0.013 | 0.000 | 0.000 | 0.000 | 2.721 | 1.500 | 1.201 | 0.999 | 0.007 |
| .050 | .003 | .117 | 2.246 | 1.550 | 1.220 | .998 | .010 | .050 | .003 | .130 | 2.471 | 1.550 | 1.251 | .999 | .005 |
| .100 | .012 | .225 | 2.049 | 1.600 | 1.270 | .999 | .008 | .100 | .013 | .247 | 2.227 | 1.600 | 1.301 | 1.000 | .003 |
| .150 | .025 | .322 | 1.858 | 1.650 | 1.320 | .999 | .006 | .150 | .028 | .353 | 1.992 | 1.650 | 1.351 | 1.000 | .002 |
| .200 | .044 | .411 | 1.675 | 1.700 | 1.370 | .999 | .004 | .200 | .048 | .447 | 1.768 | 1.700 | 1.401 | 1.000 | .002 |
| .250 | .066 | .490 | 1.501 | 1.750 | 1.420 | 1.000 | .003 | .250 | .072 | .530 | 1.558 | 1.750 | 1.451 | 1.000 | .001 |
| .300 | .092 | .561 | 1.337 | 1.800 | 1.470 | 1.000 | .002 | .300 | .101 | .603 | 1.364 | 1.800 | 1.501 | 1.000 | .001 |
| .350 | .122 | .624 | 1.184 | 1.850 | 1.520 | 1.000 | .002 | .350 | .132 | .666 | 1.185 | 1.850 | 1.551 | 1.000 | .001 |
| .400 | .155 | .679 | 1.042 | 1.900 | 1.570 | 1.000 | .001 | .400 | .167 | .721 | 1.023 | 1.900 | 1.601 | 1.000 | .000 |
| .450 | .190 | .728 | .912 | 1.950 | 1.620 | 1.000 | .001 | .450 | .204 | .769 | .877 | 1.950 | 1.651 | 1.000 | .000 |
| .500 | .227 | .771 | .793 | 2.000 | 1.670 | 1.000 | .001 | .500 | .244 | .809 | .747 | 2.000 | 1.701 | 1.000 | .000 |
| .550 | .267 | .808 | .686 | 2.050 | 1.720 | 1.000 | .000 | .550 | .285 | .844 | .631 | 2.050 | 1.751 | 1.000 | .000 |
| .600 | .308 | .840 | .590 | 2.100 | 1.770 | 1.000 | .000 | .600 | .328 | .873 | .530 | 2.100 | 1.801 | 1.000 | .000 |
| .650 | .351 | .867 | .504 | 2.150 | 1.820 | 1.000 | .000 | .650 | .372 | .897 | .442 | 2.150 | 1.851 | 1.000 | .000 |
| .700 | .395 | .890 | .428 | 2.200 | 1.870 | 1.000 | .000 | .700 | .418 | .917 | .366 | 2.200 | 1.901 | 1.000 | .000 |
| .750 | .440 | .910 | .362 | 2.250 | 1.920 | 1.000 | .000 | .750 | .464 | .934 | .301 | 2.250 | 1.951 | 1.000 | .000 |
| .800 | .486 | .926 | .304 | 2.300 | 1.970 | 1.000 | .000 | .800 | .511 | .948 | .246 | 2.300 | 2.001 | 1.000 | .000 |
| .850 | .532 | .940 | .253 | 2.350 | 2.020 | 1.000 | .000 | .850 | .559 | .959 | .200 | 2.350 | 2.051 | 1.000 | .000 |
| .900 | .580 | .952 | .210 | 2.400 | 2.070 | 1.000 | .000 | .900 | .607 | .968 | .161 | 2.400 | 2.101 | 1.000 | .000 |
| .950 | .628 | .961 | .173 | 2.450 | 2.120 | 1.000 | .000 | .950 | .656 | .975 | .128 | 2.450 | 2.151 | 1.000 | .000 |
| 1.000 | .676 | .969 | .141 | 2.500 | 2.170 | 1.000 | .000 | 1.000 | .704 | .981 | .102 | 2.500 | 2.201 | 1.000 | .000 |
| 1.050 | .724 | .976 | .115 | 2.550 | 2.220 | 1.000 | .000 | 1.050 | .754 | .985 | .080 | 2.550 | 2.251 | 1.000 | .000 |
| 1.100 | .773 | .981 | .093 | 2.600 | 2.270 | 1.000 | .000 | 1.100 | .803 | .989 | .063 | 2.600 | 2.301 | 1.000 | .000 |
| 1.150 | .823 | .985 | .075 | 2.650 | 2.320 | 1.000 | .000 | 1.150 | .852 | .991 | .049 | 2.650 | 2.351 | 1.000 | .000 |
| 1.200 | .872 | .988 | .059 | 2.700 | 2.370 | 1.000 | .000 | 1.200 | .902 | .994 | .037 | 2.700 | 2.401 | 1.000 | .000 |
| 1.250 | .921 | .991 | .047 | 2.750 | 2.420 | 1.000 | .000 | 1.250 | .952 | .995 | .029 | 2.750 | 2.451 | 1.000 | .000 |
| 1.300 | .971 | .993 | .037 | 2.800 | 2.470 | 1.000 | .000 | 1.300 | 1.002 | .996 | .022 | 2.800 | 2.501 | 1.000 | .000 |
| 1.350 | 1.021 | .995 | .029 | 2.850 | 2.520 | 1.000 | .000 | 1.350 | 1.051 | .997 | .016 | 2.850 | 2.551 | 1.000 | .000 |
| 1.400 | 1.070 | .996 | .022 | 2.900 | 2.570 | 1.000 | .000 | 1.400 | 1.101 | .998 | .012 | 2.900 | 2.601 | 1.000 | .000 |
| 1.450 | 1.120 | .997 | .017 | 2.950 | 2.620 | 1.000 | .000 | 1.450 | 1.151 | .999 | .009 | 2.950 | 2.651 | 1.000 | .000 |
| | | | | 3.000 | 2.670 | 1.000 | .000 | | | | | 3.000 | 2.701 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)(7) $p = 1$ and $m + n = 8$ (8) $p = 1$ and $m + n = 10$

| η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ | η | $g(\eta)$ | $g'(\eta)$ | $g''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.201 | 1.500 | 1.244 | 1.000 | 0.002 | 0.000 | 0.000 | 0.000 | 3.618 | 1.500 | 1.272 | 1.000 | 0.000 |
| .050 | .004 | .151 | 2.853 | 1.550 | 1.294 | 1.000 | .001 | .050 | .004 | .170 | 3.171 | 1.550 | 1.322 | 1.000 | .000 |
| .100 | .015 | .285 | 2.515 | 1.600 | 1.344 | 1.000 | .001 | .100 | .017 | .317 | 2.741 | 1.600 | 1.372 | 1.000 | .000 |
| .150 | .032 | .403 | 2.193 | 1.650 | 1.394 | 1.000 | .001 | .150 | .036 | .444 | 2.338 | 1.650 | 1.422 | 1.000 | .000 |
| .200 | .055 | .505 | 1.894 | 1.700 | 1.444 | 1.000 | .000 | .200 | .061 | .552 | 1.970 | 1.700 | 1.472 | 1.000 | .000 |
| .250 | .082 | .593 | 1.621 | 1.750 | 1.494 | 1.000 | .000 | .250 | .091 | .642 | 1.641 | 1.750 | 1.522 | 1.000 | .000 |
| .300 | .114 | .668 | 1.374 | 1.800 | 1.544 | 1.000 | .000 | .300 | .125 | .717 | 1.352 | 1.800 | 1.572 | 1.000 | .000 |
| .350 | .149 | .731 | 1.154 | 1.850 | 1.594 | 1.000 | .000 | .350 | .162 | .778 | 1.101 | 1.850 | 1.622 | 1.000 | .000 |
| .400 | .187 | .784 | .961 | 1.900 | 1.644 | 1.000 | .000 | .400 | .202 | .827 | .888 | 1.900 | 1.672 | 1.000 | .000 |
| .450 | .227 | .827 | .794 | 1.950 | 1.694 | 1.000 | .000 | .450 | .245 | .867 | .709 | 1.950 | 1.722 | 1.000 | .000 |
| .500 | .269 | .863 | .650 | 2.000 | 1.744 | 1.000 | .000 | .500 | .289 | .899 | .560 | 2.000 | 1.772 | 1.000 | .000 |
| .550 | .313 | .893 | .527 | 2.050 | 1.794 | 1.000 | .000 | .550 | .334 | .923 | .437 | 2.050 | 1.822 | 1.000 | .000 |
| .600 | .359 | .916 | .424 | 2.100 | 1.844 | 1.000 | .000 | .600 | .381 | .943 | .338 | 2.100 | 1.872 | 1.000 | .000 |
| .650 | .405 | .935 | .338 | 2.150 | 1.894 | 1.000 | .000 | .650 | .429 | .958 | .259 | 2.150 | 1.922 | 1.000 | .000 |
| .700 | .452 | .950 | .268 | 2.200 | 1.944 | 1.000 | .000 | .700 | .477 | .969 | .196 | 2.200 | 1.972 | 1.000 | .000 |
| .750 | .500 | .962 | .210 | 2.250 | 1.994 | 1.000 | .000 | .750 | .525 | .977 | .147 | 2.250 | 2.022 | 1.000 | .000 |
| .800 | .548 | .972 | .163 | 2.300 | 2.044 | 1.000 | .000 | .800 | .574 | .984 | .109 | 2.300 | 2.072 | 1.000 | .000 |
| .850 | .597 | .979 | .125 | 2.350 | 2.094 | 1.000 | .000 | .850 | .624 | .988 | .080 | 2.350 | 2.122 | 1.000 | .000 |
| .900 | .646 | .984 | .096 | 2.400 | 2.144 | 1.000 | .000 | .900 | .673 | .992 | .058 | 2.400 | 2.172 | 1.000 | .000 |
| .950 | .696 | .988 | .072 | 2.450 | 2.194 | 1.000 | .000 | .950 | .723 | .994 | .041 | 2.450 | 2.222 | 1.000 | .000 |
| 1.000 | .745 | .992 | .054 | 2.500 | 2.244 | 1.000 | .000 | 1.000 | .773 | .996 | .029 | 2.500 | 2.272 | 1.000 | .000 |
| 1.050 | .795 | .994 | .040 | 2.550 | 2.294 | 1.000 | .000 | 1.050 | .823 | .997 | .021 | 2.550 | 2.322 | 1.000 | .000 |
| 1.100 | .844 | .996 | .029 | 2.600 | 2.344 | 1.000 | .000 | 1.100 | .872 | .998 | .014 | 2.600 | 2.372 | 1.000 | .000 |
| 1.150 | .894 | .997 | .021 | 2.650 | 2.394 | 1.000 | .000 | 1.150 | .922 | .999 | .010 | 2.650 | 2.422 | 1.000 | .000 |
| 1.200 | .944 | .998 | .015 | 2.700 | 2.444 | 1.000 | .000 | 1.200 | .972 | .999 | .007 | 2.700 | 2.472 | 1.000 | .000 |
| 1.250 | .994 | .999 | .011 | 2.750 | 2.494 | 1.000 | .000 | 1.250 | 1.022 | .999 | .004 | 2.750 | 2.522 | 1.000 | .000 |
| 1.300 | 1.044 | .999 | .008 | 2.800 | 2.544 | 1.000 | .000 | 1.300 | 1.072 | 1.000 | .003 | 2.800 | 2.572 | 1.000 | .000 |
| 1.350 | 1.094 | .999 | .005 | 2.850 | 2.594 | 1.000 | .000 | 1.350 | 1.122 | 1.000 | .002 | 2.850 | 2.622 | 1.000 | .000 |
| 1.400 | 1.144 | 1.000 | .004 | 2.900 | 2.644 | 1.000 | .000 | 1.400 | 1.172 | 1.000 | .001 | 2.900 | 2.672 | 1.000 | .000 |
| 1.450 | 1.194 | 1.000 | .003 | 2.950 | 2.694 | 1.000 | .000 | 1.450 | 1.222 | 1.000 | .001 | 2.950 | 2.722 | 1.000 | .000 |
| | | | | 3.000 | 2.744 | 1.000 | .000 | | | | | 3.000 | 2.772 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^p z^{m-1}$, $W = bx^{n-1} z^m$)(9) $p = 2$, $n = 0$, and $m = 1$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 0.815 | 2.000 | 1.294 | 0.987 | 0.059 | 0.000 | 0.000 | 0.000 | 1.306 | 2.000 | 1.434 | 0.994 | 0.027 |
| .050 | .001 | .041 | .815 | 2.050 | 1.343 | .989 | .044 | .050 | .002 | .064 | 1.256 | 2.050 | 1.484 | .995 | .023 |
| .100 | .004 | .082 | .815 | 2.100 | 1.393 | .991 | .037 | .100 | .006 | .126 | 1.206 | 2.100 | 1.534 | .996 | .019 |
| .150 | .009 | .122 | .814 | 2.150 | 1.442 | .993 | .030 | .150 | .014 | .185 | 1.157 | 2.150 | 1.584 | .997 | .015 |
| .200 | .016 | .163 | .812 | 2.200 | 1.492 | .994 | .025 | .200 | .025 | .241 | 1.107 | 2.200 | 1.634 | .997 | .012 |
| .250 | .025 | .203 | .809 | 2.250 | 1.542 | .996 | .020 | .250 | .038 | .295 | 1.058 | 2.250 | 1.683 | .998 | .010 |
| .300 | .037 | .244 | .805 | 2.300 | 1.592 | .997 | .017 | .300 | .054 | .347 | 1.009 | 2.300 | 1.733 | .998 | .008 |
| .350 | .050 | .284 | .799 | 2.350 | 1.641 | .997 | .013 | .350 | .073 | .396 | .961 | 2.350 | 1.783 | .999 | .006 |
| .400 | .065 | .324 | .791 | 2.400 | 1.691 | .998 | .011 | .400 | .094 | .443 | .913 | 2.400 | 1.833 | .999 | .005 |
| .450 | .082 | .363 | .781 | 2.450 | 1.741 | .998 | .008 | .450 | .117 | .488 | .866 | 2.450 | 1.883 | .999 | .004 |
| .500 | .101 | .402 | .770 | 2.500 | 1.791 | .999 | .007 | .500 | .143 | .530 | .819 | 2.500 | 1.933 | .999 | .003 |
| .550 | .122 | .440 | .756 | 2.550 | 1.841 | .999 | .005 | .550 | .170 | .570 | .773 | 2.550 | 1.983 | 1.000 | .002 |
| .600 | .145 | .477 | .739 | 2.600 | 1.891 | .999 | .004 | .600 | .200 | .607 | .728 | 2.600 | 2.033 | 1.000 | .002 |
| .650 | .170 | .514 | .721 | 2.650 | 1.941 | .999 | .003 | .650 | .231 | .642 | .683 | 2.650 | 2.083 | 1.000 | .001 |
| .700 | .197 | .549 | .700 | 2.700 | 1.991 | 1.000 | .002 | .700 | .264 | .675 | .640 | 2.700 | 2.133 | 1.000 | .001 |
| .750 | .225 | .584 | .677 | 2.750 | 2.041 | 1.000 | .002 | .750 | .298 | .706 | .598 | 2.750 | 2.183 | 1.000 | .001 |
| .800 | .255 | .617 | .652 | 2.800 | 2.091 | 1.000 | .001 | .800 | .334 | .735 | .556 | 2.800 | 2.233 | 1.000 | .001 |
| .850 | .287 | .649 | .625 | 2.850 | 2.141 | 1.000 | .001 | .850 | .372 | .762 | .516 | 2.850 | 2.283 | 1.000 | .000 |
| .900 | .320 | .679 | .597 | 2.900 | 2.191 | 1.000 | .001 | .900 | .410 | .787 | .477 | 2.900 | 2.333 | 1.000 | .000 |
| .950 | .355 | .709 | .567 | 2.950 | 2.241 | 1.000 | .001 | .950 | .450 | .810 | .440 | 2.950 | 2.383 | 1.000 | .000 |
| 1.000 | .391 | .736 | .536 | 3.000 | 2.291 | 1.000 | .000 | 1.000 | .491 | .831 | .404 | 3.000 | 2.433 | 1.000 | .000 |
| 1.050 | .428 | .762 | .504 | 3.050 | 2.341 | 1.000 | .000 | 1.050 | .533 | .850 | .369 | 3.050 | 2.483 | 1.000 | .000 |
| 1.100 | .467 | .786 | .471 | 3.100 | 2.391 | 1.000 | .000 | 1.100 | .576 | .868 | .336 | 3.100 | 2.533 | 1.000 | .000 |
| 1.150 | .507 | .809 | .438 | 3.150 | 2.441 | 1.000 | .000 | 1.150 | .620 | .884 | .305 | 3.150 | 2.583 | 1.000 | .000 |
| 1.200 | .548 | .830 | .406 | 3.200 | 2.491 | 1.000 | .000 | 1.200 | .665 | .898 | .275 | 3.200 | 2.633 | 1.000 | .000 |
| 1.250 | .590 | .850 | .373 | 3.250 | 2.541 | 1.000 | .000 | 1.250 | .710 | .911 | .247 | 3.250 | 2.683 | 1.000 | .000 |
| 1.300 | .633 | .868 | .342 | 3.300 | 2.591 | 1.000 | .000 | 1.300 | .756 | .923 | .221 | 3.300 | 2.733 | 1.000 | .000 |
| 1.350 | .677 | .884 | .311 | 3.350 | 2.641 | 1.000 | .000 | 1.350 | .802 | .933 | .197 | 3.350 | 2.783 | 1.000 | .000 |
| 1.400 | .721 | .899 | .281 | 3.400 | 2.691 | 1.000 | .000 | 1.400 | .849 | .943 | .175 | 3.400 | 2.833 | 1.000 | .000 |
| 1.450 | .766 | .912 | .253 | 3.450 | 2.741 | 1.000 | .000 | 1.450 | .897 | .951 | .154 | 3.450 | 2.883 | 1.000 | .000 |
| 1.500 | .812 | .924 | .226 | 3.500 | 2.791 | 1.000 | .000 | 1.500 | .944 | .958 | .135 | 3.500 | 2.933 | 1.000 | .000 |
| 1.550 | .859 | .935 | .201 | 3.550 | 2.841 | 1.000 | .000 | 1.550 | .992 | .965 | .118 | 3.550 | 2.983 | 1.000 | .000 |
| 1.600 | .906 | .944 | .178 | 3.600 | 2.891 | 1.000 | .000 | 1.600 | 1.041 | .970 | .103 | 3.600 | 3.033 | 1.000 | .000 |
| 1.650 | .953 | .953 | .156 | 3.650 | 2.941 | 1.000 | .000 | 1.650 | 1.089 | .975 | .089 | 3.650 | 3.083 | 1.000 | .000 |
| 1.700 | 1.001 | .960 | .136 | 3.700 | 2.991 | 1.000 | .000 | 1.700 | 1.138 | .979 | .076 | 3.700 | 3.133 | 1.000 | .000 |
| 1.750 | 1.049 | .966 | .118 | 3.750 | 3.041 | 1.000 | .000 | 1.750 | 1.187 | .982 | .065 | 3.750 | 3.183 | 1.000 | .000 |
| 1.800 | 1.098 | .972 | .102 | 3.800 | 3.091 | 1.000 | .000 | 1.800 | 1.236 | .986 | .055 | 3.800 | 3.233 | 1.000 | .000 |
| 1.850 | 1.146 | .977 | .087 | 3.850 | 3.141 | 1.000 | .000 | 1.850 | 1.286 | .988 | .047 | 3.850 | 3.283 | 1.000 | .000 |
| 1.900 | 1.195 | .981 | .075 | 3.900 | 3.191 | 1.000 | .000 | 1.900 | 1.335 | .990 | .039 | 3.900 | 3.333 | 1.000 | .000 |
| 1.950 | 1.244 | .984 | .063 | 3.950 | 3.241 | 1.000 | .000 | 1.950 | 1.385 | .992 | .033 | 3.950 | 3.383 | 1.000 | .000 |
| | | | | 4.000 | 3.291 | 1.000 | .000 | | | | | 4.000 | 3.433 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)(10) $p = 2$, $n = 0$, and $m = 3$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.473 | 1.500 | 1.179 | 0.999 | 0.009 | 0.000 | 0.000 | 0.000 | 2.732 | 1.500 | 1.204 | 0.999 | 0.005 |
| 0.050 | .003 | .119 | 2.273 | 1.550 | 1.229 | .999 | .006 | 0.050 | .003 | .190 | 2.483 | 1.550 | 1.254 | .999 | .004 |
| 0.100 | .012 | .227 | 2.077 | 1.600 | 1.279 | .999 | .004 | 0.100 | .013 | .248 | 2.238 | 1.600 | 1.304 | 1.000 | .003 |
| 0.150 | .026 | .326 | 1.885 | 1.650 | 1.329 | 1.000 | .003 | 0.150 | .028 | .354 | 2.002 | 1.650 | 1.354 | 1.000 | .002 |
| 0.200 | .044 | .416 | 1.700 | 1.700 | 1.379 | 1.000 | .002 | 0.200 | .048 | .449 | 1.778 | 1.700 | 1.404 | 1.000 | .001 |
| 0.250 | .067 | .497 | 1.524 | 1.750 | 1.429 | 1.000 | .002 | 0.250 | .073 | .532 | 1.567 | 1.750 | 1.454 | 1.000 | .001 |
| 0.300 | .094 | .569 | 1.357 | 1.800 | 1.479 | 1.000 | .001 | 0.300 | .101 | .606 | 1.371 | 1.800 | 1.504 | 1.000 | .001 |
| 0.350 | .124 | .632 | 1.200 | 1.850 | 1.529 | 1.000 | .001 | 0.350 | .133 | .670 | 1.191 | 1.850 | 1.554 | 1.000 | .000 |
| 0.400 | .157 | .689 | 1.055 | 1.900 | 1.579 | 1.000 | .000 | 0.400 | .168 | .725 | 1.027 | 1.900 | 1.604 | 1.000 | .000 |
| 0.450 | .193 | .738 | .921 | 1.950 | 1.629 | 1.000 | .000 | 0.450 | .205 | .773 | .879 | 1.950 | 1.654 | 1.000 | .000 |
| 0.500 | .231 | .781 | .799 | 2.000 | 1.679 | 1.000 | .000 | 0.500 | .245 | .813 | .747 | 2.000 | 1.704 | 1.000 | .000 |
| 0.550 | .271 | .818 | .688 | 2.050 | 1.729 | 1.000 | .000 | 0.550 | .287 | .848 | .631 | 2.050 | 1.754 | 1.000 | .000 |
| 0.600 | .312 | .850 | .588 | 2.100 | 1.779 | 1.000 | .000 | 0.600 | .330 | .877 | .528 | 2.100 | 1.804 | 1.000 | .000 |
| 0.650 | .355 | .877 | .499 | 2.150 | 1.829 | 1.000 | .000 | 0.650 | .374 | .901 | .439 | 2.150 | 1.854 | 1.000 | .000 |
| 0.700 | .400 | .900 | .420 | 2.200 | 1.879 | 1.000 | .000 | 0.700 | .420 | .921 | .362 | 2.200 | 1.904 | 1.000 | .000 |
| 0.750 | .445 | .919 | .351 | 2.250 | 1.929 | 1.000 | .000 | 0.750 | .466 | .937 | .296 | 2.250 | 1.954 | 1.000 | .000 |
| 0.800 | .492 | .935 | .291 | 2.300 | 1.979 | 1.000 | .000 | 0.800 | .513 | .951 | .241 | 2.300 | 2.004 | 1.000 | .000 |
| 0.850 | .539 | .949 | .239 | 2.350 | 2.029 | 1.000 | .000 | 0.850 | .561 | .961 | .194 | 2.350 | 2.054 | 1.000 | .000 |
| 0.900 | .587 | .959 | .195 | 2.400 | 2.079 | 1.000 | .000 | 0.900 | .610 | .970 | .155 | 2.400 | 2.104 | 1.000 | .000 |
| 0.950 | .635 | .968 | .158 | 2.450 | 2.129 | 1.000 | .000 | 0.950 | .658 | .977 | .123 | 2.450 | 2.154 | 1.000 | .000 |
| 1.000 | .683 | .975 | .127 | 2.500 | 2.179 | 1.000 | .000 | 1.000 | .707 | .982 | .096 | 2.500 | 2.204 | 1.000 | .000 |
| 1.050 | .732 | .981 | .101 | 2.550 | 2.229 | 1.000 | .000 | 1.050 | .756 | .987 | .075 | 2.550 | 2.254 | 1.000 | .000 |
| 1.100 | .781 | .985 | .080 | 2.600 | 2.279 | 1.000 | .000 | 1.100 | .806 | .990 | .058 | 2.600 | 2.304 | 1.000 | .000 |
| 1.150 | .831 | .989 | .062 | 2.650 | 2.329 | 1.000 | .000 | 1.150 | .855 | .993 | .044 | 2.650 | 2.354 | 1.000 | .000 |
| 1.200 | .880 | .992 | .048 | 2.700 | 2.379 | 1.000 | .000 | 1.200 | .905 | .995 | .034 | 2.700 | 2.404 | 1.000 | .000 |
| 1.250 | .930 | .994 | .037 | 2.750 | 2.429 | 1.000 | .000 | 1.250 | .955 | .996 | .025 | 2.750 | 2.454 | 1.000 | .000 |
| 1.300 | .980 | .995 | .028 | 2.800 | 2.479 | 1.000 | .000 | 1.300 | 1.005 | .997 | .019 | 2.800 | 2.504 | 1.000 | .000 |
| 1.350 | 1.029 | .997 | .021 | 2.850 | 2.529 | 1.000 | .000 | 1.350 | 1.055 | .998 | .014 | 2.850 | 2.554 | 1.000 | .000 |
| 1.400 | 1.079 | .998 | .016 | 2.900 | 2.579 | 1.000 | .000 | 1.400 | 1.105 | .999 | .010 | 2.900 | 2.604 | 1.000 | .000 |
| 1.450 | 1.129 | .998 | .012 | 2.950 | 2.629 | 1.000 | .000 | 1.450 | 1.154 | .999 | .007 | 2.950 | 2.654 | 1.000 | .000 |
| | | | | 3.000 | 2.679 | 1.000 | .000 | | | | | 3.000 | 2.704 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)

(11) $p = 2$, $n = 0$, and $m = 5$

(a) Tabulation of $F(\eta)$ and derivatives

(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.431 | 1.000 | 0.763 | 0.995 | 0.035 | 0.000 | 0.000 | 0.000 | 3.629 | 1.000 | 0.774 | 0.997 | 0.027 |
| .025 | .001 | .083 | 3.231 | 1.025 | .788 | .996 | .030 | .025 | .001 | .088 | 3.404 | 1.025 | .799 | .997 | .022 |
| .050 | .004 | .162 | 3.033 | 1.050 | .813 | .997 | .025 | .050 | .004 | .170 | 3.182 | 1.050 | .824 | .998 | .019 |
| .075 | .009 | .235 | 2.838 | 1.075 | .837 | .997 | .021 | .075 | .010 | .247 | 2.963 | 1.075 | .849 | .998 | .015 |
| .100 | .016 | .304 | 2.648 | 1.100 | .862 | .998 | .017 | .100 | .017 | .318 | 2.751 | 1.100 | .874 | .998 | .013 |
| .125 | .024 | .367 | 2.463 | 1.125 | .887 | .998 | .014 | .125 | .025 | .385 | 2.545 | 1.125 | .899 | .999 | .010 |
| .150 | .034 | .427 | 2.285 | 1.150 | .912 | .999 | .012 | .150 | .036 | .446 | 2.347 | 1.150 | .924 | .999 | .009 |
| .175 | .046 | .482 | 2.113 | 1.175 | .937 | .999 | .010 | .175 | .048 | .502 | 2.158 | 1.175 | .949 | .999 | .007 |
| .200 | .058 | .532 | 1.949 | 1.200 | .962 | .999 | .008 | .200 | .061 | .554 | 1.978 | 1.200 | .974 | .999 | .006 |
| .225 | .072 | .579 | 1.792 | 1.225 | .987 | .999 | .007 | .225 | .075 | .601 | 1.807 | 1.225 | .999 | .999 | .005 |
| .250 | .087 | .622 | 1.644 | 1.250 | 1.012 | .999 | .005 | .250 | .091 | .644 | 1.647 | 1.250 | 1.024 | 1.000 | .004 |
| .275 | .103 | .661 | 1.504 | 1.275 | 1.037 | 1.000 | .004 | .275 | .108 | .683 | 1.496 | 1.275 | 1.049 | 1.000 | .003 |
| .300 | .120 | .697 | 1.373 | 1.300 | 1.062 | 1.000 | .004 | .300 | .125 | .719 | 1.355 | 1.300 | 1.074 | 1.000 | .002 |
| .325 | .138 | .730 | 1.249 | 1.325 | 1.087 | 1.000 | .003 | .325 | .143 | .751 | 1.225 | 1.325 | 1.099 | 1.000 | .002 |
| .350 | .157 | .760 | 1.134 | 1.350 | 1.112 | 1.000 | .002 | .350 | .163 | .780 | 1.103 | 1.350 | 1.124 | 1.000 | .002 |
| .375 | .176 | .787 | 1.027 | 1.375 | 1.137 | 1.000 | .002 | .375 | .182 | .806 | .991 | 1.375 | 1.149 | 1.000 | .001 |
| .400 | .196 | .811 | .927 | 1.400 | 1.162 | 1.000 | .001 | .400 | .203 | .830 | .888 | 1.400 | 1.174 | 1.000 | .001 |
| .425 | .217 | .833 | .835 | 1.425 | 1.187 | 1.000 | .001 | .425 | .224 | .851 | .793 | 1.425 | 1.199 | 1.000 | .001 |
| .450 | .238 | .853 | .750 | 1.450 | 1.212 | 1.000 | .001 | .450 | .245 | .870 | .707 | 1.450 | 1.224 | 1.000 | .001 |
| .475 | .259 | .871 | .672 | 1.475 | 1.237 | 1.000 | .001 | .475 | .267 | .886 | .628 | 1.475 | 1.249 | 1.000 | .000 |
| .500 | .281 | .887 | .600 | 1.500 | 1.262 | 1.000 | .001 | .500 | .290 | .901 | .556 | 1.500 | 1.274 | 1.000 | .000 |
| .525 | .304 | .901 | .535 | 1.525 | 1.287 | 1.000 | .000 | .525 | .312 | .914 | .492 | 1.525 | 1.299 | 1.000 | .000 |
| .550 | .326 | .914 | .476 | 1.550 | 1.312 | 1.000 | .000 | .550 | .335 | .926 | .433 | 1.550 | 1.324 | 1.000 | .000 |
| .575 | .349 | .925 | .422 | 1.575 | 1.337 | 1.000 | .000 | .575 | .359 | .936 | .381 | 1.575 | 1.349 | 1.000 | .000 |
| .600 | .372 | .935 | .373 | 1.600 | 1.362 | 1.000 | .000 | .600 | .382 | .945 | .334 | 1.600 | 1.374 | 1.000 | .000 |
| .625 | .396 | .944 | .329 | 1.625 | 1.387 | 1.000 | .000 | .625 | .406 | .953 | .291 | 1.625 | 1.399 | 1.000 | .000 |
| .650 | .420 | .951 | .289 | 1.650 | 1.412 | 1.000 | .000 | .650 | .430 | .959 | .254 | 1.650 | 1.424 | 1.000 | .000 |
| .675 | .443 | .958 | .253 | 1.675 | 1.437 | 1.000 | .000 | .675 | .454 | .965 | .221 | 1.675 | 1.449 | 1.000 | .000 |
| .700 | .468 | .964 | .221 | 1.700 | 1.462 | 1.000 | .000 | .700 | .478 | .971 | .191 | 1.700 | 1.474 | 1.000 | .000 |
| .725 | .492 | .969 | .193 | 1.725 | 1.487 | 1.000 | .000 | .725 | .502 | .975 | .165 | 1.725 | 1.499 | 1.000 | .000 |
| .750 | .516 | .974 | .168 | 1.750 | 1.512 | 1.000 | .000 | .750 | .527 | .979 | .142 | 1.750 | 1.524 | 1.000 | .000 |
| .775 | .540 | .978 | .145 | 1.775 | 1.537 | 1.000 | .000 | .775 | .551 | .982 | .122 | 1.775 | 1.549 | 1.000 | .000 |
| .800 | .565 | .981 | .126 | 1.800 | 1.562 | 1.000 | .000 | .800 | .576 | .985 | .104 | 1.800 | 1.574 | 1.000 | .000 |
| .825 | .589 | .984 | .108 | 1.825 | 1.587 | 1.000 | .000 | .825 | .601 | .987 | .089 | 1.825 | 1.599 | 1.000 | .000 |
| .850 | .614 | .986 | .093 | 1.850 | 1.612 | 1.000 | .000 | .850 | .625 | .989 | .076 | 1.850 | 1.624 | 1.000 | .000 |
| .875 | .639 | .988 | .080 | 1.875 | 1.637 | 1.000 | .000 | .875 | .650 | .991 | .064 | 1.875 | 1.649 | 1.000 | .000 |
| .900 | .663 | .990 | .068 | 1.900 | 1.662 | 1.000 | .000 | .900 | .675 | .993 | .054 | 1.900 | 1.674 | 1.000 | .000 |
| .925 | .688 | .992 | .058 | 1.925 | 1.687 | 1.000 | .000 | .925 | .700 | .994 | .046 | 1.925 | 1.699 | 1.000 | .000 |
| .950 | .713 | .993 | .049 | 1.950 | 1.712 | 1.000 | .000 | .950 | .725 | .995 | .039 | 1.950 | 1.724 | 1.000 | .000 |
| .975 | .738 | .994 | .042 | 1.975 | 1.737 | 1.000 | .000 | .975 | .749 | .996 | .032 | 1.975 | 1.749 | 1.000 | .000 |
| | | | | 2.000 | 1.762 | 1.000 | .000 | | | | | 2.000 | 1.774 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)(12) $p = 2$, $n = 1$, and $m = 1$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.412 | 2.000 | 1.497 | 0.998 | 0.010 | 0.000 | 0.000 | 0.000 | 1.792 | 2.000 | 1.570 | 0.999 | 0.005 |
| .050 | .002 | .069 | 1.361 | 2.050 | 1.547 | .999 | .007 | .050 | .002 | .087 | 1.692 | 2.050 | 1.620 | .999 | .004 |
| .100 | .007 | .136 | 1.311 | 2.100 | 1.597 | .999 | .006 | .100 | .009 | .169 | 1.592 | 2.100 | 1.670 | 1.000 | .003 |
| .150 | .015 | .200 | 1.260 | 2.150 | 1.647 | .999 | .004 | .150 | .019 | .246 | 1.494 | 2.150 | 1.719 | 1.000 | .002 |
| .200 | .027 | .262 | 1.208 | 2.200 | 1.697 | .999 | .003 | .200 | .033 | .319 | 1.397 | 2.200 | 1.769 | 1.000 | .002 |
| .250 | .041 | .321 | 1.156 | 2.250 | 1.747 | 1.000 | .003 | .250 | .051 | .386 | 1.301 | 2.250 | 1.819 | 1.000 | .001 |
| .300 | .059 | .378 | 1.102 | 2.300 | 1.797 | 1.000 | .002 | .300 | .072 | .449 | 1.208 | 2.300 | 1.869 | 1.000 | .001 |
| .350 | .079 | .431 | 1.048 | 2.350 | 1.847 | 1.000 | .001 | .350 | .096 | .507 | 1.117 | 2.350 | 1.919 | 1.000 | .001 |
| .400 | .102 | .482 | .992 | 2.400 | 1.897 | 1.000 | .001 | .400 | .122 | .560 | 1.029 | 2.400 | 1.969 | 1.000 | .000 |
| .450 | .127 | .531 | .937 | 2.450 | 1.947 | 1.000 | .001 | .450 | .152 | .610 | .944 | 2.450 | 2.019 | 1.000 | .000 |
| .500 | .155 | .576 | .880 | 2.500 | 1.997 | 1.000 | .001 | .500 | .183 | .655 | .863 | 2.500 | 2.069 | 1.000 | .000 |
| .550 | .185 | .619 | .824 | 2.550 | 2.047 | 1.000 | .000 | .550 | .217 | .696 | .785 | 2.550 | 2.119 | 1.000 | .000 |
| .600 | .217 | .658 | .768 | 2.600 | 2.097 | 1.000 | .000 | .600 | .253 | .734 | .711 | 2.600 | 2.169 | 1.000 | .000 |
| .650 | .251 | .695 | .712 | 2.650 | 2.147 | 1.000 | .000 | .650 | .290 | .767 | .641 | 2.650 | 2.219 | 1.000 | .000 |
| .700 | .286 | .730 | .657 | 2.700 | 2.197 | 1.000 | .000 | .700 | .329 | .798 | .576 | 2.700 | 2.269 | 1.000 | .000 |
| .750 | .324 | .761 | .603 | 2.750 | 2.247 | 1.000 | .000 | .750 | .370 | .825 | .514 | 2.750 | 2.319 | 1.000 | .000 |
| .800 | .362 | .790 | .551 | 2.800 | 2.297 | 1.000 | .000 | .800 | .412 | .849 | .457 | 2.800 | 2.369 | 1.000 | .000 |
| .850 | .403 | .816 | .500 | 2.850 | 2.347 | 1.000 | .000 | .850 | .455 | .871 | .404 | 2.850 | 2.419 | 1.000 | .000 |
| .900 | .444 | .840 | .452 | 2.900 | 2.397 | 1.000 | .000 | .900 | .499 | .890 | .356 | 2.900 | 2.469 | 1.000 | .000 |
| .950 | .487 | .862 | .406 | 2.950 | 2.447 | 1.000 | .000 | .950 | .544 | .906 | .311 | 2.950 | 2.519 | 1.000 | .000 |
| 1.000 | .530 | .881 | .362 | 3.000 | 2.497 | 1.000 | .000 | 1.000 | .590 | .921 | .271 | 3.000 | 2.569 | 1.000 | .000 |
| 1.050 | .575 | .898 | .322 | 3.050 | 2.547 | 1.000 | .000 | 1.050 | .636 | .934 | .235 | 3.050 | 2.619 | 1.000 | .000 |
| 1.100 | .620 | .913 | .284 | 3.100 | 2.597 | 1.000 | .000 | 1.100 | .683 | .945 | .202 | 3.100 | 2.669 | 1.000 | .000 |
| 1.150 | .666 | .926 | .249 | 3.150 | 2.647 | 1.000 | .000 | 1.150 | .730 | .954 | .173 | 3.150 | 2.719 | 1.000 | .000 |
| 1.200 | .713 | .938 | .217 | 3.200 | 2.697 | 1.000 | .000 | 1.200 | .778 | .962 | .147 | 3.200 | 2.769 | 1.000 | .000 |
| 1.250 | .760 | .948 | .187 | 3.250 | 2.747 | 1.000 | .000 | 1.250 | .827 | .969 | .124 | 3.250 | 2.819 | 1.000 | .000 |
| 1.300 | .807 | .957 | .161 | 3.300 | 2.797 | 1.000 | .000 | 1.300 | .875 | .974 | .105 | 3.300 | 2.869 | 1.000 | .000 |
| 1.350 | .855 | .964 | .138 | 3.350 | 2.847 | 1.000 | .000 | 1.350 | .924 | .979 | .087 | 3.350 | 2.919 | 1.000 | .000 |
| 1.400 | .904 | .970 | .117 | 3.400 | 2.897 | 1.000 | .000 | 1.400 | .973 | .983 | .073 | 3.400 | 2.969 | 1.000 | .000 |
| 1.450 | .952 | .976 | .099 | 3.450 | 2.947 | 1.000 | .000 | 1.450 | 1.022 | .986 | .060 | 3.450 | 3.019 | 1.000 | .000 |
| 1.500 | 1.001 | .980 | .083 | 3.500 | 2.997 | 1.000 | .000 | 1.500 | 1.072 | .989 | .049 | 3.500 | 3.069 | 1.000 | .000 |
| 1.550 | 1.050 | .984 | .069 | 3.550 | 3.047 | 1.000 | .000 | 1.550 | 1.121 | .991 | .040 | 3.550 | 3.119 | 1.000 | .000 |
| 1.600 | 1.100 | .987 | .057 | 3.600 | 3.097 | 1.000 | .000 | 1.600 | 1.171 | .993 | .033 | 3.600 | 3.169 | 1.000 | .000 |
| 1.650 | 1.149 | .990 | .047 | 3.650 | 3.147 | 1.000 | .000 | 1.650 | 1.220 | .995 | .026 | 3.650 | 3.219 | 1.000 | .000 |
| 1.700 | 1.199 | .992 | .038 | 3.700 | 3.197 | 1.000 | .000 | 1.700 | 1.270 | .996 | .021 | 3.700 | 3.269 | 1.000 | .000 |
| 1.750 | 1.248 | .994 | .031 | 3.750 | 3.247 | 1.000 | .000 | 1.750 | 1.320 | .997 | .017 | 3.750 | 3.319 | 1.000 | .000 |
| 1.800 | 1.298 | .995 | .025 | 3.800 | 3.297 | 1.000 | .000 | 1.800 | 1.370 | .998 | .013 | 3.800 | 3.369 | 1.000 | .000 |
| 1.850 | 1.348 | .996 | .020 | 3.850 | 3.347 | 1.000 | .000 | 1.850 | 1.420 | .998 | .010 | 3.850 | 3.419 | 1.000 | .000 |
| 1.900 | 1.398 | .997 | .016 | 3.900 | 3.397 | 1.000 | .000 | 1.900 | 1.470 | .999 | .008 | 3.900 | 3.469 | 1.000 | .000 |
| 1.950 | 1.448 | .998 | .012 | 3.950 | 3.447 | 1.000 | .000 | 1.950 | 1.520 | .999 | .006 | 3.950 | 3.519 | 1.000 | .000 |
| | | | | 4.000 | 3.497 | 1.000 | .000 | | | | | 4.000 | 3.569 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}z^{m-1}$, $W = bx^{n-1}z^m$)

(13) $p = 2$, $n = 1$, and $m = 3$

(a) Tabulation of $F(\eta)$ and derivatives

(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.747 | 1.500 | 1.208 | 0.999 | 0.004 | 0.000 | 0.000 | 0.000 | 2.985 | 1.500 | 1.228 | 1.000 | 0.009 |
| .050 | .003 | .131 | 2.497 | 1.550 | 1.258 | 1.000 | .003 | .050 | .004 | .142 | 2.686 | 1.550 | 1.278 | 1.000 | .002 |
| .100 | .013 | .250 | 2.253 | 1.600 | 1.308 | 1.000 | .002 | .100 | .014 | .269 | 2.394 | 1.600 | 1.328 | 1.000 | .001 |
| .150 | .028 | .356 | 2.016 | 1.650 | 1.358 | 1.000 | .001 | .150 | .030 | .381 | 2.115 | 1.650 | 1.378 | 1.000 | .001 |
| .200 | .048 | .452 | 1.791 | 1.700 | 1.408 | 1.000 | .001 | .200 | .052 | .480 | 1.851 | 1.700 | 1.428 | 1.000 | .001 |
| .250 | .073 | .536 | 1.578 | 1.750 | 1.458 | 1.000 | .001 | .250 | .078 | .567 | 1.607 | 1.750 | 1.478 | 1.000 | .000 |
| .300 | .102 | .610 | 1.380 | 1.800 | 1.508 | 1.000 | .000 | .300 | .108 | .641 | 1.382 | 1.800 | 1.528 | 1.000 | .000 |
| .350 | .134 | .674 | 1.198 | 1.850 | 1.558 | 1.000 | .000 | .350 | .142 | .705 | 1.180 | 1.850 | 1.578 | 1.000 | .000 |
| .400 | .169 | .730 | 1.032 | 1.900 | 1.608 | 1.000 | .000 | .400 | .179 | .760 | .998 | 1.900 | 1.628 | 1.000 | .000 |
| .450 | .207 | .778 | .882 | 1.950 | 1.658 | 1.000 | .000 | .450 | .218 | .806 | .837 | 1.950 | 1.678 | 1.000 | .000 |
| .500 | .247 | .818 | .748 | 2.000 | 1.708 | 1.000 | .000 | .500 | .259 | .844 | .697 | 2.000 | 1.728 | 1.000 | .000 |
| .550 | .288 | .853 | .629 | 2.050 | 1.758 | 1.000 | .000 | .550 | .302 | .876 | .575 | 2.050 | 1.778 | 1.000 | .000 |
| .600 | .332 | .881 | .525 | 2.100 | 1.808 | 1.000 | .000 | .600 | .347 | .902 | .470 | 2.100 | 1.828 | 1.000 | .000 |
| .650 | .377 | .905 | .434 | 2.150 | 1.858 | 1.000 | .000 | .650 | .392 | .923 | .381 | 2.150 | 1.878 | 1.000 | .000 |
| .700 | .422 | .925 | .356 | 2.200 | 1.908 | 1.000 | .000 | .700 | .439 | .940 | .307 | 2.200 | 1.928 | 1.000 | .000 |
| .750 | .469 | .941 | .289 | 2.250 | 1.958 | 1.000 | .000 | .750 | .486 | .954 | .244 | 2.250 | 1.978 | 1.000 | .000 |
| .800 | .516 | .954 | .233 | 2.300 | 2.008 | 1.000 | .000 | .800 | .534 | .965 | .193 | 2.300 | 2.028 | 1.000 | .000 |
| .850 | .564 | .965 | .186 | 2.350 | 2.058 | 1.000 | .000 | .850 | .583 | .973 | .151 | 2.350 | 2.078 | 1.000 | .000 |
| .900 | .613 | .973 | .147 | 2.400 | 2.108 | 1.000 | .000 | .900 | .631 | .980 | .117 | 2.400 | 2.128 | 1.000 | .000 |
| .950 | .662 | .979 | .116 | 2.450 | 2.158 | 1.000 | .000 | .950 | .681 | .985 | .090 | 2.450 | 2.178 | 1.000 | .000 |
| 1.000 | .711 | .984 | .090 | 2.500 | 2.208 | 1.000 | .000 | 1.000 | .730 | .989 | .068 | 2.500 | 2.228 | 1.000 | .000 |
| 1.050 | .760 | .988 | .069 | 2.550 | 2.258 | 1.000 | .000 | 1.050 | .779 | .992 | .051 | 2.550 | 2.278 | 1.000 | .000 |
| 1.100 | .809 | .991 | .053 | 2.600 | 2.308 | 1.000 | .000 | 1.100 | .829 | .994 | .038 | 2.600 | 2.328 | 1.000 | .000 |
| 1.150 | .859 | .994 | .040 | 2.650 | 2.358 | 1.000 | .000 | 1.150 | .879 | .996 | .028 | 2.650 | 2.378 | 1.000 | .000 |
| 1.200 | .909 | .995 | .030 | 2.700 | 2.408 | 1.000 | .000 | 1.200 | .929 | .997 | .021 | 2.700 | 2.428 | 1.000 | .000 |
| 1.250 | .959 | .997 | .022 | 2.750 | 2.458 | 1.000 | .000 | 1.250 | .979 | .998 | .015 | 2.750 | 2.478 | 1.000 | .000 |
| 1.300 | 1.009 | .998 | .016 | 2.800 | 2.508 | 1.000 | .000 | 1.300 | 1.028 | .999 | .011 | 2.800 | 2.528 | 1.000 | .000 |
| 1.350 | 1.058 | .998 | .012 | 2.850 | 2.558 | 1.000 | .000 | 1.350 | 1.078 | .999 | .008 | 2.850 | 2.578 | 1.000 | .000 |
| 1.400 | 1.108 | .999 | .008 | 2.900 | 2.608 | 1.000 | .000 | 1.400 | 1.128 | .999 | .005 | 2.900 | 2.628 | 1.000 | .000 |
| 1.450 | 1.158 | .999 | .006 | 2.950 | 2.658 | 1.000 | .000 | 1.450 | 1.178 | 1.000 | .004 | 2.950 | 2.678 | 1.000 | .000 |
| | | | | 3.000 | 2.708 | 1.000 | .000 | | | | | 3.000 | 2.728 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n_2}z^{m-1}$, $W = bx^{n-1}z^m$)(14) $p = 2$, $n = 1$, and $m = 5$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.633 | 1.000 | 0.775 | 0.997 | 0.026 | 0.000 | 0.000 | 0.000 | 3.822 | 1.000 | 0.785 | 0.998 | 0.020 |
| .025 | .001 | .088 | 3.409 | 1.025 | .800 | .997 | .021 | .025 | .001 | .092 | 3.572 | 1.025 | .810 | .998 | .016 |
| .050 | .004 | .170 | 3.186 | 1.050 | .825 | .998 | .018 | .050 | .005 | .179 | 3.325 | 1.050 | .835 | .998 | .013 |
| .075 | .010 | .247 | 2.968 | 1.075 | .850 | .998 | .014 | .075 | .010 | .259 | 3.083 | 1.075 | .860 | .999 | .011 |
| .100 | .017 | .319 | 2.755 | 1.100 | .875 | .999 | .012 | .100 | .017 | .333 | 2.849 | 1.100 | .885 | .999 | .009 |
| .125 | .025 | .385 | 2.549 | 1.125 | .900 | .999 | .010 | .125 | .027 | .401 | 2.622 | 1.125 | .910 | .999 | .007 |
| .150 | .036 | .446 | 2.351 | 1.150 | .925 | .999 | .008 | .150 | .037 | .464 | 2.405 | 1.150 | .935 | .999 | .006 |
| .175 | .048 | .503 | 2.162 | 1.175 | .950 | .999 | .006 | .175 | .050 | .522 | 2.199 | 1.175 | .960 | 1.000 | .005 |
| .200 | .061 | .555 | 1.981 | 1.200 | .975 | .999 | .005 | .200 | .064 | .574 | 2.003 | 1.200 | .985 | 1.000 | .004 |
| .225 | .075 | .602 | 1.811 | 1.225 | 1.000 | 1.000 | .004 | .225 | .078 | .622 | 1.819 | 1.225 | 1.010 | 1.000 | .003 |
| .250 | .091 | .645 | 1.650 | 1.250 | 1.025 | 1.000 | .003 | .250 | .095 | .665 | 1.647 | 1.250 | 1.035 | 1.000 | .002 |
| .275 | .108 | .685 | 1.499 | 1.275 | 1.050 | 1.000 | .003 | .275 | .112 | .704 | 1.486 | 1.275 | 1.060 | 1.000 | .002 |
| .300 | .128 | .720 | 1.358 | 1.300 | 1.075 | 1.000 | .002 | .300 | .130 | .740 | 1.337 | 1.300 | 1.085 | 1.000 | .001 |
| .325 | .144 | .752 | 1.226 | 1.325 | 1.100 | 1.000 | .002 | .325 | .149 | .771 | 1.199 | 1.325 | 1.110 | 1.000 | .001 |
| .350 | .163 | .782 | 1.105 | 1.350 | 1.125 | 1.000 | .001 | .350 | .168 | .800 | 1.072 | 1.350 | 1.135 | 1.000 | .001 |
| .375 | .183 | .808 | .992 | 1.375 | 1.150 | 1.000 | .001 | .375 | .189 | .825 | .956 | 1.375 | 1.160 | 1.000 | .001 |
| .400 | .203 | .831 | .888 | 1.400 | 1.175 | 1.000 | .001 | .400 | .209 | .847 | .849 | 1.400 | 1.185 | 1.000 | .001 |
| .425 | .224 | .852 | .793 | 1.425 | 1.200 | 1.000 | .001 | .425 | .231 | .867 | .753 | 1.425 | 1.210 | 1.000 | .000 |
| .450 | .246 | .871 | .706 | 1.450 | 1.225 | 1.000 | .001 | .450 | .253 | .885 | .663 | 1.450 | 1.235 | 1.000 | .000 |
| .475 | .268 | .888 | .627 | 1.475 | 1.250 | 1.000 | .000 | .475 | .275 | .901 | .586 | 1.475 | 1.260 | 1.000 | .000 |
| .500 | .290 | .902 | .555 | 1.500 | 1.275 | 1.000 | .000 | .500 | .298 | .914 | .514 | 1.500 | 1.285 | 1.000 | .000 |
| .525 | .313 | .916 | .490 | 1.525 | 1.300 | 1.000 | .000 | .525 | .321 | .927 | .450 | 1.525 | 1.310 | 1.000 | .000 |
| .550 | .336 | .927 | .432 | 1.550 | 1.325 | 1.000 | .000 | .550 | .344 | .937 | .393 | 1.550 | 1.335 | 1.000 | .000 |
| .575 | .359 | .937 | .379 | 1.575 | 1.350 | 1.000 | .000 | .575 | .368 | .946 | .342 | 1.575 | 1.360 | 1.000 | .000 |
| .600 | .383 | .946 | .331 | 1.600 | 1.375 | 1.000 | .000 | .600 | .391 | .954 | .297 | 1.600 | 1.385 | 1.000 | .000 |
| .625 | .407 | .954 | .289 | 1.625 | 1.400 | 1.000 | .000 | .625 | .415 | .961 | .256 | 1.625 | 1.410 | 1.000 | .000 |
| .650 | .430 | .960 | .251 | 1.650 | 1.425 | 1.000 | .000 | .650 | .440 | .967 | .221 | 1.650 | 1.435 | 1.000 | .000 |
| .675 | .455 | .966 | .218 | 1.675 | 1.450 | 1.000 | .000 | .675 | .464 | .972 | .190 | 1.675 | 1.460 | 1.000 | .000 |
| .700 | .479 | .971 | .189 | 1.700 | 1.475 | 1.000 | .000 | .700 | .488 | .977 | .163 | 1.700 | 1.485 | 1.000 | .000 |
| .725 | .503 | .976 | .163 | 1.725 | 1.500 | 1.000 | .000 | .725 | .513 | .980 | .139 | 1.725 | 1.510 | 1.000 | .000 |
| .750 | .528 | .980 | .140 | 1.750 | 1.525 | 1.000 | .000 | .750 | .537 | .984 | .118 | 1.750 | 1.535 | 1.000 | .000 |
| .775 | .552 | .983 | .120 | 1.775 | 1.550 | 1.000 | .000 | .775 | .562 | .986 | .100 | 1.775 | 1.560 | 1.000 | .000 |
| .800 | .577 | .986 | .102 | 1.800 | 1.575 | 1.000 | .000 | .800 | .586 | .989 | .085 | 1.800 | 1.585 | 1.000 | .000 |
| .825 | .601 | .988 | .087 | 1.825 | 1.600 | 1.000 | .000 | .825 | .611 | .991 | .072 | 1.825 | 1.610 | 1.000 | .000 |
| .850 | .626 | .990 | .074 | 1.850 | 1.625 | 1.000 | .000 | .850 | .636 | .992 | .060 | 1.850 | 1.635 | 1.000 | .000 |
| .875 | .651 | .992 | .062 | 1.875 | 1.650 | 1.000 | .000 | .875 | .661 | .994 | .050 | 1.875 | 1.660 | 1.000 | .000 |
| .900 | .676 | .993 | .053 | 1.900 | 1.675 | 1.000 | .000 | .900 | .686 | .995 | .042 | 1.900 | 1.685 | 1.000 | .000 |
| .925 | .701 | .994 | .044 | 1.925 | 1.700 | 1.000 | .000 | .925 | .711 | .996 | .035 | 1.925 | 1.710 | 1.000 | .000 |
| .950 | .725 | .995 | .037 | 1.950 | 1.725 | 1.000 | .000 | .950 | .735 | .996 | .029 | 1.950 | 1.735 | 1.000 | .000 |
| .975 | .750 | .996 | .031 | 1.975 | 1.750 | 1.000 | .000 | .975 | .760 | .997 | .024 | 1.975 | 1.760 | 1.000 | .000 |
| | | | | 2.000 | 1.775 | 1.000 | .000 | | | | | 2.000 | 1.785 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}z^{-1}$, $W = bx^{n-1}z^m$)(15) $p = 2$, $n = 3$, and $m = 0$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 1.439 | 1.500 | 1.013 | 0.983 | 0.073 | 0.000 | 0.000 | 0.000 | 1.818 | 1.500 | 1.082 | 0.991 | 0.041 |
| .050 | .002 | .071 | 1.389 | 1.550 | 1.062 | .987 | .060 | .050 | .002 | .088 | 1.718 | 1.550 | 1.132 | .993 | .033 |
| .100 | .007 | .139 | 1.339 | 1.600 | 1.112 | .989 | .049 | .100 | .009 | .172 | 1.618 | 1.600 | 1.182 | .995 | .026 |
| .150 | .016 | .205 | 1.287 | 1.650 | 1.161 | .992 | .040 | .150 | .019 | .250 | 1.519 | 1.650 | 1.231 | .996 | .021 |
| .200 | .027 | .268 | 1.234 | 1.700 | 1.211 | .993 | .032 | .200 | .034 | .324 | 1.421 | 1.700 | 1.281 | .997 | .016 |
| .250 | .042 | .328 | 1.180 | 1.750 | 1.261 | .995 | .026 | .250 | .052 | .392 | 1.324 | 1.750 | 1.331 | .998 | .013 |
| .300 | .060 | .386 | 1.125 | 1.800 | 1.310 | .996 | .021 | .300 | .073 | .456 | 1.228 | 1.800 | 1.381 | .998 | .010 |
| .350 | .081 | .440 | 1.068 | 1.850 | 1.360 | .997 | .016 | .350 | .097 | .515 | 1.135 | 1.850 | 1.431 | .999 | .008 |
| .400 | .104 | .492 | 1.010 | 1.900 | 1.410 | .998 | .013 | .400 | .124 | .570 | 1.045 | 1.900 | 1.481 | .999 | .006 |
| .450 | .130 | .541 | .951 | 1.950 | 1.460 | .998 | .010 | .450 | .154 | .620 | .957 | 1.950 | 1.531 | .999 | .004 |
| .500 | .158 | .588 | .892 | 2.000 | 1.510 | .999 | .008 | .500 | .186 | .665 | .872 | 2.000 | 1.581 | .999 | .003 |
| .550 | .189 | .631 | .832 | 2.050 | 1.560 | .999 | .006 | .550 | .220 | .707 | .791 | 2.050 | 1.631 | 1.000 | .003 |
| .600 | .221 | .671 | .772 | 2.100 | 1.610 | .999 | .005 | .600 | .257 | .745 | .714 | 2.100 | 1.681 | 1.000 | .002 |
| .650 | .256 | .708 | .713 | 2.150 | 1.660 | .999 | .003 | .650 | .293 | .778 | .641 | 2.150 | 1.731 | 1.000 | .001 |
| .700 | .292 | .742 | .655 | 2.200 | 1.710 | 1.000 | .003 | .700 | .335 | .809 | .573 | 2.200 | 1.781 | 1.000 | .001 |
| .750 | .330 | .773 | .598 | 2.250 | 1.760 | 1.000 | .002 | .750 | .376 | .836 | .509 | 2.250 | 1.831 | 1.000 | .001 |
| .800 | .369 | .802 | .543 | 2.300 | 1.810 | 1.000 | .001 | .800 | .418 | .860 | .449 | 2.300 | 1.881 | 1.000 | .001 |
| .850 | .410 | .828 | .490 | 2.350 | 1.860 | 1.000 | .001 | .850 | .462 | .881 | .395 | 2.350 | 1.931 | 1.000 | .000 |
| .900 | .452 | .851 | .440 | 2.400 | 1.910 | 1.000 | .001 | .900 | .506 | .899 | .344 | 2.400 | 1.981 | 1.000 | .000 |
| .950 | .495 | .872 | .393 | 2.450 | 1.960 | 1.000 | .001 | .950 | .551 | .915 | .299 | 2.450 | 2.031 | 1.000 | .000 |
| 1.000 | .539 | .890 | .348 | 2.500 | 2.010 | 1.000 | .000 | 1.000 | .598 | .929 | .258 | 2.500 | 2.081 | 1.000 | .000 |
| 1.050 | .584 | .907 | .307 | 2.550 | 2.060 | 1.000 | .000 | 1.050 | .644 | .941 | .221 | 2.550 | 2.131 | 1.000 | .000 |
| 1.100 | .630 | .921 | .269 | 2.600 | 2.110 | 1.000 | .000 | 1.100 | .692 | .951 | .188 | 2.600 | 2.181 | 1.000 | .000 |
| 1.150 | .676 | .934 | .234 | 2.650 | 2.160 | 1.000 | .000 | 1.150 | .739 | .960 | .159 | 2.650 | 2.231 | 1.000 | .000 |
| 1.200 | .723 | .944 | .202 | 2.700 | 2.210 | 1.000 | .000 | 1.200 | .788 | .967 | .134 | 2.700 | 2.281 | 1.000 | .000 |
| 1.250 | .771 | .954 | .173 | 2.750 | 2.260 | 1.000 | .000 | 1.250 | .836 | .973 | .112 | 2.750 | 2.331 | 1.000 | .000 |
| 1.300 | .818 | .962 | .148 | 2.800 | 2.310 | 1.000 | .000 | 1.300 | .885 | .979 | .093 | 2.800 | 2.381 | 1.000 | .000 |
| 1.350 | .867 | .969 | .125 | 2.850 | 2.360 | 1.000 | .000 | 1.350 | .934 | .983 | .077 | 2.850 | 2.431 | 1.000 | .000 |
| 1.400 | .915 | .974 | .105 | 2.900 | 2.410 | 1.000 | .000 | 1.400 | .983 | .986 | .063 | 2.900 | 2.481 | 1.000 | .000 |
| 1.450 | .964 | .979 | .088 | 2.950 | 2.460 | 1.000 | .000 | 1.450 | 1.033 | .989 | .051 | 2.950 | 2.531 | 1.000 | .000 |
| | | | | 3.000 | 2.510 | 1.000 | .000 | | | | | 3.000 | 2.581 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)(18) $p = 2$, $n = 3$, and $m = 1$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.188 | 1.500 | 1.146 | 0.997 | 0.016 | 0.000 | 0.000 | 0.000 | 2.473 | 1.500 | 1.179 | 0.999 | 0.009 |
| .050 | .003 | .106 | 2.038 | 1.550 | 1.196 | .998 | .012 | .050 | .003 | .119 | 2.274 | 1.550 | 1.228 | .999 | .007 |
| .100 | .010 | .204 | 1.890 | 1.600 | 1.246 | .999 | .009 | .100 | .012 | .227 | 2.077 | 1.600 | 1.278 | .999 | .005 |
| .150 | .023 | .295 | 1.743 | 1.650 | 1.296 | .999 | .006 | .150 | .026 | .326 | 1.885 | 1.650 | 1.328 | 1.000 | .004 |
| .200 | .040 | .378 | 1.599 | 1.700 | 1.345 | .999 | .005 | .200 | .044 | .416 | 1.700 | 1.700 | 1.378 | 1.000 | .003 |
| .250 | .061 | .455 | 1.459 | 1.750 | 1.395 | 1.000 | .003 | .250 | .067 | .497 | 1.523 | 1.750 | 1.428 | 1.000 | .002 |
| .300 | .085 | .524 | 1.324 | 1.800 | 1.445 | 1.000 | .002 | .300 | .094 | .568 | 1.356 | 1.800 | 1.478 | 1.000 | .001 |
| .350 | .113 | .587 | 1.195 | 1.850 | 1.495 | 1.000 | .002 | .350 | .124 | .632 | 1.199 | 1.850 | 1.528 | 1.000 | .001 |
| .400 | .144 | .644 | 1.071 | 1.900 | 1.545 | 1.000 | .001 | .400 | .157 | .689 | 1.053 | 1.900 | 1.578 | 1.000 | .001 |
| .450 | .177 | .694 | .955 | 1.950 | 1.595 | 1.000 | .001 | .450 | .192 | .738 | .919 | 1.950 | 1.628 | 1.000 | .000 |
| .500 | .213 | .739 | .845 | 2.000 | 1.645 | 1.000 | .001 | .500 | .230 | .781 | .797 | 2.000 | 1.678 | 1.000 | .000 |
| .550 | .251 | .779 | .744 | 2.050 | 1.695 | 1.000 | .000 | .550 | .270 | .818 | .686 | 2.050 | 1.728 | 1.000 | .000 |
| .600 | .291 | .814 | .650 | 2.100 | 1.745 | 1.000 | .000 | .600 | .312 | .849 | .586 | 2.100 | 1.778 | 1.000 | .000 |
| .650 | .332 | .844 | .564 | 2.150 | 1.795 | 1.000 | .000 | .650 | .355 | .876 | .497 | 2.150 | 1.828 | 1.000 | .000 |
| .700 | .375 | .870 | .486 | 2.200 | 1.845 | 1.000 | .000 | .700 | .400 | .899 | .419 | 2.200 | 1.878 | 1.000 | .000 |
| .750 | .419 | .893 | .416 | 2.250 | 1.895 | 1.000 | .000 | .750 | .445 | .918 | .350 | 2.250 | 1.928 | 1.000 | .000 |
| .800 | .465 | .912 | .353 | 2.300 | 1.945 | 1.000 | .000 | .800 | .491 | .934 | .291 | 2.300 | 1.978 | 1.000 | .000 |
| .850 | .511 | .928 | .298 | 2.350 | 1.995 | 1.000 | .000 | .850 | .539 | .948 | .240 | 2.350 | 2.028 | 1.000 | .000 |
| .900 | .557 | .942 | .249 | 2.400 | 2.045 | 1.000 | .000 | .900 | .586 | .959 | .196 | 2.400 | 2.078 | 1.000 | .000 |
| .950 | .605 | .953 | .207 | 2.450 | 2.095 | 1.000 | .000 | .950 | .634 | .967 | .159 | 2.450 | 2.128 | 1.000 | .000 |
| 1.000 | .653 | .963 | .171 | 2.500 | 2.145 | 1.000 | .000 | 1.000 | .683 | .975 | .128 | 2.500 | 2.178 | 1.000 | .000 |
| 1.050 | .701 | .971 | .139 | 2.550 | 2.195 | 1.000 | .000 | 1.050 | .732 | .980 | .102 | 2.550 | 2.228 | 1.000 | .000 |
| 1.100 | .750 | .977 | .113 | 2.600 | 2.245 | 1.000 | .000 | 1.100 | .781 | .985 | .081 | 2.600 | 2.278 | 1.000 | .000 |
| 1.150 | .799 | .982 | .091 | 2.650 | 2.295 | 1.000 | .000 | 1.150 | .830 | .988 | .064 | 2.650 | 2.328 | 1.000 | .000 |
| 1.200 | .848 | .986 | .073 | 2.700 | 2.345 | 1.000 | .000 | 1.200 | .880 | .991 | .050 | 2.700 | 2.378 | 1.000 | .000 |
| 1.250 | .897 | .989 | .057 | 2.750 | 2.395 | 1.000 | .000 | 1.250 | .929 | .993 | .038 | 2.750 | 2.428 | 1.000 | .000 |
| 1.300 | .947 | .992 | .045 | 2.800 | 2.445 | 1.000 | .000 | 1.300 | .979 | .995 | .029 | 2.800 | 2.478 | 1.000 | .000 |
| 1.350 | .996 | .994 | .035 | 2.850 | 2.495 | 1.000 | .000 | 1.350 | 1.029 | .996 | .022 | 2.850 | 2.528 | 1.000 | .000 |
| 1.400 | 1.046 | .995 | .027 | 2.900 | 2.545 | 1.000 | .000 | 1.400 | 1.079 | .997 | .017 | 2.900 | 2.578 | 1.000 | .000 |
| 1.450 | 1.096 | .997 | .021 | 2.950 | 2.595 | 1.000 | .000 | 1.450 | 1.129 | .998 | .013 | 2.950 | 2.628 | 1.000 | .000 |
| | | | | 3.000 | 2.645 | 1.000 | .000 | | | | | 3.000 | 2.678 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$)

(17) $p = 2$, $n = 3$, and $m = 3$

(a) Tabulation of $F(\eta)$ and derivatives

(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 3.225 | 1.000 | 0.749 | 0.993 | 0.046 | 0.000 | 0.000 | 0.000 | 3.433 | 1.000 | 0.763 | 0.995 | 0.035 |
| .025 | .001 | .078 | 3.050 | 1.025 | .774 | .994 | .039 | .025 | .001 | .083 | 3.234 | 1.025 | .788 | .996 | .030 |
| .050 | .004 | .153 | 2.876 | 1.050 | .799 | .995 | .033 | .050 | .004 | .162 | 3.036 | 1.050 | .813 | .997 | .025 |
| .075 | .009 | .222 | 2.705 | 1.075 | .824 | .996 | .028 | .075 | .009 | .235 | 2.841 | 1.075 | .838 | .997 | .021 |
| .100 | .015 | .288 | 2.537 | 1.100 | .849 | .997 | .024 | .100 | .016 | .304 | 2.650 | 1.100 | .863 | .998 | .017 |
| .125 | .023 | .349 | 2.373 | 1.125 | .874 | .997 | .020 | .125 | .024 | .368 | 2.465 | 1.125 | .888 | .998 | .015 |
| .150 | .032 | .406 | 2.214 | 1.150 | .899 | .998 | .017 | .150 | .034 | .427 | 2.286 | 1.150 | .912 | .999 | .012 |
| .175 | .043 | .460 | 2.061 | 1.175 | .924 | .998 | .014 | .175 | .046 | .482 | 2.114 | 1.175 | .937 | .999 | .010 |
| .200 | .055 | .510 | 1.913 | 1.200 | .949 | .999 | .012 | .200 | .058 | .533 | 1.950 | 1.200 | .962 | .999 | .008 |
| .225 | .069 | .556 | 1.771 | 1.225 | .974 | .999 | .010 | .225 | .072 | .580 | 1.793 | 1.225 | .987 | .999 | .007 |
| .250 | .083 | .598 | 1.636 | 1.250 | .999 | .999 | .008 | .250 | .087 | .623 | 1.645 | 1.250 | 1.012 | .999 | .006 |
| .275 | .099 | .637 | 1.507 | 1.275 | 1.024 | .999 | .007 | .275 | .103 | .662 | 1.504 | 1.275 | 1.037 | .999 | .005 |
| .300 | .115 | .674 | 1.385 | 1.300 | 1.049 | .999 | .006 | .300 | .120 | .698 | 1.373 | 1.300 | 1.062 | 1.000 | .004 |
| .325 | .132 | .707 | 1.270 | 1.325 | 1.074 | .999 | .005 | .325 | .138 | .731 | 1.249 | 1.325 | 1.087 | 1.000 | .003 |
| .350 | .150 | .737 | 1.162 | 1.350 | 1.099 | 1.000 | .004 | .350 | .157 | .760 | 1.133 | 1.350 | 1.112 | 1.000 | .002 |
| .375 | .169 | .765 | 1.060 | 1.375 | 1.124 | 1.000 | .003 | .375 | .176 | .787 | 1.026 | 1.375 | 1.137 | 1.000 | .002 |
| .400 | .188 | .790 | .965 | 1.400 | 1.149 | 1.000 | .002 | .400 | .196 | .812 | .926 | 1.400 | 1.162 | 1.000 | .002 |
| .425 | .209 | .813 | .876 | 1.425 | 1.174 | 1.000 | .002 | .425 | .217 | .834 | .834 | 1.425 | 1.187 | 1.000 | .001 |
| .450 | .229 | .834 | .793 | 1.450 | 1.199 | 1.000 | .002 | .450 | .238 | .853 | .749 | 1.450 | 1.212 | 1.000 | .001 |
| .475 | .250 | .853 | .717 | 1.475 | 1.224 | 1.000 | .001 | .475 | .259 | .871 | .670 | 1.475 | 1.237 | 1.000 | .001 |
| .500 | .272 | .870 | .646 | 1.500 | 1.249 | 1.000 | .001 | .500 | .281 | .887 | .599 | 1.500 | 1.262 | 1.000 | .001 |
| .525 | .294 | .885 | .580 | 1.525 | 1.274 | 1.000 | .001 | .525 | .304 | .901 | .534 | 1.525 | 1.287 | 1.000 | .001 |
| .550 | .316 | .899 | .520 | 1.550 | 1.299 | 1.000 | .001 | .550 | .326 | .914 | .474 | 1.550 | 1.312 | 1.000 | .000 |
| .575 | .339 | .911 | .465 | 1.575 | 1.324 | 1.000 | .001 | .575 | .349 | .925 | .420 | 1.575 | 1.337 | 1.000 | .000 |
| .600 | .362 | .922 | .415 | 1.600 | 1.349 | 1.000 | .000 | .600 | .373 | .935 | .371 | 1.600 | 1.362 | 1.000 | .000 |
| .625 | .385 | .932 | .369 | 1.625 | 1.374 | 1.000 | .000 | .625 | .396 | .944 | .327 | 1.625 | 1.387 | 1.000 | .000 |
| .650 | .408 | .941 | .328 | 1.650 | 1.399 | 1.000 | .000 | .650 | .420 | .951 | .288 | 1.650 | 1.412 | 1.000 | .000 |
| .675 | .432 | .949 | .290 | 1.675 | 1.424 | 1.000 | .000 | .675 | .444 | .958 | .252 | 1.675 | 1.437 | 1.000 | .000 |
| .700 | .456 | .955 | .256 | 1.700 | 1.449 | 1.000 | .000 | .700 | .468 | .964 | .221 | 1.700 | 1.462 | 1.000 | .000 |
| .725 | .480 | .961 | .226 | 1.725 | 1.474 | 1.000 | .000 | .725 | .492 | .969 | .192 | 1.725 | 1.487 | 1.000 | .000 |
| .750 | .504 | .967 | .198 | 1.750 | 1.499 | 1.000 | .000 | .750 | .516 | .974 | .167 | 1.750 | 1.512 | 1.000 | .000 |
| .775 | .528 | .971 | .173 | 1.775 | 1.524 | 1.000 | .000 | .775 | .541 | .977 | .145 | 1.775 | 1.537 | 1.000 | .000 |
| .800 | .552 | .975 | .151 | 1.800 | 1.549 | 1.000 | .000 | .800 | .565 | .981 | .125 | 1.800 | 1.562 | 1.000 | .000 |
| .825 | .577 | .979 | .132 | 1.825 | 1.574 | 1.000 | .000 | .825 | .590 | .984 | .108 | 1.825 | 1.587 | 1.000 | .000 |
| .850 | .601 | .982 | .115 | 1.850 | 1.599 | 1.000 | .000 | .850 | .614 | .986 | .093 | 1.850 | 1.612 | 1.000 | .000 |
| .875 | .626 | .985 | .099 | 1.875 | 1.624 | 1.000 | .000 | .875 | .639 | .988 | .080 | 1.875 | 1.637 | 1.000 | .000 |
| .900 | .650 | .987 | .086 | 1.900 | 1.649 | 1.000 | .000 | .900 | .664 | .990 | .068 | 1.900 | 1.662 | 1.000 | .000 |
| .925 | .675 | .989 | .074 | 1.925 | 1.674 | 1.000 | .000 | .925 | .688 | .992 | .058 | 1.925 | 1.687 | 1.000 | .000 |
| .950 | .700 | .991 | .063 | 1.950 | 1.699 | 1.000 | .000 | .950 | .713 | .993 | .049 | 1.950 | 1.712 | 1.000 | .000 |
| .975 | .725 | .992 | .054 | 1.975 | 1.724 | 1.000 | .000 | .975 | .738 | .994 | .042 | 1.975 | 1.737 | 1.000 | .000 |
| | | | | 2.000 | 1.749 | 1.000 | .000 | | | | | 2.000 | 1.762 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}z^{m-1}$, $W = bx^{n-1}z^m$)(18) $p = 2$, $n = 3$, and $m = 5$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 4.007 | 1.000 | 0.795 | 0.998 | 0.014 | 0.000 | 0.000 | 0.000 | 4.180 | 1.000 | 0.803 | 0.999 | 0.011 |
| .025 | .001 | .097 | 3.733 | 1.025 | .820 | .999 | .011 | .025 | .001 | .101 | 3.881 | 1.025 | .828 | .999 | .009 |
| .050 | .005 | .187 | 3.462 | 1.050 | .845 | .999 | .009 | .050 | .005 | .194 | 3.585 | 1.050 | .853 | .999 | .007 |
| .075 | .011 | .270 | 3.197 | 1.075 | .870 | .999 | .007 | .075 | .011 | .280 | 3.297 | 1.075 | .878 | .999 | .005 |
| .100 | .018 | .347 | 2.940 | 1.100 | .895 | .999 | .006 | .100 | .019 | .359 | 3.019 | 1.100 | .903 | 1.000 | .004 |
| .125 | .028 | .417 | 2.693 | 1.125 | .920 | 1.000 | .005 | .125 | .029 | .431 | 2.752 | 1.125 | .928 | 1.000 | .003 |
| .150 | .039 | .481 | 2.457 | 1.150 | .945 | 1.000 | .004 | .150 | .040 | .497 | 2.499 | 1.150 | .953 | 1.000 | .003 |
| .175 | .052 | .540 | 2.234 | 1.175 | .970 | 1.000 | .003 | .175 | .054 | .556 | 2.259 | 1.175 | .978 | 1.000 | .002 |
| .200 | .066 | .593 | 2.024 | 1.200 | .995 | 1.000 | .002 | .200 | .068 | .610 | 2.035 | 1.200 | 1.003 | 1.000 | .002 |
| .225 | .081 | .641 | 1.827 | 1.225 | 1.020 | 1.000 | .002 | .225 | .084 | .658 | 1.827 | 1.225 | 1.028 | 1.000 | .001 |
| .250 | .098 | .685 | 1.644 | 1.250 | 1.045 | 1.000 | .001 | .250 | .101 | .701 | 1.633 | 1.250 | 1.053 | 1.000 | .001 |
| .275 | .116 | .724 | 1.473 | 1.275 | 1.070 | 1.000 | .001 | .275 | .119 | .740 | 1.455 | 1.275 | 1.078 | 1.000 | .001 |
| .300 | .134 | .758 | 1.316 | 1.300 | 1.095 | 1.000 | .001 | .300 | .138 | .774 | 1.291 | 1.300 | 1.103 | 1.000 | .001 |
| .325 | .153 | .789 | 1.172 | 1.325 | 1.120 | 1.000 | .001 | .325 | .158 | .805 | 1.142 | 1.325 | 1.128 | 1.000 | .000 |
| .350 | .174 | .817 | 1.040 | 1.350 | 1.145 | 1.000 | .000 | .350 | .178 | .831 | 1.007 | 1.350 | 1.153 | 1.000 | .000 |
| .375 | .194 | .842 | .920 | 1.375 | 1.170 | 1.000 | .000 | .375 | .199 | .855 | .884 | 1.375 | 1.178 | 1.000 | .000 |
| .400 | .216 | .863 | .811 | 1.400 | 1.195 | 1.000 | .000 | .400 | .221 | .876 | .774 | 1.400 | 1.203 | 1.000 | .000 |
| .425 | .237 | .882 | .713 | 1.425 | 1.220 | 1.000 | .000 | .425 | .243 | .894 | .675 | 1.425 | 1.228 | 1.000 | .000 |
| .450 | .260 | .899 | .624 | 1.450 | 1.245 | 1.000 | .000 | .450 | .266 | .910 | .587 | 1.450 | 1.253 | 1.000 | .000 |
| .475 | .282 | .914 | .545 | 1.475 | 1.270 | 1.000 | .000 | .475 | .289 | .923 | .508 | 1.475 | 1.278 | 1.000 | .000 |
| .500 | .305 | .926 | .474 | 1.500 | 1.295 | 1.000 | .000 | .500 | .312 | .935 | .438 | 1.500 | 1.303 | 1.000 | .000 |
| .525 | .329 | .937 | .411 | 1.525 | 1.320 | 1.000 | .000 | .525 | .335 | .945 | .377 | 1.525 | 1.328 | 1.000 | .000 |
| .550 | .352 | .947 | .355 | 1.550 | 1.345 | 1.000 | .000 | .550 | .359 | .954 | .323 | 1.550 | 1.353 | 1.000 | .000 |
| .575 | .376 | .955 | .306 | 1.575 | 1.370 | 1.000 | .000 | .575 | .383 | .961 | .276 | 1.575 | 1.378 | 1.000 | .000 |
| .600 | .400 | .962 | .262 | 1.600 | 1.395 | 1.000 | .000 | .600 | .407 | .968 | .235 | 1.600 | 1.403 | 1.000 | .000 |
| .625 | .424 | .968 | .224 | 1.625 | 1.420 | 1.000 | .000 | .625 | .431 | .973 | .199 | 1.625 | 1.428 | 1.000 | .000 |
| .650 | .448 | .973 | .191 | 1.650 | 1.445 | 1.000 | .000 | .650 | .456 | .978 | .168 | 1.650 | 1.453 | 1.000 | .000 |
| .675 | .473 | .978 | .162 | 1.675 | 1.470 | 1.000 | .000 | .675 | .480 | .982 | .142 | 1.675 | 1.478 | 1.000 | .000 |
| .700 | .497 | .982 | .137 | 1.700 | 1.495 | 1.000 | .000 | .700 | .505 | .985 | .119 | 1.700 | 1.503 | 1.000 | .000 |
| .725 | .522 | .985 | .116 | 1.725 | 1.520 | 1.000 | .000 | .725 | .529 | .988 | .099 | 1.725 | 1.528 | 1.000 | .000 |
| .750 | .547 | .987 | .097 | 1.750 | 1.545 | 1.000 | .000 | .750 | .554 | .990 | .083 | 1.750 | 1.553 | 1.000 | .000 |
| .775 | .571 | .990 | .082 | 1.775 | 1.570 | 1.000 | .000 | .775 | .579 | .992 | .068 | 1.775 | 1.578 | 1.000 | .000 |
| .800 | .596 | .992 | .068 | 1.800 | 1.595 | 1.000 | .000 | .800 | .604 | .993 | .057 | 1.800 | 1.603 | 1.000 | .000 |
| .825 | .621 | .993 | .056 | 1.825 | 1.620 | 1.000 | .000 | .825 | .629 | .995 | .047 | 1.825 | 1.628 | 1.000 | .000 |
| .850 | .646 | .994 | .047 | 1.850 | 1.645 | 1.000 | .000 | .850 | .653 | .996 | .038 | 1.850 | 1.653 | 1.000 | .000 |
| .875 | .671 | .995 | .039 | 1.875 | 1.670 | 1.000 | .000 | .875 | .678 | .996 | .031 | 1.875 | 1.678 | 1.000 | .000 |
| .900 | .695 | .996 | .032 | 1.900 | 1.695 | 1.000 | .000 | .900 | .703 | .997 | .025 | 1.900 | 1.703 | 1.000 | .000 |
| .925 | .720 | .997 | .026 | 1.925 | 1.720 | 1.000 | .000 | .925 | .728 | .998 | .021 | 1.925 | 1.728 | 1.000 | .000 |
| .950 | .745 | .998 | .021 | 1.950 | 1.745 | 1.000 | .000 | .950 | .753 | .998 | .017 | 1.950 | 1.753 | 1.000 | .000 |
| .975 | .770 | .998 | .017 | 1.975 | 1.770 | 1.000 | .000 | .975 | .778 | .999 | .013 | 1.975 | 1.778 | 1.000 | .000 |
| | | | | 2.000 | 1.795 | 1.000 | .000 | | | | | 2.000 | 1.803 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n_2}m^{-1}$, $W = bx^{n-1}z^m$)(19) $p = 2$, $n = 5$, and $m = 0$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.200 | 1.500 | 1.149 | 0.998 | 0.014 | 0.000 | 0.000 | 0.000 | 2.484 | 1.900 | 1.182 | 0.999 | 0.008 |
| .050 | .003 | .106 | 2.050 | 1.550 | 1.199 | .998 | .011 | .050 | .003 | .119 | 2.285 | 1.550 | 1.231 | .999 | .006 |
| .100 | .011 | .205 | 1.901 | 1.600 | 1.249 | .999 | .008 | .100 | .012 | .229 | 2.088 | 1.600 | 1.281 | .999 | .004 |
| .150 | .023 | .296 | 1.754 | 1.650 | 1.299 | .999 | .006 | .150 | .026 | .328 | 1.895 | 1.650 | 1.331 | 1.000 | .003 |
| .200 | .040 | .380 | 1.609 | 1.700 | 1.349 | .999 | .004 | .200 | .044 | .418 | 1.709 | 1.700 | 1.381 | 1.000 | .002 |
| .250 | .061 | .457 | 1.468 | 1.750 | 1.399 | 1.000 | .003 | .250 | .067 | .499 | 1.531 | 1.750 | 1.431 | 1.000 | .001 |
| .300 | .086 | .527 | 1.332 | 1.800 | 1.449 | 1.000 | .002 | .300 | .094 | .571 | 1.362 | 1.800 | 1.481 | 1.000 | .001 |
| .350 | .114 | .591 | 1.201 | 1.850 | 1.499 | 1.000 | .002 | .350 | .124 | .636 | 1.204 | 1.850 | 1.531 | 1.000 | .001 |
| .400 | .145 | .648 | 1.075 | 1.900 | 1.549 | 1.000 | .001 | .400 | .158 | .692 | 1.057 | 1.900 | 1.581 | 1.000 | .000 |
| .450 | .178 | .698 | .957 | 1.950 | 1.599 | 1.000 | .001 | .450 | .193 | .741 | .921 | 1.950 | 1.631 | 1.000 | .000 |
| .500 | .214 | .743 | .846 | 2.000 | 1.649 | 1.000 | .001 | .500 | .232 | .784 | .797 | 2.000 | 1.681 | 1.000 | .000 |
| .550 | .253 | .783 | .743 | 2.050 | 1.699 | 1.000 | .000 | .550 | .272 | .821 | .684 | 2.050 | 1.731 | 1.000 | .000 |
| .600 | .293 | .818 | .648 | 2.100 | 1.749 | 1.000 | .000 | .600 | .314 | .853 | .584 | 2.100 | 1.781 | 1.000 | .000 |
| .650 | .334 | .848 | .561 | 2.150 | 1.799 | 1.000 | .000 | .650 | .357 | .880 | .494 | 2.150 | 1.831 | 1.000 | .000 |
| .700 | .377 | .874 | .482 | 2.200 | 1.849 | 1.000 | .000 | .700 | .402 | .902 | .415 | 2.200 | 1.881 | 1.000 | .000 |
| .750 | .422 | .896 | .411 | 2.250 | 1.899 | 1.000 | .000 | .750 | .447 | .921 | .345 | 2.250 | 1.931 | 1.000 | .000 |
| .800 | .467 | .915 | .348 | 2.300 | 1.949 | 1.000 | .000 | .800 | .494 | .937 | .286 | 2.300 | 1.981 | 1.000 | .000 |
| .850 | .513 | .931 | .292 | 2.350 | 1.999 | 1.000 | .000 | .850 | .541 | .950 | .234 | 2.350 | 2.031 | 1.000 | .000 |
| .900 | .560 | .945 | .243 | 2.400 | 2.049 | 1.000 | .000 | .900 | .589 | .961 | .190 | 2.400 | 2.081 | 1.000 | .000 |
| .950 | .607 | .956 | .201 | 2.450 | 2.099 | 1.000 | .000 | .950 | .637 | .969 | .154 | 2.450 | 2.131 | 1.000 | .000 |
| 1.000 | .655 | .965 | .165 | 2.500 | 2.149 | 1.000 | .000 | 1.000 | .686 | .976 | .123 | 2.500 | 2.181 | 1.000 | .000 |
| 1.050 | .704 | .972 | .134 | 2.550 | 2.199 | 1.000 | .000 | 1.050 | .734 | .982 | .098 | 2.550 | 2.231 | 1.000 | .000 |
| 1.100 | .753 | .978 | .108 | 2.600 | 2.249 | 1.000 | .000 | 1.100 | .784 | .986 | .077 | 2.600 | 2.281 | 1.000 | .000 |
| 1.150 | .802 | .983 | .087 | 2.650 | 2.299 | 1.000 | .000 | 1.150 | .833 | .989 | .060 | 2.650 | 2.331 | 1.000 | .000 |
| 1.200 | .851 | .987 | .069 | 2.700 | 2.349 | 1.000 | .000 | 1.200 | .883 | .992 | .046 | 2.700 | 2.381 | 1.000 | .000 |
| 1.250 | .900 | .990 | .054 | 2.750 | 2.399 | 1.000 | .000 | 1.250 | .932 | .994 | .035 | 2.750 | 2.431 | 1.000 | .000 |
| 1.300 | .950 | .992 | .042 | 2.800 | 2.449 | 1.000 | .000 | 1.300 | .982 | .996 | .027 | 2.800 | 2.481 | 1.000 | .000 |
| 1.350 | 1.000 | .994 | .033 | 2.850 | 2.499 | 1.000 | .000 | 1.350 | 1.032 | .997 | .020 | 2.850 | 2.531 | 1.000 | .000 |
| 1.400 | 1.049 | .996 | .025 | 2.900 | 2.549 | 1.000 | .000 | 1.400 | 1.082 | .998 | .015 | 2.900 | 2.581 | 1.000 | .000 |
| 1.450 | 1.099 | .997 | .019 | 2.950 | 2.599 | 1.000 | .000 | 1.450 | 1.132 | .998 | .011 | 2.950 | 2.631 | 1.000 | .000 |
| | | | | 3.000 | 2.649 | 1.000 | .000 | | | | | 3.000 | 2.681 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^{n-1}z^{m-1}$, $W = bx^{n-1}z^m$)(20) $p = 2$, $n = 5$, and $m = 1$ (a) Tabulation of $F(\eta)$ and derivatives(b) Tabulation of $G(\eta)$ and derivatives

| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ |
|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--------|-----------|------------|-------------|
| 0.000 | 0.000 | 0.000 | 2.760 | 1.000 | 0.713 | 0.986 | 0.085 | 0.000 | 0.000 | 0.000 | 2.998 | 1.000 | 0.732 | 0.990 | 0.064 |
| .025 | .001 | .067 | 2.635 | 1.025 | .738 | .988 | .075 | .025 | .001 | .079 | 2.848 | 1.025 | .757 | .991 | .055 |
| .050 | .003 | .132 | 2.511 | 1.050 | .763 | .989 | .065 | .050 | .004 | .142 | 2.699 | 1.050 | .782 | .993 | .048 |
| .075 | .007 | .193 | 2.388 | 1.075 | .787 | .991 | .057 | .075 | .008 | .208 | 2.552 | 1.075 | .807 | .994 | .041 |
| .100 | .013 | .251 | 2.266 | 1.100 | .812 | .992 | .049 | .100 | .014 | .270 | 2.407 | 1.100 | .832 | .995 | .035 |
| .125 | .020 | .306 | 2.146 | 1.125 | .837 | .993 | .043 | .125 | .021 | .328 | 2.265 | 1.125 | .857 | .996 | .030 |
| .150 | .028 | .358 | 2.028 | 1.150 | .862 | .994 | .037 | .150 | .030 | .383 | 2.126 | 1.150 | .881 | .996 | .026 |
| .175 | .038 | .408 | 1.913 | 1.175 | .887 | .995 | .032 | .175 | .041 | .435 | 1.992 | 1.175 | .906 | .997 | .022 |
| .200 | .049 | .454 | 1.801 | 1.200 | .912 | .996 | .027 | .200 | .052 | .483 | 1.861 | 1.200 | .931 | .997 | .019 |
| .225 | .061 | .498 | 1.692 | 1.225 | .937 | .997 | .023 | .225 | .065 | .528 | 1.736 | 1.225 | .956 | .998 | .016 |
| .250 | .073 | .539 | 1.587 | 1.250 | .961 | .997 | .020 | .250 | .078 | .570 | 1.615 | 1.250 | .981 | .998 | .013 |
| .275 | .087 | .577 | 1.485 | 1.275 | .986 | .998 | .017 | .275 | .093 | .609 | 1.499 | 1.275 | 1.006 | .998 | .011 |
| .300 | .102 | .613 | 1.387 | 1.300 | 1.011 | .998 | .015 | .300 | .109 | .645 | 1.389 | 1.300 | 1.031 | .999 | .009 |
| .325 | .118 | .647 | 1.293 | 1.325 | 1.036 | .998 | .012 | .325 | .125 | .678 | 1.283 | 1.325 | 1.056 | .999 | .008 |
| .350 | .135 | .678 | 1.202 | 1.350 | 1.061 | .999 | .010 | .350 | .143 | .709 | 1.183 | 1.350 | 1.081 | .999 | .007 |
| .375 | .152 | .707 | 1.116 | 1.375 | 1.086 | .999 | .009 | .375 | .161 | .737 | 1.089 | 1.375 | 1.106 | .999 | .006 |
| .400 | .170 | .734 | 1.034 | 1.400 | 1.111 | .999 | .007 | .400 | .180 | .763 | 1.000 | 1.400 | 1.131 | .999 | .005 |
| .425 | .189 | .758 | .956 | 1.425 | 1.136 | .999 | .006 | .425 | .199 | .787 | .916 | 1.425 | 1.156 | 1.000 | .004 |
| .450 | .208 | .781 | .882 | 1.450 | 1.161 | .999 | .005 | .450 | .219 | .809 | .837 | 1.450 | 1.181 | 1.000 | .003 |
| .475 | .228 | .803 | .812 | 1.475 | 1.186 | .999 | .004 | .475 | .239 | .829 | .763 | 1.475 | 1.206 | 1.000 | .003 |
| .500 | .248 | .822 | .746 | 1.500 | 1.211 | 1.000 | .004 | .500 | .260 | .847 | .695 | 1.500 | 1.231 | 1.000 | .002 |
| .525 | .269 | .840 | .683 | 1.525 | 1.236 | 1.000 | .003 | .525 | .282 | .864 | .630 | 1.525 | 1.256 | 1.000 | .002 |
| .550 | .290 | .856 | .625 | 1.550 | 1.261 | 1.000 | .003 | .550 | .304 | .879 | .571 | 1.550 | 1.281 | 1.000 | .001 |
| .575 | .312 | .871 | .571 | 1.575 | 1.286 | 1.000 | .002 | .575 | .326 | .893 | .516 | 1.575 | 1.306 | 1.000 | .001 |
| .600 | .334 | .885 | .520 | 1.600 | 1.311 | 1.000 | .002 | .600 | .348 | .905 | .465 | 1.600 | 1.331 | 1.000 | .001 |
| .625 | .356 | .897 | .472 | 1.625 | 1.336 | 1.000 | .001 | .625 | .371 | .916 | .419 | 1.625 | 1.356 | 1.000 | .001 |
| .650 | .378 | .908 | .428 | 1.650 | 1.361 | 1.000 | .001 | .650 | .394 | .926 | .376 | 1.650 | 1.381 | 1.000 | .001 |
| .675 | .401 | .919 | .387 | 1.675 | 1.386 | 1.000 | .001 | .675 | .417 | .935 | .336 | 1.675 | 1.406 | 1.000 | .000 |
| .700 | .424 | .928 | .350 | 1.700 | 1.411 | 1.000 | .001 | .700 | .441 | .943 | .300 | 1.700 | 1.431 | 1.000 | .000 |
| .725 | .448 | .936 | .315 | 1.725 | 1.436 | 1.000 | .001 | .725 | .464 | .950 | .268 | 1.725 | 1.456 | 1.000 | .000 |
| .750 | .471 | .944 | .283 | 1.750 | 1.461 | 1.000 | .001 | .750 | .488 | .956 | .238 | 1.750 | 1.481 | 1.000 | .000 |
| .775 | .495 | .950 | .254 | 1.775 | 1.486 | 1.000 | .000 | .775 | .512 | .962 | .211 | 1.775 | 1.506 | 1.000 | .000 |
| .800 | .519 | .956 | .227 | 1.800 | 1.511 | 1.000 | .000 | .800 | .536 | .967 | .187 | 1.800 | 1.531 | 1.000 | .000 |
| .825 | .543 | .962 | .202 | 1.825 | 1.536 | 1.000 | .000 | .825 | .561 | .971 | .165 | 1.825 | 1.556 | 1.000 | .000 |
| .850 | .567 | .966 | .180 | 1.850 | 1.561 | 1.000 | .000 | .850 | .585 | .975 | .145 | 1.850 | 1.581 | 1.000 | .000 |
| .875 | .591 | .971 | .160 | 1.875 | 1.586 | 1.000 | .000 | .875 | .609 | .978 | .127 | 1.875 | 1.606 | 1.000 | .000 |
| .900 | .615 | .974 | .142 | 1.900 | 1.611 | 1.000 | .000 | .900 | .634 | .981 | .112 | 1.900 | 1.631 | 1.000 | .000 |
| .925 | .640 | .978 | .125 | 1.925 | 1.636 | 1.000 | .000 | .925 | .658 | .984 | .098 | 1.925 | 1.656 | 1.000 | .000 |
| .950 | .664 | .981 | .110 | 1.950 | 1.661 | 1.000 | .000 | .950 | .683 | .986 | .085 | 1.950 | 1.681 | 1.000 | .000 |
| .975 | .689 | .983 | .097 | 1.975 | 1.686 | 1.000 | .000 | .975 | .708 | .988 | .074 | 1.975 | 1.706 | 1.000 | .000 |
| | | | | 2.000 | 1.711 | 1.000 | .000 | | | | | 2.000 | 1.731 | 1.000 | .000 |

TABLE II. - Continued. NUMERICAL SOLUTION TO CASE II ($U = ax^p z^{m-1}$, $W = bx^{n-1} z^m$)

(21) $p = 2$, $n = 5$, and $m = 3$

| (a) Tabulation of $F(\eta)$ and derivatives | | | | | | | | | | (b) Tabulation of $G(\eta)$ and derivatives | | | | | | | | | |
|---|-----------|------------|-------------|-----------|------------|-------------|--------|-----------|------------|---|--------|-----------|------------|-------------|--------|-----------|------------|-------------|--|
| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | |
| 0.000 | 0.000 | 0.000 | 3.640 | 0.776 | 0.997 | 0.025 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 | 0.786 | 0.998 | 0.019 | |
| 0.025 | 0.001 | 0.088 | 3.415 | 0.801 | 0.998 | 0.020 | 0.025 | 0.001 | 0.093 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.025 | 0.811 | 0.998 | 0.015 | |
| 0.050 | 0.004 | 0.171 | 3.193 | 0.826 | 0.998 | 0.017 | 0.050 | 0.005 | 0.179 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.050 | 0.836 | 0.999 | 0.013 | |
| 0.075 | 0.010 | 0.248 | 2.974 | 0.851 | 0.998 | 0.014 | 0.075 | 0.010 | 0.259 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.075 | 0.861 | 0.999 | 0.010 | |
| 0.100 | 0.017 | 0.320 | 2.761 | 0.876 | 0.999 | 0.011 | 0.100 | 0.017 | 0.333 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.100 | 0.886 | 0.999 | 0.008 | |
| 0.125 | 0.026 | 0.386 | 2.555 | 0.901 | 0.999 | 0.009 | 0.125 | 0.027 | 0.402 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.125 | 0.911 | 0.999 | 0.007 | |
| 0.150 | 0.036 | 0.447 | 2.356 | 0.926 | 0.999 | 0.007 | 0.150 | 0.038 | 0.465 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.150 | 0.936 | 0.999 | 0.005 | |
| 0.175 | 0.048 | 0.504 | 2.166 | 0.951 | 0.999 | 0.006 | 0.175 | 0.050 | 0.523 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.175 | 0.961 | 0.999 | 0.004 | |
| 0.200 | 0.061 | 0.556 | 1.986 | 0.976 | 0.999 | 0.005 | 0.200 | 0.064 | 0.575 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.200 | 0.986 | 0.999 | 0.003 | |
| 0.225 | 0.076 | 0.603 | 1.814 | 1.001 | 1.000 | 0.004 | 0.225 | 0.079 | 0.623 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.225 | 1.011 | 1.000 | 0.003 | |
| 0.250 | 0.091 | 0.647 | 1.653 | 1.026 | 1.000 | 0.003 | 0.250 | 0.095 | 0.666 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.250 | 1.036 | 1.000 | 0.002 | |
| 0.275 | 0.108 | 0.686 | 1.501 | 1.051 | 1.000 | 0.003 | 0.275 | 0.112 | 0.706 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.275 | 1.061 | 1.000 | 0.002 | |
| 0.300 | 0.126 | 0.722 | 1.359 | 1.076 | 1.000 | 0.002 | 0.300 | 0.130 | 0.747 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.300 | 1.086 | 1.000 | 0.001 | |
| 0.325 | 0.144 | 0.754 | 1.227 | 1.101 | 1.000 | 0.002 | 0.325 | 0.149 | 0.773 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.325 | 1.111 | 1.000 | 0.001 | |
| 0.350 | 0.163 | 0.783 | 1.105 | 1.126 | 1.000 | 0.001 | 0.350 | 0.169 | 0.801 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.350 | 1.136 | 1.000 | 0.001 | |
| 0.375 | 0.183 | 0.809 | 0.992 | 1.151 | 1.000 | 0.001 | 0.375 | 0.189 | 0.826 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.375 | 1.161 | 1.000 | 0.001 | |
| 0.400 | 0.204 | 0.833 | 0.887 | 1.176 | 1.000 | 0.001 | 0.400 | 0.210 | 0.849 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.400 | 1.186 | 1.000 | 0.000 | |
| 0.425 | 0.225 | 0.854 | 0.792 | 1.201 | 1.000 | 0.001 | 0.425 | 0.231 | 0.869 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.425 | 1.211 | 1.000 | 0.000 | |
| 0.450 | 0.246 | 0.872 | 0.705 | 1.226 | 1.000 | 0.000 | 0.450 | 0.253 | 0.887 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.450 | 1.236 | 1.000 | 0.000 | |
| 0.475 | 0.268 | 0.889 | 0.625 | 1.251 | 1.000 | 0.000 | 0.475 | 0.276 | 0.902 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.475 | 1.261 | 1.000 | 0.000 | |
| 0.500 | 0.291 | 0.904 | 0.553 | 1.276 | 1.000 | 0.000 | 0.500 | 0.298 | 0.916 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.500 | 1.286 | 1.000 | 0.000 | |
| 0.525 | 0.314 | 0.917 | 0.484 | 1.301 | 1.000 | 0.000 | 0.525 | 0.321 | 0.926 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.525 | 1.311 | 1.000 | 0.000 | |
| 0.550 | 0.337 | 0.928 | 0.429 | 1.326 | 1.000 | 0.000 | 0.550 | 0.345 | 0.936 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.550 | 1.336 | 1.000 | 0.000 | |
| 0.575 | 0.360 | 0.938 | 0.376 | 1.351 | 1.000 | 0.000 | 0.575 | 0.368 | 0.947 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.575 | 1.361 | 1.000 | 0.000 | |
| 0.600 | 0.383 | 0.947 | 0.328 | 1.376 | 1.000 | 0.000 | 0.600 | 0.392 | 0.955 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.600 | 1.386 | 1.000 | 0.000 | |
| 0.625 | 0.407 | 0.956 | 0.286 | 1.401 | 1.000 | 0.000 | 0.625 | 0.414 | 0.962 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.625 | 1.411 | 1.000 | 0.000 | |
| 0.650 | 0.431 | 0.964 | 0.248 | 1.426 | 1.000 | 0.000 | 0.650 | 0.437 | 0.969 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.650 | 1.436 | 1.000 | 0.000 | |
| 0.675 | 0.455 | 0.967 | 0.215 | 1.451 | 1.000 | 0.000 | 0.675 | 0.459 | 0.975 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.675 | 1.461 | 1.000 | 0.000 | |
| 0.700 | 0.480 | 0.972 | 0.186 | 1.476 | 1.000 | 0.000 | 0.700 | 0.489 | 0.977 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.700 | 1.486 | 1.000 | 0.000 | |
| 0.725 | 0.504 | 0.976 | 0.161 | 1.501 | 1.000 | 0.000 | 0.725 | 0.515 | 0.981 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.725 | 1.511 | 1.000 | 0.000 | |
| 0.750 | 0.528 | 0.980 | 0.137 | 1.526 | 1.000 | 0.000 | 0.750 | 0.535 | 0.984 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.750 | 1.536 | 1.000 | 0.000 | |
| 0.775 | 0.553 | 0.983 | 0.117 | 1.551 | 1.000 | 0.000 | 0.775 | 0.555 | 0.986 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.775 | 1.561 | 1.000 | 0.000 | |
| 0.800 | 0.578 | 0.986 | 0.098 | 1.576 | 1.000 | 0.000 | 0.800 | 0.575 | 0.987 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.800 | 1.586 | 1.000 | 0.000 | |
| 0.825 | 0.602 | 0.988 | 0.080 | 1.601 | 1.000 | 0.000 | 0.825 | 0.595 | 0.988 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.825 | 1.611 | 1.000 | 0.000 | |
| 0.850 | 0.627 | 0.990 | 0.062 | 1.626 | 1.000 | 0.000 | 0.850 | 0.615 | 0.989 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.850 | 1.636 | 1.000 | 0.000 | |
| 0.875 | 0.652 | 0.992 | 0.045 | 1.651 | 1.000 | 0.000 | 0.875 | 0.635 | 0.990 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.875 | 1.661 | 1.000 | 0.000 | |
| 0.900 | 0.677 | 0.993 | 0.030 | 1.676 | 1.000 | 0.000 | 0.900 | 0.655 | 0.991 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.900 | 1.686 | 1.000 | 0.000 | |
| 0.925 | 0.701 | 0.995 | 0.016 | 1.701 | 1.000 | 0.000 | 0.925 | 0.675 | 0.992 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.925 | 1.711 | 1.000 | 0.000 | |
| 0.950 | 0.726 | 0.995 | 0.006 | 1.726 | 1.000 | 0.000 | 0.950 | 0.695 | 0.993 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.950 | 1.736 | 1.000 | 0.000 | |
| 0.975 | 0.751 | 0.996 | 0.000 | 1.751 | 1.000 | 0.000 | 0.975 | 0.715 | 0.994 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.975 | 1.761 | 1.000 | 0.000 | |
| 2.000 | 1.776 | 1.000 | 0.000 | 1.776 | 1.000 | 0.000 | 2.000 | 1.776 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.000 | 1.786 | 1.000 | 0.000 | |

TABLE II. - Concluded. NUMERICAL SOLUTION TO CASE II ($U = ax^{n_2}m^{-1}$, $W = bx^{n-1}zm$)

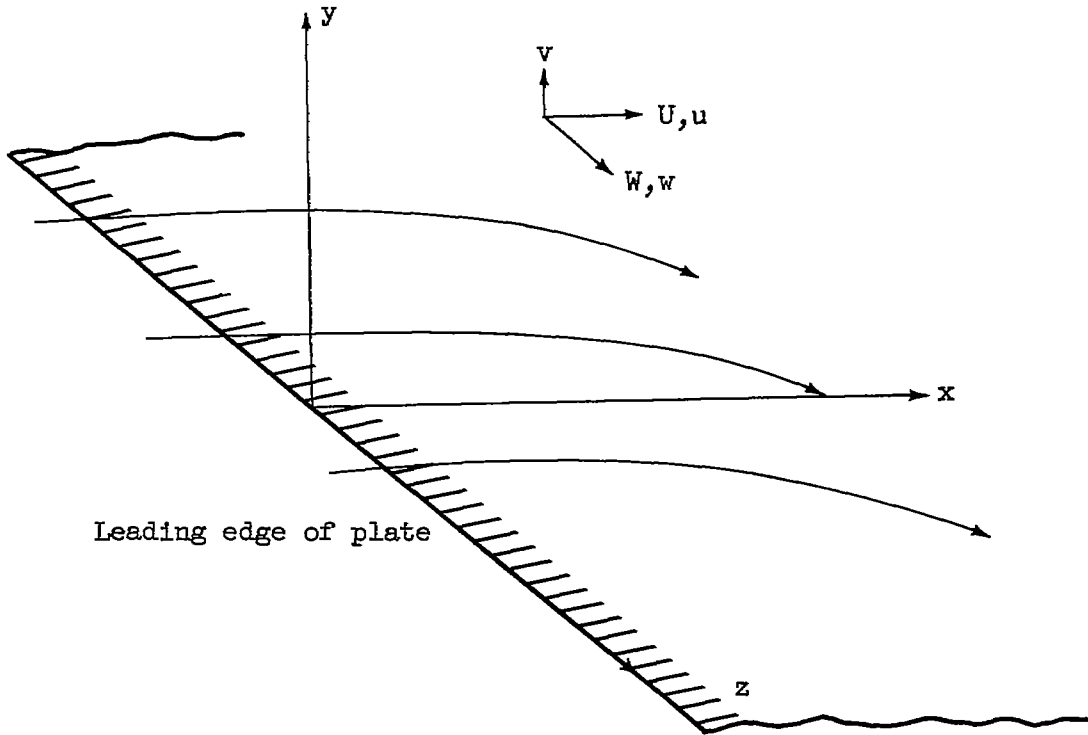
(22) $p = 2$, $n = 5$, and $m = 5$

| (a) Tabulation of $F(\eta)$ and derivatives | | | | | | | | | | (b) Tabulation of $G(\eta)$ and derivatives | | | | | | | | | |
|---|-----------|------------|-------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|-----------|------------|-------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| η | $F(\eta)$ | $F'(\eta)$ | $F''(\eta)$ | $F'''(\eta)$ | $F^{(4)}(\eta)$ | $F^{(5)}(\eta)$ | $F^{(6)}(\eta)$ | $F^{(7)}(\eta)$ | $F^{(8)}(\eta)$ | η | $G(\eta)$ | $G'(\eta)$ | $G''(\eta)$ | $G'''(\eta)$ | $G^{(4)}(\eta)$ | $G^{(5)}(\eta)$ | $G^{(6)}(\eta)$ | $G^{(7)}(\eta)$ | $G^{(8)}(\eta)$ |
| 0.000 | 0.000 | 0.000 | 4.349 | 0.811 | 0.999 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.817 | 0.999 | 0.006 | 0.006 | 0.000 | 0.000 | 0.000 |
| 0.025 | 0.01 | 0.105 | 4.025 | 0.836 | 0.999 | 0.006 | 0.006 | 0.006 | 0.006 | 0.025 | 0.01 | 0.108 | 4.160 | 0.842 | 0.999 | 0.005 | 0.005 | 0.000 | 0.000 |
| 0.050 | 0.005 | 0.201 | 3.705 | 0.861 | 1.000 | 0.005 | 0.005 | 0.005 | 0.005 | 0.050 | 0.005 | 0.208 | 3.817 | 0.857 | 1.000 | 0.004 | 0.004 | 0.000 | 0.000 |
| 0.075 | 0.011 | 0.290 | 3.394 | 0.886 | 1.000 | 0.004 | 0.004 | 0.004 | 0.004 | 0.075 | 0.012 | 0.299 | 3.483 | 0.892 | 1.000 | 0.003 | 0.003 | 0.000 | 0.000 |
| 0.100 | 0.020 | 0.371 | 3.094 | 0.911 | 1.000 | 0.003 | 0.003 | 0.003 | 0.003 | 0.100 | 0.020 | 0.382 | 3.162 | 0.917 | 1.000 | 0.002 | 0.002 | 0.000 | 0.000 |
| 0.125 | 0.030 | 0.445 | 2.808 | 0.936 | 1.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.125 | 0.031 | 0.457 | 2.856 | 0.942 | 1.000 | 0.002 | 0.002 | 0.000 | 0.000 |
| 0.150 | 0.042 | 0.512 | 2.537 | 0.961 | 1.000 | 0.002 | 0.002 | 0.002 | 0.002 | 0.150 | 0.043 | 0.525 | 2.568 | 0.967 | 1.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.175 | 0.055 | 0.572 | 2.283 | 0.986 | 1.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.175 | 0.057 | 0.586 | 2.299 | 0.992 | 1.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.200 | 0.070 | 0.626 | 2.045 | 1.011 | 1.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.200 | 0.072 | 0.640 | 2.049 | 1.017 | 1.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.225 | 0.087 | 0.674 | 1.825 | 1.036 | 1.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.225 | 0.089 | 0.689 | 1.818 | 1.042 | 1.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.250 | 0.104 | 0.717 | 1.622 | 1.061 | 1.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.250 | 0.107 | 0.731 | 1.607 | 1.057 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.275 | 0.122 | 0.755 | 1.436 | 1.086 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.275 | 0.125 | 0.769 | 1.414 | 1.092 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.300 | 0.142 | 0.789 | 1.267 | 1.111 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.300 | 0.145 | 0.802 | 1.239 | 1.117 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.325 | 0.162 | 0.819 | 1.113 | 1.136 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.325 | 0.166 | 0.831 | 1.082 | 1.142 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.350 | 0.183 | 0.845 | 0.974 | 1.161 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.350 | 0.187 | 0.857 | 0.941 | 1.167 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.375 | 0.204 | 0.868 | 0.849 | 1.186 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.375 | 0.208 | 0.878 | 0.815 | 1.192 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.400 | 0.226 | 0.888 | 0.738 | 1.211 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.400 | 0.231 | 0.894 | 0.703 | 1.217 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.425 | 0.248 | 0.905 | 0.638 | 1.236 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.425 | 0.253 | 0.914 | 0.604 | 1.242 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.450 | 0.271 | 0.920 | 0.550 | 1.261 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.450 | 0.276 | 0.928 | 0.517 | 1.267 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.475 | 0.294 | 0.932 | 0.473 | 1.286 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.475 | 0.300 | 0.940 | 0.440 | 1.292 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.500 | 0.318 | 0.943 | 0.404 | 1.311 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.500 | 0.323 | 0.950 | 0.374 | 1.317 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.525 | 0.342 | 0.953 | 0.345 | 1.336 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.525 | 0.347 | 0.958 | 0.316 | 1.342 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.550 | 0.365 | 0.961 | 0.293 | 1.361 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.550 | 0.371 | 0.966 | 0.266 | 1.367 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.575 | 0.390 | 0.967 | 0.247 | 1.386 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.575 | 0.395 | 0.972 | 0.223 | 1.392 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.600 | 0.414 | 0.973 | 0.208 | 1.411 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.600 | 0.420 | 0.977 | 0.187 | 1.417 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.625 | 0.438 | 0.978 | 0.175 | 1.436 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.625 | 0.444 | 0.981 | 0.155 | 1.442 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.650 | 0.463 | 0.982 | 0.146 | 1.461 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.650 | 0.469 | 0.985 | 0.129 | 1.467 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.675 | 0.487 | 0.985 | 0.122 | 1.486 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.675 | 0.493 | 0.988 | 0.106 | 1.492 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.700 | 0.512 | 0.988 | 0.101 | 1.511 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.700 | 0.518 | 0.990 | 0.087 | 1.517 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.725 | 0.537 | 0.990 | 0.083 | 1.536 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.725 | 0.543 | 0.992 | 0.071 | 1.542 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.750 | 0.561 | 0.992 | 0.068 | 1.561 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.750 | 0.568 | 0.994 | 0.058 | 1.567 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.775 | 0.586 | 0.994 | 0.056 | 1.586 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.775 | 0.593 | 0.995 | 0.047 | 1.592 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.800 | 0.611 | 0.995 | 0.046 | 1.611 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.800 | 0.617 | 0.996 | 0.038 | 1.617 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.825 | 0.636 | 0.996 | 0.037 | 1.636 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.825 | 0.642 | 0.997 | 0.031 | 1.642 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.850 | 0.661 | 0.997 | 0.030 | 1.661 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.850 | 0.667 | 0.997 | 0.025 | 1.667 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.875 | 0.686 | 0.997 | 0.024 | 1.686 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.875 | 0.692 | 0.998 | 0.020 | 1.692 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.900 | 0.711 | 0.998 | 0.019 | 1.711 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.900 | 0.717 | 0.998 | 0.015 | 1.717 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.925 | 0.736 | 0.998 | 0.015 | 1.736 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.925 | 0.742 | 0.999 | 0.012 | 1.742 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.950 | 0.761 | 0.999 | 0.012 | 1.761 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.950 | 0.767 | 0.999 | 0.010 | 1.767 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.975 | 0.786 | 0.999 | 0.010 | 1.786 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.975 | 0.792 | 0.999 | 0.008 | 1.792 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2.000 | 1.811 | 1.000 | 1.811 | 1.811 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.000 | 1.817 | 1.817 | 1.817 | 1.817 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

TABLE III. - SUMMARY OF EIGENVALUES, RATIO OF EIGENVALUES, AND TABLE INDEX

| Case I | | | | | | | | | | | | |
|---------|-----|--------------------|--------------------|-------------------------|-----------------------------|----|----|--------------------|--------------------|-------------------------|-----------------------------|-----------------------------|
| n | m | F ⁿ (0) | G ⁿ (0) | $\frac{G^n(0)}{F^n(0)}$ | Solutions listed in table - | n | m | F ⁿ (0) | G ⁿ (0) | $\frac{G^n(0)}{F^n(0)}$ | Solutions listed in table - | |
| 0 | 0 | 0.33205801 | 0.33205801 | 1.0000000 | I(1) | 6 | 0 | 2.9383584 | 1.1175517 | 0.38033199 | I(29) | |
| 1 | 1 | ↓ | 1.4180286 | 4.2704243 | I(2) | 1 | 1 | ↓ | 1.4912850 | .50752318 | I(30) | |
| 2 | 2 | ↓ | 2.1971143 | 6.6166580 | I(3) | 2 | 2 | ↓ | 1.8261230 | .62147728 | I(31) | |
| 4 | 4 | ↓ | 3.4501245 | 10.390126 | I(4) | 4 | 4 | ↓ | 2.4173584 | .82269011 | I(32) | |
| 6 | 6 | ↓ | 4.50568198 | 13.568960 | I(5) | 6 | 6 | ↓ | 2.9383584 | 1.0000000 | I(33) | |
| 8 | 8 | ↓ | 5.44926954 | 16.410595 | I(6) | 8 | 8 | ↓ | 3.4117643 | 1.1611124 | I(34) | |
| 10 | 10 | ↓ | 6.31716707 | 19.024288 | I(7) | 10 | 10 | ↓ | 3.8502869 | 1.3103531 | I(35) | |
| 1 | 0 | 1.2325876 | .57046526 | .46281924 | I(8) | 8 | 0 | 3.3882993 | 1.2711033 | .37514493 | I(36) | |
| 1 | 1 | ↓ | 1.2325876 | 1.0000000 | I(9) | 1 | 1 | ↓ | 1.6035898 | .47327277 | I(37) | |
| 2 | 2 | ↓ | 1.7480821 | 1.4182214 | I(10) | 2 | 2 | ↓ | 1.9075416 | .58297907 | I(38) | |
| 4 | 4 | ↓ | 2.5897020 | 2.1010288 | I(11) | 4 | 4 | ↓ | 2.4538180 | .72420344 | I(39) | |
| 6 | 6 | ↓ | 3.2999556 | 2.6772585 | I(12) | 6 | 6 | ↓ | 2.9417263 | .86820143 | I(40) | |
| 8 | 8 | ↓ | 3.9339120 | 3.1915882 | I(13) | 8 | 8 | ↓ | 3.3882993 | 1.0000000 | I(41) | |
| 10 | 10 | ↓ | 4.5159800 | 3.6638207 | I(14) | 10 | 10 | ↓ | 3.8037494 | 1.1226132 | I(42) | |
| 2 | 0 | 1.7150676 | .71607175 | .41751809 | I(15) | 10 | 0 | 3.7851302 | 1.4079382 | .37196559 | I(43) | |
| 1 | 1 | ↓ | 1.2652246 | .73771121 | I(16) | 1 | 1 | ↓ | 1.7104632 | .45189019 | I(44) | |
| 2 | 2 | ↓ | 1.7150676 | 1.0000000 | I(17) | 2 | 2 | ↓ | 1.9909028 | .52598001 | I(45) | |
| 4 | 4 | ↓ | 2.4647970 | 1.4371428 | I(18) | 4 | 4 | ↓ | 2.5017160 | .66093262 | I(46) | |
| 6 | 6 | ↓ | 3.1030232 | 1.8092717 | I(19) | 6 | 6 | ↓ | 2.9630576 | .78281524 | I(47) | |
| 8 | 8 | ↓ | 3.6742484 | 2.1423344 | I(20) | 8 | 8 | ↓ | 3.3680884 | .89510485 | I(48) | |
| 10 | 10 | ↓ | 4.1992824 | 2.4484647 | I(21) | 10 | 10 | ↓ | 3.7851302 | 1.0000000 | I(49) | |
| 4 | 0 | 2.4057224 | .93897044 | .39030706 | I(22) | | | | | | | |
| 1 | 1 | ↓ | 1.3750248 | .57156420 | I(23) | | | | | | | |
| 2 | 2 | ↓ | 1.7534514 | .72886689 | I(24) | | | | | | | |
| 4 | 4 | ↓ | 2.4057224 | 1.0000000 | I(25) | | | | | | | |
| 6 | 6 | ↓ | 2.9712802 | 1.2350886 | I(26) | | | | | | | |
| 8 | 8 | ↓ | 3.4812041 | 1.4470515 | I(27) | | | | | | | |
| 10 | 10 | ↓ | 3.9515635 | 1.6425684 | I(28) | | | | | | | |
| Case II | | | | | | | | | | | | |
| p | n+m | F ⁿ (0) | G ⁿ (0) | $\frac{G^n(0)}{F^n(0)}$ | Solutions listed in table - | p | n | m | F ⁿ (0) | G ⁿ (0) | $\frac{G^n(0)}{F^n(0)}$ | Solutions listed in table - |
| 1 | 1 | 0.57514219 | 0.57514219 | 1.0 | II(1) | 2 | 0 | 1 | 0.81535508 | 1.3062116 | 1.6020157 | II(9) |
| 2 | 2 | 1.3119376 | 1.3119376 | ↓ | II(2) | 3 | 3 | 2.4730115 | 2.7318811 | 1.1046779 | II(10) | |
| 3 | 3 | 1.7712984 | 1.7712984 | ↓ | II(3) | 5 | 5 | 3.4309556 | 3.6287362 | 1.0576459 | II(11) | |
| 4 | 4 | 2.1349036 | 2.1349036 | ↓ | II(4) | 1 | 1 | 1.4115422 | 1.7916184 | 1.2692631 | II(12) | |
| 5 | 5 | 2.4452962 | 2.4452962 | ↓ | II(5) | 3 | 3 | 2.7466290 | 2.9849798 | 1.0867794 | II(13) | |
| 6 | 6 | 2.7206142 | 2.7206142 | ↓ | II(6) | 5 | 5 | 3.6334391 | 3.8216402 | 1.0517970 | II(14) | |
| 8 | 8 | 3.2011128 | 3.2011128 | ↓ | II(7) | 3 | 0 | 1.4393410 | 1.8175671 | 1.2627773 | II(15) | |
| 10 | 10 | 3.6184272 | 3.6184272 | ↓ | II(8) | 1 | 1 | 2.1883259 | 2.4732072 | 1.1301823 | II(16) | |
| | | | | | | 3 | 3 | 2.2246025 | 3.4333645 | 1.0647404 | II(17) | |
| | | | | | | 5 | 4 | 4.0074496 | 4.1800578 | 1.0430718 | II(18) | |
| | | | | | | 5 | 0 | 2.1999634 | 2.4843196 | 1.1292550 | II(19) | |
| | | | | | | 1 | 2 | 2.7601433 | 2.9980445 | 1.0861916 | II(20) | |
| | | | | | | 3 | 3 | 3.6400506 | 3.8281042 | 1.0516624 | II(21) | |
| | | | | | | 5 | 4 | 4.3490950 | 4.5094492 | 1.0368707 | II(22) | |

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Leading edge of plate

Figure 1. - Orientation of rectangular coordinates.

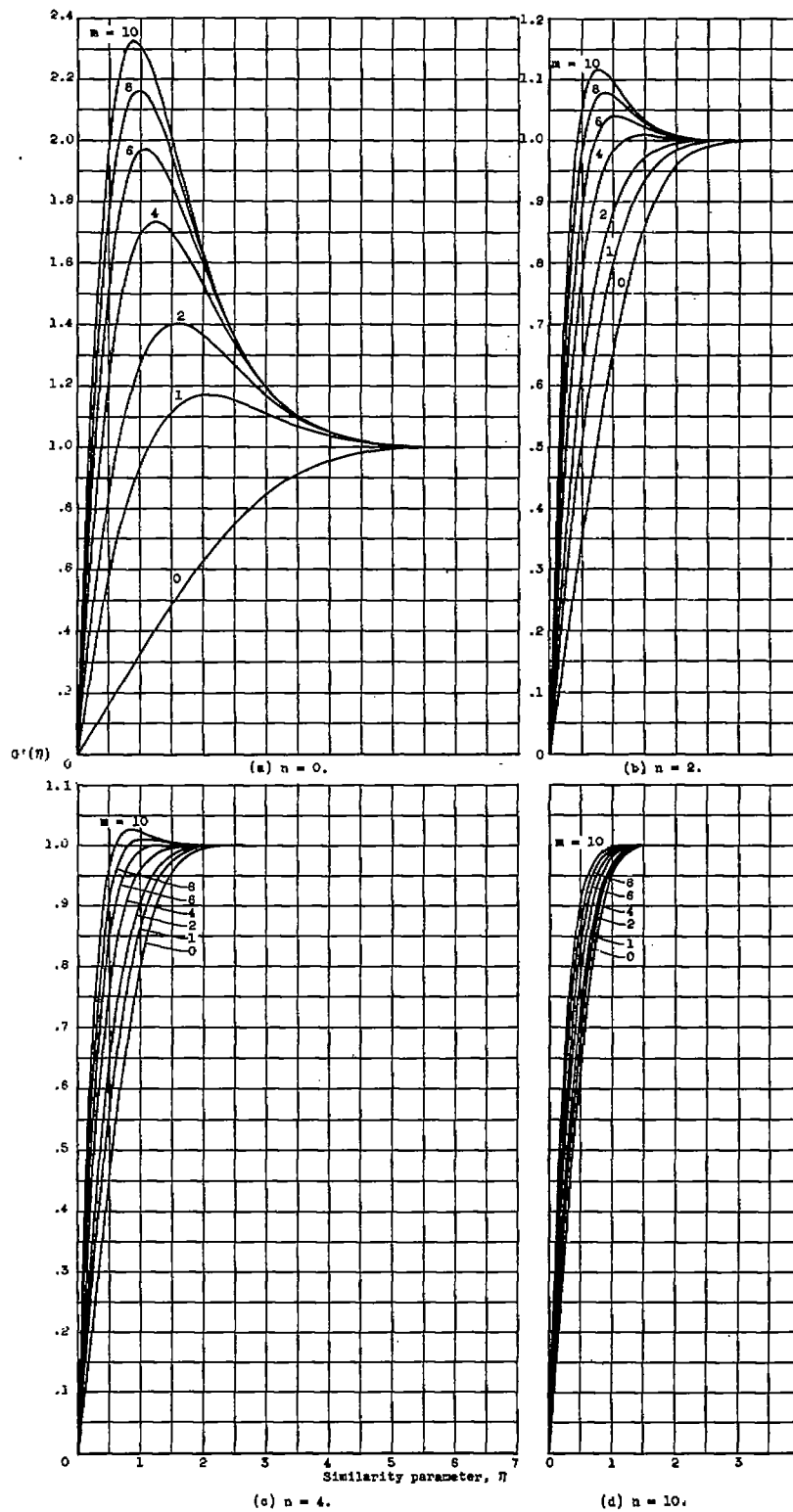


Figure 2. - Variation of solutions to Case I
($U = ax^n$, $W = bx^m$) with m .

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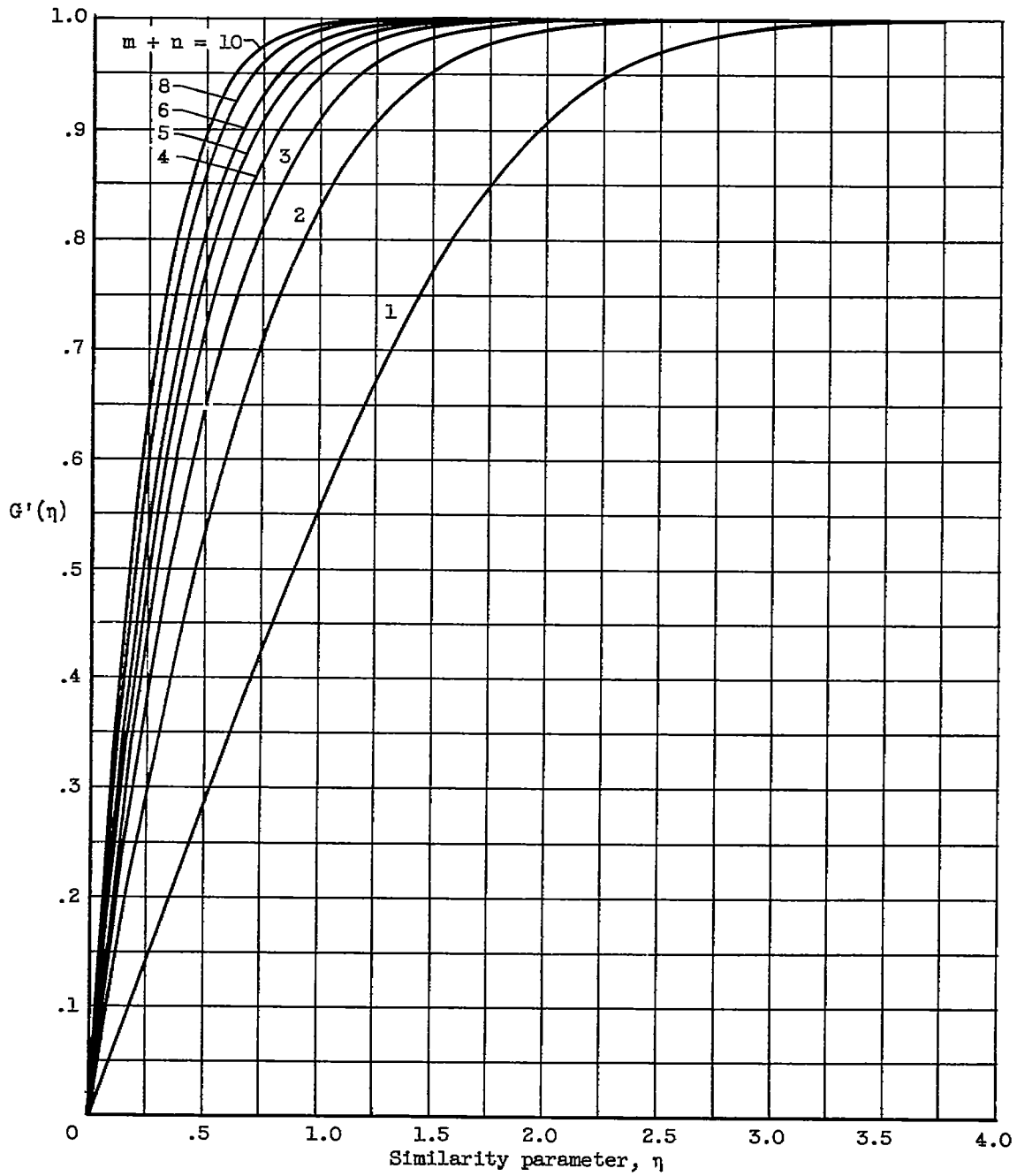


Figure 3. - Variation of solutions to Case II ($U = ax^n z^{m-1}$, $W = bx^{n-1} z^m$) with $m + n, p = 1$.

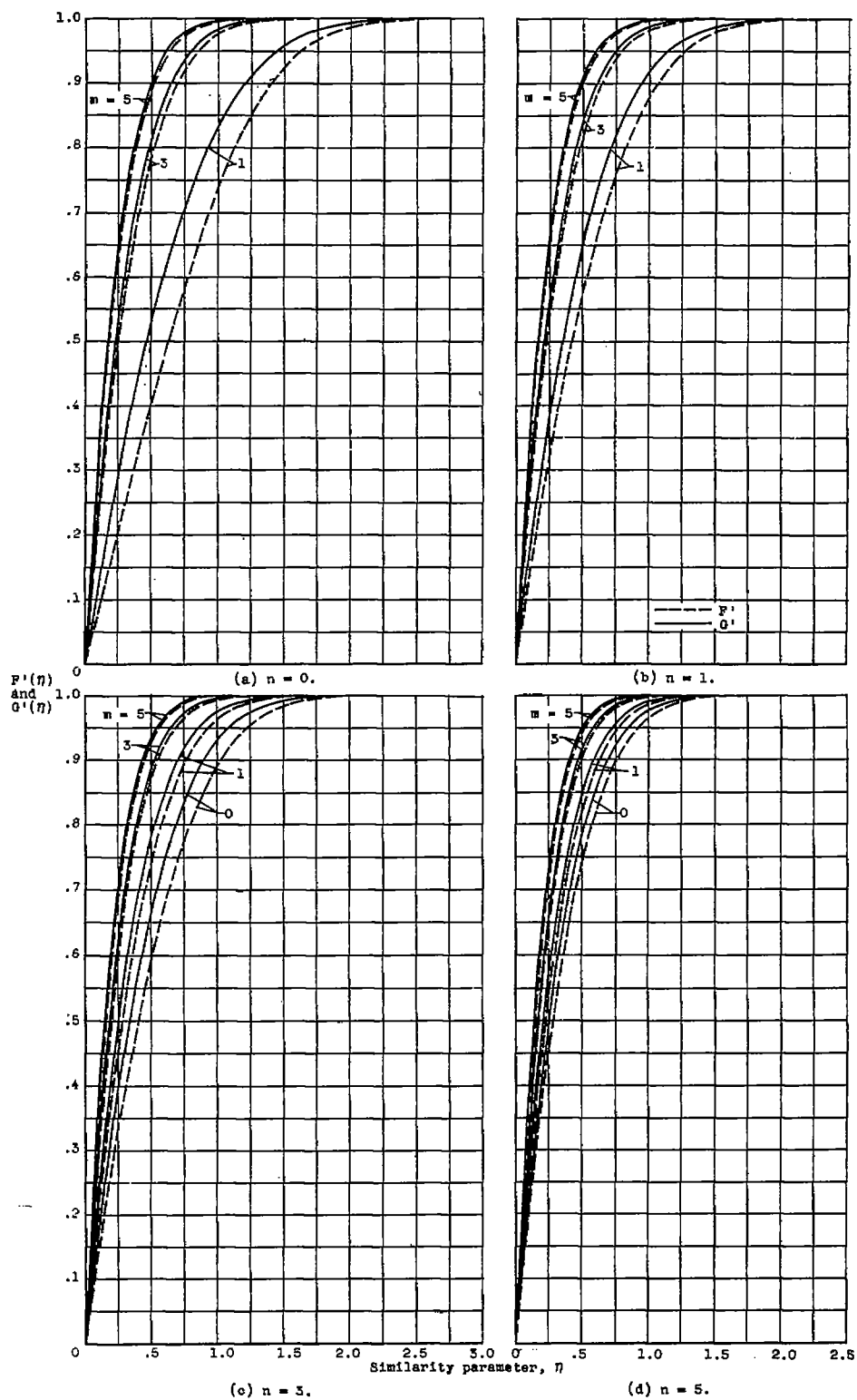


Figure 4. - Variation of solutions to Case II
 $(U = ax^nz^{m-1}, W = bx^{n-1}z^m)$ with $m, p = 2$.

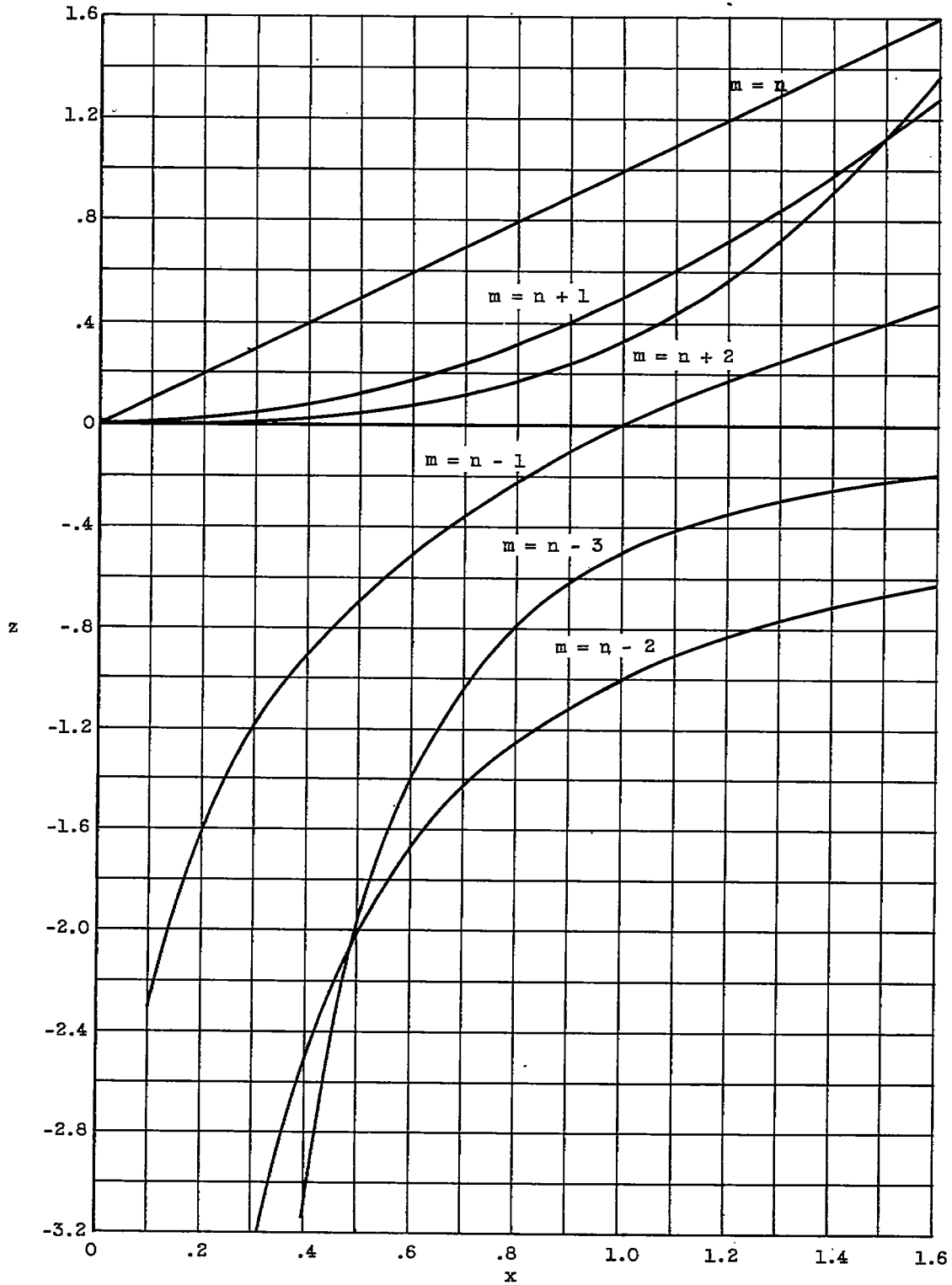


Figure 5. - Typical main-flow streamlines for Case I ($U = ax^n$, $W = bx^m$).

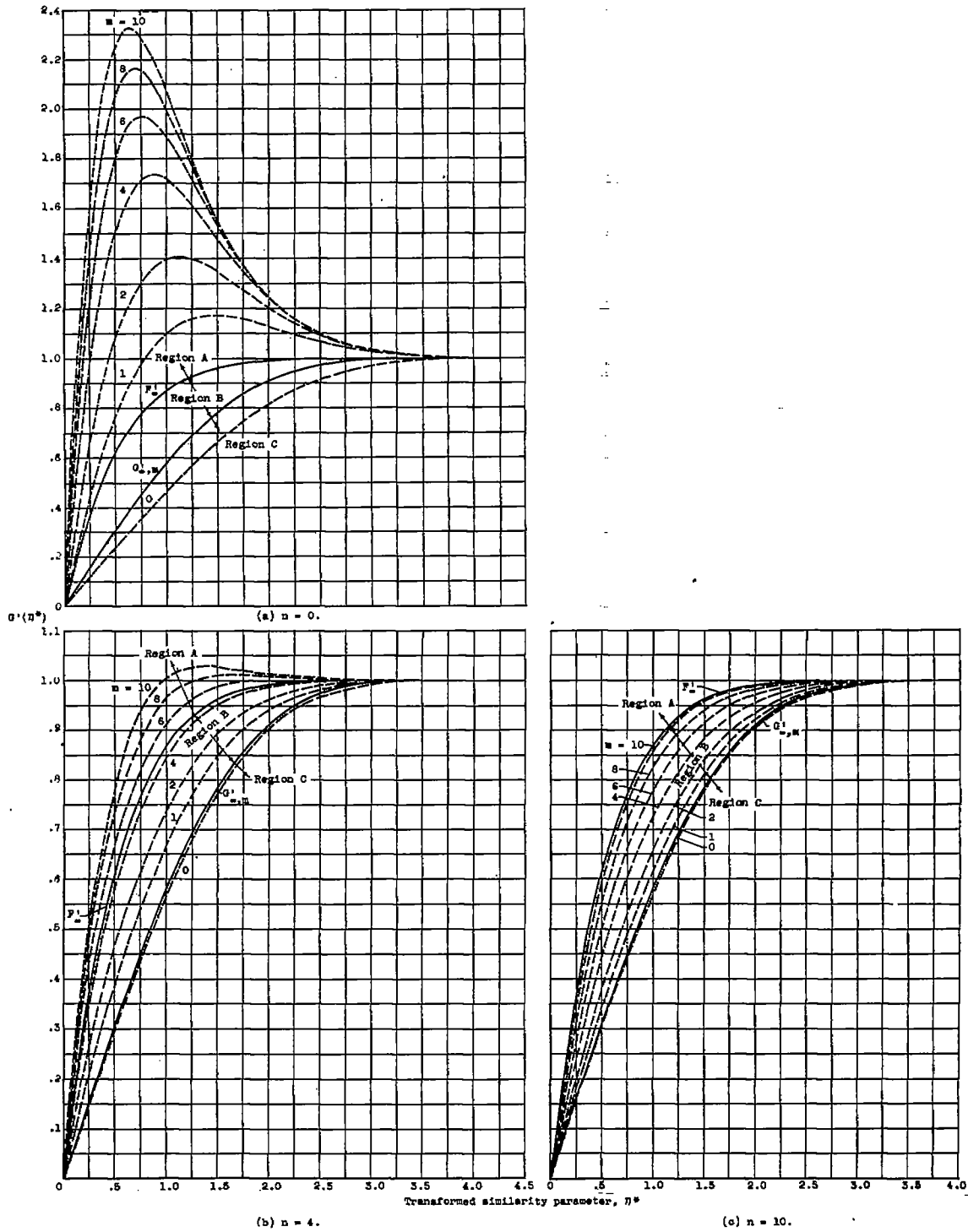
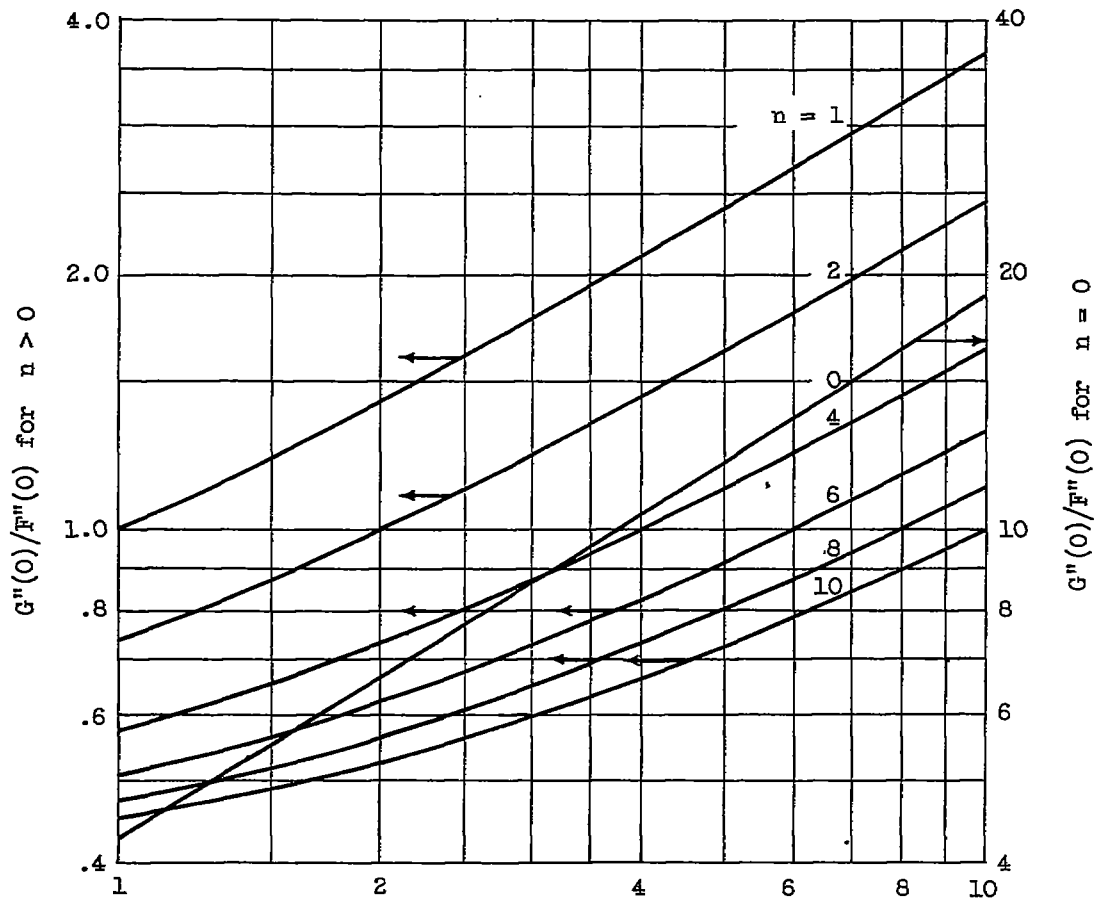
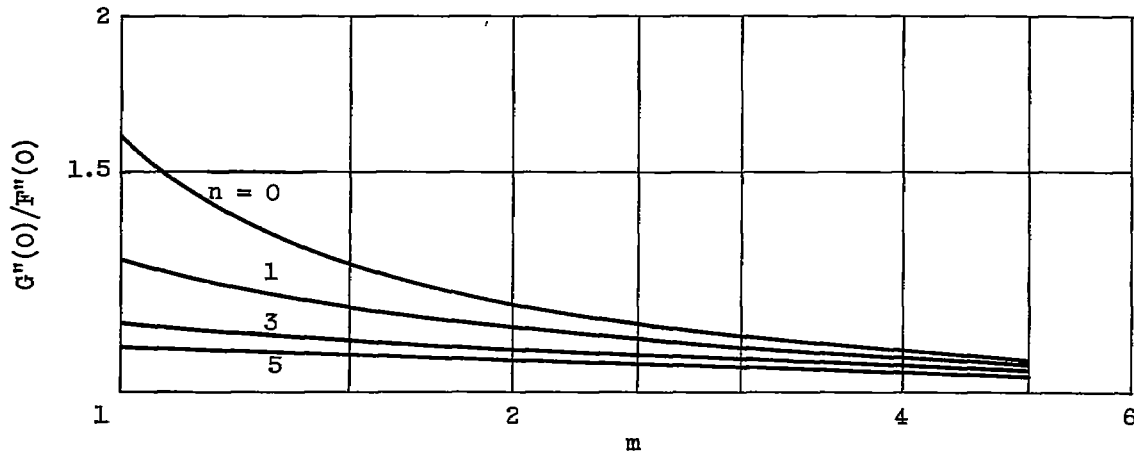


Figure 6. - Regional division of solutions to Case I.



(a) Case I solutions.



(b) Case II, $p = 2$, solutions.

Figure 7. - Variation of $G''(0)/F'''(0)$ with m and n (except for $m = 0$).

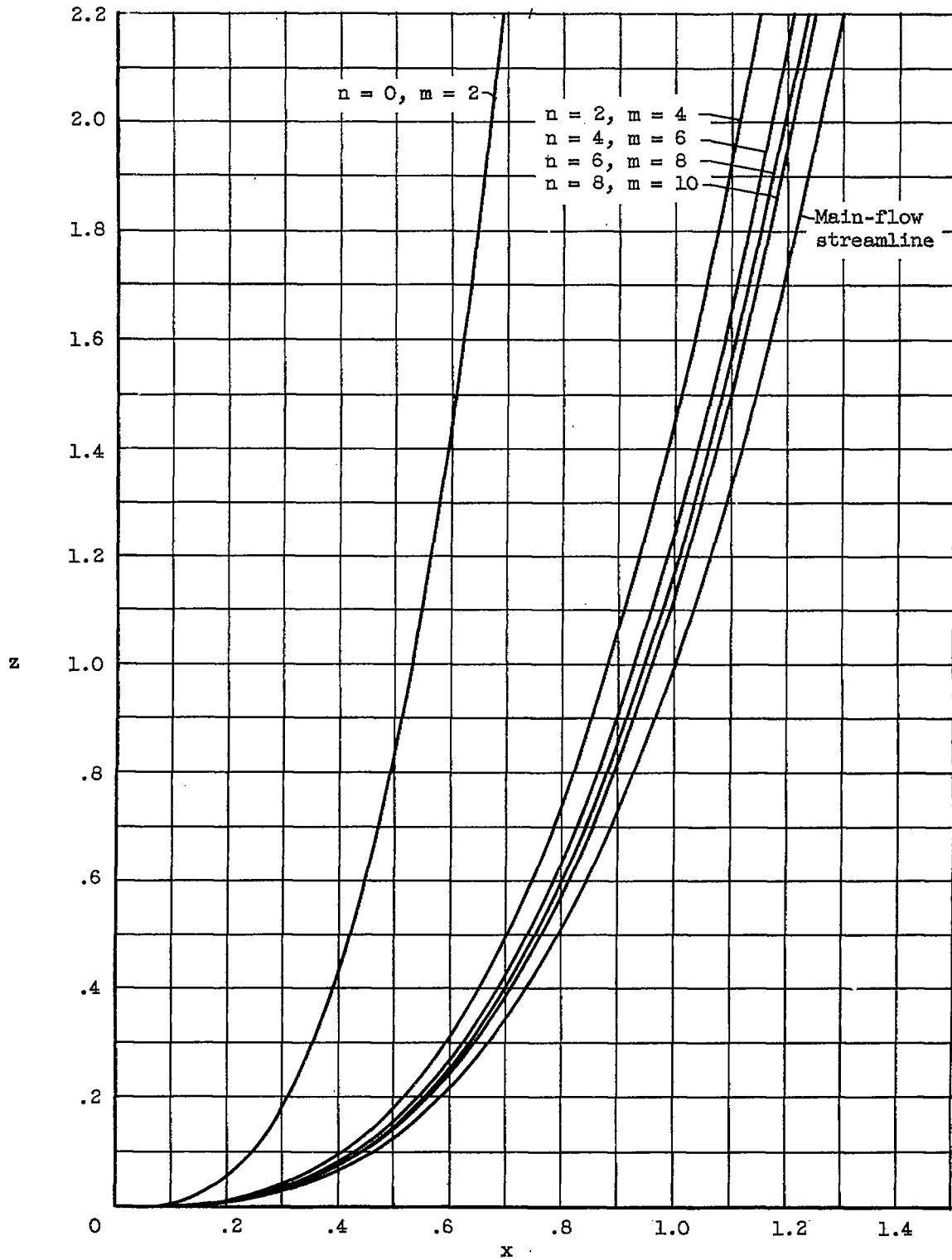


Figure 8. - Example of limiting streamlines for Case I.