Modified Bessel Functions of Purely Imaginary Order $K_{is}(x)$, $I_{is}(x)$ and their Related Functions

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The solutions of the Bessel equation

$$\frac{d^2y}{dx^2}+\frac{dy}{xdx}-(1-s^2/x^2)y=0$$

are discussed in detail. The modified Bessel Functions $K_\nu(x)$ and $I_\nu(x)$ are the two independent solutions of above equation when the order is purely imaginary, i.e., ν=is. The value of the function $K_{is}(x)$ is real while the value of the function $I_{is}(x)$ is complex for real s and x. Hence a new real function $M_{is}(x)$ is introduced in place of the complex function $I_{is}(x)$.

Some series expansions for $K_{is}(x)$ and $M_{is}(x)$ are given. The possibility to compute the value of these functions and their derivatives by the use of their series expansions are discussed and a practical procedure with the accuracy of the eight decimal places is presented. Short tables for $K_{is}(x)$ and $M_{is}(x)$ and their related functions are given.

Some related formulas with $K_{is}(x)$ are also collected.

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§1 Introduction

A special form of the modified Bessel functions $I_\nu(x)$ and $K_\nu(x)$ when ν is imaginary, plays important role in the analysis of some kinds of boundary value problems in the potential theory(1).

J. Dougall(2) has given three expressions of Green's function for several regions constructed in the cylindrical coordinates. The expression of the φ-form, one of them, for the region bounded by two parallel planes and a cylinder is given as follows:

$$V=\frac{8}{\pi c}\sum_{p=1}^{\infty}\sin(p\pi z/c)\sin(p\pi z'/c)\int_0^\infty \cosh s(\pi-|\varphi-\varphi'|)\frac{f(r)f(r')}{I_{is}(p\pi a/c)I_{-is}(p\pi a/c)}ds, \quad (1.1)$$

where

$$f(r)=I_{is}(p\pi a/c)K_{is}(p\pi r/c)-I_{is}(p\pi r/c)K_{is}(p\pi a/c). \quad (1.2)$$

The other expressions of the z- and r-forms are often used to analyze some practical problems. However the expression of the φ-form has not been used because that the method to compute the functions $I_{is}(x)$ and $K_{is}(x)$ has not been established yet.

In the previous paper(3), the authors discussed the possibilities to compute the values of $K_{is}(x)$ starting from the integral representation for this function and proposed a procedure based on such an algorithm. However the algorithm is too time-consuming for some kinds of combination of s and x. Further, we must established the method to compute the values of $I_{is}(x)$ if we want to use the expression of the φ-form.

In this paper, the possibilities to compute the values of these functions and their derivatives by the use of the series expansions are discussed and a practical procedure with the accuracy of the eight decimal places is presented. Functions $I_{is}(x)$ and $K_{is}(x)$ are the two independent solutions of the Bessel equation

$$\frac{d^2y}{dx^2}+\frac{1}{x}\frac{dy}{dx}-\left(1-\frac{s^2}{x^2}\right)y=0. \quad (1.3)$$

It is well known that $I_{is}(x)$ and $I_{-is}(x)$ are also the two independent solutions. Hence which set should be adopted is a problem.

When s and x are both real, the value of $K_{is}(x)$ is real while the value of $I_{is}(x)$ is complex and the imaginary part of $I_{is}(x)$ can be expressed by $K_{is}(x)$. Since the function having a complex value is unwieldy, we introduce a function $M_{is}(x)$ which is a real part of $I_{is}(x)$ mutiplied by $\pi/\cosh(s\pi)$, the relations between $I_{is}(x)$, $K_{is}(x)$ and $M_{is}(x)$ are

$$I_{is}(x)=\frac{\cosh(s\pi)}{\pi}M_{is}(x)-i\frac{\sinh(s\pi)}{\pi}K_{is}(x) \quad , \quad (1.4)$$

$$I_{-is}(x)=\frac{\cosh(s\pi)}{\pi}M_{is}(x)i+\frac{\sinh(s\pi)}{\pi}K_{is}(x), \tag{1.5}$$

$$K_{is}(x)=\frac{(\pi/2)}{i\sinh(s\pi)}\{I_{-is}(x)-I_{is}(x)\}, \tag{1.6}$$

and

$$M_{is}(x)=\frac{(\pi/2)}{\cosh(s\pi)}\{I_{-is}(x)+I_{is}(x)\}. \tag{1.7}$$

The reasons of introducing the function $M_{is}(x)$ are 1) by the real functions of $K_{is}(x)$ and $M_{is}(x)$, the expression of the φ-form involving the complex functions $I_{is}(x)$ and $I_{-is}(x)$ is simplified in the form taking the above expression as an example

$$\int_0^\infty \cosh s\,(\pi-|\varphi-\varphi'|)\frac{f(r)f(r')}{I_{is}(p\pi a/c)I_{-is}(p\pi a/c)}ds$$

$$=\int_0^\infty \cosh s\,(\pi-|\varphi-\varphi'|)\frac{g(r)g(r')}{M_{is}^2(p\pi a/c)+\tanh(s\pi)^2K_{is}^2(p\pi a/c)}ds \tag{1.8}$$

where

$$g(r)=M_{is}(p\pi a/c)K_{is}(p\pi r/c)-M_{is}(p\pi r/c)K_{is}(p\pi a/c), \tag{1.9}$$

and 2) in the region of oscillation, the amplitudes of envelope of $K_{is}(x)$ and $M_{is}(x)$ are comparable to each other as following form:

$$K_{is}(x)\simeq\sqrt{\frac{2\pi}{s}}e^{-s\pi/2}\sin(\pi/4-s+s\log(2s/x)), \tag{1.10}$$

$$M_{is}(x)\simeq\sqrt{\frac{2\pi}{s}}e^{-s\pi/2}\cos(\pi/4-s+s\log(2s/x)). \tag{1.11}$$

The procedure presented here is made to compute both values of $K_{is}(x)$ and $M_{is}(x)$, simultaneously. It is because that since the contents of computations of these two values are almost the same as each other, therefore if we make the procedure to compute these two values simultaneously, the amount of computations can be reduced to a large extent. It is also because that for the problems we aim to analyze the two values are usually necessary.

The well known recurrence technique for the calculation of Bessel functions is not applicable for this case because that the orders of Bessel functions are not real.

The derivatives of the functions $K_{is}(x)$ and $M_{is}(x)$ with respect to the variable x are also discussed. These derivatives are necessary to analyze the problem with Neuman-type boudary condition. In general if the Bessel function with real order is given, the derivative of the Bessel function can be derived by the use of recurrence formula. However it is not applicable for this case therefore the procedure to compute the two values of $K'_{is}(x)$ and $M'_{is}(x)$

must be provided separately.

At the end of this paper, some important formulas for $K_{is}(x)$ and $M_{is}(x)$ are given. In these formulas, the Fourier-type series expansions are involved. This fact shows that these functions have the large possibility to be used for the analysis of various boundary value problems.

§2 Series Expansions of the Functions $K_{is}(x)$ and $M_{is}(x)$

2.1 Series Expansion Available for Large Order

It is well known that the modified Bessel function of the second kind $K_\nu(x)$ is defined as follows:

$$K_\nu(x)=\frac{\pi\{I_{-\nu}(x)-I_\nu(x)\}}{2\sin(\nu\pi)}, \qquad (2.1)$$

and the modified Bessel function of the first kind $I_\nu(x)$ is expressed[6] by

$$I_\nu(x)=\frac{(x/2)^\nu}{\Gamma(\nu+1)}\left\{1+\frac{(x/2)^2}{\nu+1}+\frac{(x/2)^4}{2!(1+\nu)(2+\nu)}+\frac{(x/2)^6}{3!(1+\nu)(2+\nu)(3+\nu)}+\right\}. \qquad (2.2)$$

Since $\Gamma(\nu+1)\Gamma(1-\nu)=\nu\pi/\sin(\nu\pi)$, we obtain

$$I_\nu(x)=\frac{\sin(\nu\pi)}{\nu\pi}\Pi(-\nu)(x/2)^\nu\left\{1+\frac{(x/2)^2}{1+\nu}+\frac{(x/2)^4}{2!(1+\nu)(2+\nu)}+\cdots\right\}. \qquad (2.3)$$

and for $\nu=is$, where s is real, we obtain

$$I_{is}(x)=\frac{\sinh(s\pi)}{s\pi}\Pi(-is)(x/2)^{is}\left\{1+\frac{(x/2)^2}{1+is}+\frac{(x/2)^4}{2!(1+is)(2+is)}+\cdots\right\}. \qquad (2.4)$$

Here, we put

$$\Pi(-is)=A+iB, \qquad (2.5)$$

$$F(s,x)=1+\frac{(x/2)^2}{1+is}+\frac{(x/2)^4}{2!(1+is)(2+is)}+\cdots=C-iD. \qquad (2.6)$$

Hence we obtain

$$I_{is}(x)=\frac{\sinh(s\pi)}{s\pi}(A+iB)e^{is\log(x/2)}(C-iD), \qquad (2.7)$$

and

$$I_{-is}(x)=\frac{\sinh(s\pi)}{s\pi}(A-iB)e^{-is\log(x/2)}(C+iD). \qquad (2.8)$$

Substituting (2. 7) and (2. 8) into (2. 1), we obtain

$$K_{is}(x)=\frac{(\pi/2)}{i\ \sinh(s\pi)}\{I_{-is}(x)-I_{is}(x)\}$$

$$=-\frac{1}{s}\{\sin\alpha(AC+BD)+\cos\alpha(BC-AD)\}, \qquad (2.9)$$

and

$$M_{is}(x)=\frac{(\pi/2)}{\cosh(s\pi)}\{I_{-is}(x)+I_{is}(x)\}$$

$$=\frac{\tanh(s\pi)}{s}\{\cos\alpha(AC+BD)-\sin\alpha(BC-AD)\}, \qquad (2.10)$$

where $\alpha=s\log(x/2)$.
When $s\gg 1\gg x$, $F(s, x)\simeq 1$ and $\Pi(is)$ is expressed as follows

$$\Pi(is)\simeq(is/e)^{is}(2\pi is)^{1/2}=(2\pi e)^{1/2}e^{-s\pi/2}e^{\,i(\pi/4-s\log s-s)} \qquad (2.\ 11)$$

from the Stirling's formula.
Hence, we obtain for $s\gg 1\gg x$

$$K_{is}(x)=(2\pi/s)^{1/2}e^{-s\pi/2}\sin(\pi/4-s+s\log(2s/x)), \qquad (2.\ 12)$$

$$M_{is}(x)\simeq(2\pi/s)^{1/2}e^{-s\pi/2}\cos(\pi/4-s+s\log(2s/x)). \qquad (2.\ 13)$$

The method of computing the values of $K_{is}(x)$ and $M_{is}(x)$ given above is discussed later.
This method is available for the region of oscillation of $K_{is}(x)$ and $M_{is}(x)$, i.e., $s>x$.

2.2 The Hankel Asymptotic Series

From Erdelyi[7], we get

$$I_\nu(z)=(2\pi z)^{-1/2}[e^z\{\sum_{m=0}^{M-1}(-1)^m(\nu, m)(2z)^{-m}+O(|z|^{-M})\}$$

$$+ie^{-z+i\nu\pi}\{\sum_{m=0}^{M-1}(\nu, m)(2z)^{-m}+O(|z|^{-M})\}],\quad -\pi/2<\arg z<3\pi/2, \qquad (2.14)$$

where

$$(\nu, m)=2^{-2m}(4\nu^2-1)(4\nu^2-3^2)(4\nu^2-5^2)\ldots[4\nu^2-(2m-1)^2]/m!. \qquad (2.15)$$

From the definitions of $K_{is}(x)$ and $M_{is}(x)$ and substituting $\nu=is$ into (2. 14) and (2. 15), we obtain

$$K_{is}(x)=(\pi/2x)^{1/2}e^{-x}\Big\{1-\frac{4s^2+1}{1!8x}+\frac{(4s^2+1)(4s^2+3^2)}{(8x)^2 2!}$$

$$-\frac{(4s^2+1)(4s^2+3^2)(4s^2+5^2)}{(8x)^3 3!}+\cdots\Big\} \qquad (2.16)$$

and

$$M_{is}(x)=\frac{1}{\cosh(s\pi)}(\pi/2x)^{1/2}e^{x}\left\{1+\frac{4s^2+1}{1!8x}+\frac{(4s^2+1)(4s^2+3^2)}{(8x)^2 2!}+\cdots\right\} \quad (2.17)$$

2.3 Other Asymptotic Expansions

The following asymptotic expansion are given in reference[7]

$$K_{is}(x)=2^{-1/2}(x^2-s^2)^{-1/4}\exp[-(x^2-s^2)^{1/2}-s\sin^{-1}(s/x)]$$

$$\times\left[\sum_{m=0}^{M-1}(-2)^m b_m\Gamma\left(m+\frac{1}{2}\right)(x^2-s^2)^{-m/2}+O(x^{-M})\right],\quad x>s>0, \quad (2.18)$$

where

$$b_0=1,\ b_1=\frac{1}{8}-\frac{5}{24}(1-x^2/s^2)^{-1},$$

$$b_2=\frac{3}{128}-\frac{77}{576}(1-x^2/s^2)^{-1}+\frac{385}{3456}(1-x^2/s^2)^2, \quad (2.19)$$

$$K_{is}(x)=2^{+1/2}(s^2-x^2)^{-1/4}e^{-s\pi/2}\times[\sum_{m=0}^{M-1}2^m b_m\Gamma(m+1/2)(s^2-x^2)^{-m/2}$$

$$\times\sin\{m\pi/2+s\cosh^{-1}(s/x)-(s^2-x^2)^{1/2}+\pi/4\}+O(x^{-M})],\quad s>x>0, \quad (2.20)$$

$$K_{is}(x)\approx\pi/3e^{-s\pi/2}\sum_{m=0}^{\infty}(-1)^m C_m(\varepsilon x)\sin\{(m+1)\pi/3\}\times\Gamma(m/2+1/3)(x/6)^{-(m+1)/3},$$

$$\text{for } s>x,\quad s,\ x>0,\quad \varepsilon=1-s/x,\ \varepsilon=O(x^{-2/3}), \quad (2.21)$$

where

$$C_0(X)=1,\ C_1(X)=X,\ C_2(X)=X^2/2+\frac{1}{20},\ C_3(X)=\frac{X^3}{6}+\frac{X}{15},$$

$$C_4(x)=\left(X^4-X^2+\frac{1}{20}\right)\frac{1}{24},\ C_5(X)=\frac{X^5}{120}+\frac{X^3}{60}+\frac{43X}{4800}. \quad (2.22)$$

The expression of $M_{is}(x)$ corresponding to (2. 18) is

$$M_{is}(x)=\frac{1}{\cosh(s\pi)}2^{+1/2}(x^2-s^2)^{-1/4}\exp\{(x^2-s^2)^{1/2}+s\sin^{-1}(s/x)\}$$

$$\times[\sum_{m=0}^{M-1}2^m b_m\Gamma(m+1/2)(x^2-s^2)^{-m/2}+O(x^{-M})]. \quad (2.23)$$

§ 3 Numerical Computations Based on the Hankel Asmptotic Series

It is clear that the individual terms of (2. 16) and (2. 17) at first decrease and begin to increase after number of terms exceeds a certain number N_m. The number N_m is determined as the maximum value of N which fulfils the condition

$$\frac{4s^2+(2N-1)^2}{8xN}<1. \tag{3.1}$$

It is

$$N_m=[0.5+x+\sqrt{x^2+x-s^2}]. \tag{3.2}$$

For (2. 16) and (2.17) to be significant, they must be as follows

$$K_{is}(x)=(\pi/2x)^{1/2}e^{-x}\left[1+\sum_{n=1}^{n\leq N_m}\frac{(4s^2+1)(4s^2+3^2)\ldots\{4s^2+(2n-1)^2\}}{n!(-8x)^n}\right], \tag{3.3}$$

$$M_{is}(x)=\frac{1}{\cosh(s\pi)}(\pi/2x)^{1/2}e^{x}\left[1+\sum_{n=1}^{n\leq N_m}\frac{(4s^2+1)(4s^2+3^2)\ldots\{4s^2+(2n-1)^2\}}{n!(8x)^n}\right]. \tag{3.4}$$

There is an upper limit on the accuracy obtained by the use of (3. 3) and (3. 4). From preliminary numerical experiments, we can roughly conclude that this method based on the Hankel asymptotic series (3. 3) and (3. 4) yields the accuracy of eight decimal places for

$$\begin{aligned} &x\geqq 1.5s+8.0 &&\text{for } s\leqq 6,\\ &x\geqq 2.0s+5.0 &&\text{for } s\geqq 6. \end{aligned} \tag{3. 5}$$

In Table 1, the number of terms necessary to obtain the accuracy of eight decimal places by the use of the Hankel asymptotic series is given.

Table 1. Numbers of terms necessary to obtain the accuracy of eight decimal places by the use of the Hankel asymptotic series (3.3).

x \ s	0.0	0.5	1	1.5	2	3	4	5	6	7	8
9	13	16									
10	11	12	15								
11	10	11	13	16							
12	9	10	11	13	16						
13	8	9	10	12	14	21					
14	8	9	10	11	13	17					
15	8	8	9	10	12	15	21				
16	7	8	9	10	11	14	18	26			
17	7	8	8	9	11	13	17	22			
18	7	7	8	9	10	12	15	19	26		
19	7	7	8	9	10	12	15	18	23	33	
20	6	7	8	9	9	11	14	17	21	27	
21	6	7	7	8	9	10	14	17	19	21	38
22	6	6	7	8	9	10	13	16	17	19	30

§ 4 Numerical Computations Based on the Series Expansions Available for Large Order

In this section a method based on (2. 9) and (2. 10) is discussed. It consists of two parts, one is the estimation of a complex series $F(s, x)$ and other is the estimation of the Pai function of imaginary variable $\Pi(is)$.

4.1 Estimation of a Complex Series $F(s, x)$

A complex series

$$F(s,x)=1+\frac{(x/2)^2}{1+is}+\frac{(x/2)^4}{2!(1+is)(2+is)}+\frac{(x/2)^6}{3!(1+is)(2+is)(3+is)}+\cdots \quad (4.1)$$

converges for any real s and x althrough it increases rapidly as x increases. As the number of terms n increases, the values of individual terms increase at first but they begin to decrease when n exceeds the value

$$n_0=[(\sqrt{s^4+x^4/4}-s^2)/2]^{1/2}.$$

In Fig. 1, the numbers of the terms necessary to obtain the accuracy of ten-decimal places are shown. In the figure the numbers don't depend on s strongly, hence we put

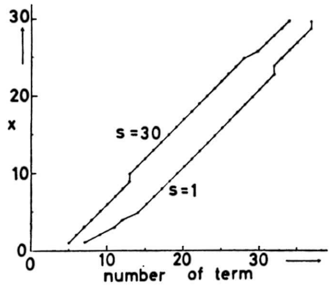

Fig. 1. Numbers of terms necessary to estimate $F(s, x)$ with the accuracy of ten decimal places.

$$n=6+[2x] \quad x<5.0, \qquad (4.\ 2)$$
$$n=10+[x] \quad x\geq 5.0.$$

Using the value n given by (4. 2), $F(s, x)$ is computed by

$$F(s,x)=1+\sum_{p=1}^{n}\frac{(x/2)^{2p}}{p!(1+is)(2+is)(3+is)\cdots(p+is)} \qquad (4.3)$$

4.2 Estimation of Pai function of Purely Imaginary Variable

A method to evaluate the Pai function will be to use Stirling's formula. The formula is given[8] as follows

$$\Pi(z)=\Gamma(z+1)=(z/e)^z(2\pi z)^{1/2}\Big[1+\frac{1}{12z}+\frac{1}{288z^2}-\frac{139}{51840z^3}+\frac{571}{2488320z^4}$$
$$+\frac{1\ 63879}{2090\ 18880z^5}+\frac{52\ 46819}{7\ 52467\ 96800z^6}-\frac{5347\ 03531}{90\ 29615\ 61600z^7}+\cdots\Big]. \qquad (4.4)$$

When $z=is$, we get

$$\Pi(is)=(2\pi s)^{1/2}e^{-s\pi/2}e^{i(\pi/4-s\log s-s)}\Big\{\Big(1-\frac{1}{288s^2}+\frac{571}{24\ 88320s^4}+\frac{52\ 46819}{7\ 52467\ 96800s^6}\Big)$$

$$-i\left(\frac{1}{12s}+\frac{139}{51840s^3}-\frac{1\ 63879}{2090\ 18880s^5}+\frac{5347\ 03531}{90\ 29615\ 61600s^7}\right)\Big\}. \tag{4.5}$$

When s is small, (4. 5) does not yield high accuracy. Then it must be reduced to the form which yields high accuracy when we use the Stirling's formula.

From the recurrence formula of Gamma function, we obtain

$$\Pi(is)=\frac{\Gamma(7+is)}{(1+is)(2+is)(3+is)(4+is)(5+is)(6+is)}$$

$$=\frac{\Gamma(7+is)}{(720-1624s^2+175s^4-s^6)+is(1764-735s^2+21s^4)} \tag{4.6}$$

where the part of Gamma function $\Pi(7+is)$ in (4. 6) is computed by the Stirling's formula (4. 4). In this case, the argument is complex $z=6+is$ hence additional complex division is necessary.

This method yeilds as high accuracy as required if we use the recurrence formula repeatedly. Another method of evaluating the Pai function is to use the Taylor series expansions. Following formula is given by Luke[9]

$$[\Gamma(z+1)]^{-1}=\sum_{n=0}^{\infty}a_n z^n,\ |z|<\infty, \tag{4.7}$$

n	a_n
0	1.00000 00000 00000 00000
1	0.57721 56649 01532 86061
2	−0.65587 80715 20253 88108
3	−0.04200 26350 34095 23553
4	0.16653 86113 82291 48950
5	−0.04219 77345 55544 33675
6	−0.00962 19715 27876 97356
7	0.00721 89432 46663 09954
8	−0.00116 51675 91859 06511
9	−0.00021 52416 74114 95097
10	0.00012 80502 82388 11619
11	−0.00002 01348 54780 78824
12	−0.00000 12504 93482 14267
13	0.00000 11330 27231 98170
14	−0.00000 02056 33841 69776
15	0.00000 00061 16095 10448
16	0.00000 00050 02007 64447
17	−0.00000 00011 81274 57049
18	0.00000 00001 04342 67117
19	0.00000 00000 07782 26344
20	−0.00000 00000 03696 80562
21	0.00000 00000 00510 03703
22	−0.00000 00000 00020 00020
23	−0.00000 00000 00005 34812
24	0.00000 00000 00001 22678
25	−0.00000 00000 00000 11813
26	0.00000 00000 00000 00119
27	0.00000 00000 00000 00141
28	−0.00000 00000 00000 00023
29	0.00000 00000 00000 00002

Using (4. 7), we obtain

$$\Pi(is)=\Gamma(is+1)=\{\sum_{n=0}^{14}(a_{2n}+isa_{2n+1})(-s^2)^n\}^{-1}. \tag{4.8}$$

In Table 2, the values obtained by above three methods based on (4. 5), (4. 6) and (4. 8) are compared with the exact values. In the table the absolute values of Pai function are listed to the decimal places where the discrepancy appears.

Table 2 Comparison of three methods to compute the Pai function of imaginary vairable Π (is)

s	by (4.5)	by (4.6)	by (4.8)	Exact values by (4.9)
0.5	0.82	0.82617 76142	0.82617 76142 76045 23	0.82617 76142 76045 232
1.0	0.521	0.52156 40468 65	0.52156 40468 64939 8	0.52156 40468 64939 849
1.5	0.2909	0.29098 51478 2	0.29098 51478 15861	0.29098 51478 15861 831
2.0	0.15318 9	0.15318 96187 9	0.15318 96187 9124	0.15318 96187 91234 621
3.0	0.39001 924	0.39001 92404 4	0.39001 924	0.39001 92404 47059 543
4.0	0.93619 6951	0.93619 69505 1	0.93619	0.93619 69505 16372 486
5.0	0.21758 75548	0.21758 75548 18	0.217	0.21758 75548 18708 343
6.0	0.49549 18299	0.49549 18298 882	0·5	0.49549 18298 88537 677
7.0	0.11125 55578 66	0.11125 55578 647		0.11125 55578 64641 210
8.0	0.24724 61355 48	0.24724 61355 477		0.24724 61355 47541 997
10.0	0.11945 60541 104	0.11945 60541 1036		0.11945 60541 10345 570

The absolute value of Pai function is computed accurately by

$$|\Pi(is)|^2=\Gamma(1+is)\Gamma(1-is)=\frac{\pi s}{\sinh(\pi s)}. \tag{4.9}$$

The computing times of the three methods based on (4. 5), (4. 6) and (4. 8) are less than 1, 4 and 2 msec, respectively, according to the results directly measured. Hence we can conclude as follows

$$\Pi(is) \text{ must be computed}\begin{cases}\text{by (4. 8)} & \text{for} \quad s\leqq 2.0,\\ \text{by (4. 6)} & \text{for} \quad 2.0<s<7.0,\\ \text{by (4. 5)} & \text{for} \quad s\geqq 7.0.\end{cases} \tag{4. 10}$$

In Fig. 2, the behavior of $\Pi(is)$ is shown.

4.3 Compensation of Cancellation

Now we can obtain the values of $K_{is}(x)$ and $M_{is}(x)$ from the values of $F(s, x)$ and $\Pi(is)$ computed by the methods discussed heretofore. The values of $K_{is}(x)$ and $M_{is}(x)$ are accurate for $s>x$ or for a region of oscillation. However for large x, the values of $K_{is}(x)$ are not accurate because of a violent cancellation. The reason of the violent cancellation in the computation of $K_{is}(x)$ is easily understandable from Fig. 3. After the oscillations end, $M_{is}(x)$ increases rapidly while $K_{is}(x)$ tends to zero monotonously as x increases.

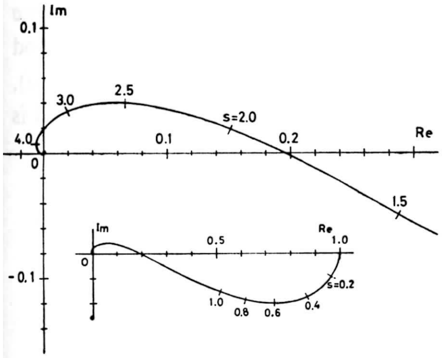

Fig. 2. Behaviors of Π (is).

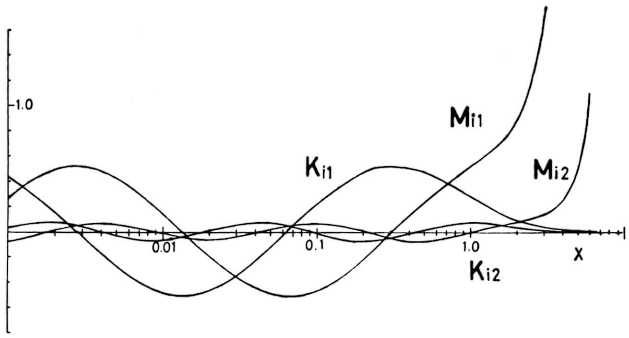

Fig. 3. Behaviors of $K_{is}(x)$ and $M_{is}(x)$.

Such a cancellation can be roughly estimated by comparing the values of $K_{is}(x)$ and $M_{is}(x)$. The estimations of the number of decimal places lost by cancellation are listed in Table 3.

Table 3 The number of decimal places lost in the computation of $K_{is}(x)$ by (2.9).

x \ s	0.5	1	2	3	4	6	8	10	12	14	16	18	20	22
0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	1	0												
1	1	0												
2	1	1	0											
3	2	2	1	0										
4	3	3	2	1	0									
5	4	3	2	1	1	0								
6	4	4	4	2	2	0								
7	6	5	4	3	2	1	0							
8	6	6	4	4	3	1	0							
9	8	6	6	4	3	2	0							
10		7	6	6	5	2	1	0						
12			7	6	6	3	2	1	0					
14				7	6	4	3	2	1	0				
16					8	6	4	3	2	1	0			
18						8	6	5	4	2	1	0		
20	Range computable by (2.16)						8	6	4	3	2	1	0	
22								8	6	5	3	2	1	0
24								9	6	5	4.	3	1	1
26									9	7	6	4	3	2
28										9	7	5	3	2
30										11	8	7	5	4

From the Table 3, the numbers of decimal places to be compensated are at most six for $s<9$ and nine for $s>9$. Hence if $F(s, x)$ and $\Pi(is)$ are evaluated at the accuracy of seventeen decimal places, the cancellation will be compensated and the accuracy of eight decimal places will be obtained.

To evaluate the complex series $F(s, x)$ with high accuracy, we have only to continue the computation beyond n given by (4. 2) until the required accuracy is obtained. A method to compute the values of $\Pi(is)$ with high accuracy will be to modify the method based on (4. 6), *i.e.*, to apply the recurrence formula of Gamma function repeatedly. A following method is examined:

$$\Pi(is)=\frac{\Gamma(N+1+is)}{(1+is)(2+is)(3+is)\cdots\cdots(N+is)}, \tag{4.11}$$

where

$$N=\begin{cases}30 & \text{for} \quad s<11\\ 24 & \text{for} \quad s<20\\ 18 & \text{for} \quad s<25\\ 10 & \text{for} \quad s<30.\end{cases} \tag{4. 12}$$

A procedure based on (4. 11) can compute the values of $\Pi(is)$ accurately to at least 15 decimal digits for $0<s<30$. By the use of (4. 11) and by evaluating $F(s, x)$ with high accuracy the revised computation were carried out. The results are given in Table 4 together with the values obtained by the Hankel asymptotic series (2. 16). For small s less than about 10, the cancellations are compensated by 5 or 6 decimal digits and the range where the accuracy of

Table 4 The values of $K_{is}(x)$ computed by several methods.

$s=0.5$ x	by (2.9)	by revised (2.9)	by (2.16)	by a method using an integral representation
3.0	0.33495 853			0.33495 853 E–1
3.5	0.18986 305			0.18986 305 E–1
4.0	0.10850 043		0.1085	0.10850 042 E–1
4.5	0.62401 86	0.62401 847	0.62401	0.62401 847 E–2
5.0	0.36074 28	0.36074 271	0.36074	0.36074 217 E–2
6.0	0.12201 5	0.12201 479	0.12201 5	0.12201 479 E–2
7.0	0.41775	0.41774 012	0.41774 02	0.41774 012 E–3
8.0	0.14432	0.14432 424	0.14432 424	0.14432 424 E–3
9.0	0.502	0.50214 132	0.50214 132	0.50214 132 E–4
10.0	0.176	0.17569 102	0.17569 108	0.17569 108 E–4
12.0	0.1	0.21788 8	0.21788 865	0.21788 865 E–5
$s=5.0$ x	by (2.9)	by revised (2.9)	by (2.16)	by a method using an integral representation
4.0	0.48966 527			0.48966 527 E–3
5.0	0.31859 102			0.31859 103 E–3
6.0	0.16387 417			0.16387 417 E–3
7.0	0.75060 449			0.75060 449 E–4
8.0	0.32161 473		0.3	0.32161 473 E–4
9.0	0.13213 430	0.13273 431	0.132	0.13213 431 E–4
10.0	0.52781 2	0.52781 218	0.528	0.52781 218 E–5
12.0	0.79817	0.79817 117	0.79817 2	0.79817 117 E–6
14.0	0.115	0.11554 514	0.11554 516	0.11554 514 E–6
16.0	0.2	0.16303 194	0.16303 194	0.16303 194 E–7
18.0		0.22636 742	0.22636 742	0.22636 742 E–8
20.0		0.31100 7	0.31100 591	0.31100 591 E–9

8 decimal places attained is enlarged and is connected continuously to the range computable by (2. 16).

However for s larger than about 10, the situation becomes different. In this case, the range exists where the accuracy of 8 decimal places is not obtained by revised (2. 9) and also by (2. 16). The range is expressed by following simplified form

$$\begin{array}{l} x<2.0s+5.0 \\ x>s+11. \end{array} \qquad (4.\ 13)$$

In this range, the accuracy is reduced to 5 or 6 decimal places.

The computation of $K_{is}(x)$ in this range is computed by Debye's asymptotic expansion (2. 18) which is discussed in next sub-section.

For the values of $M_{is}(x)$, the cancellation does not occur. In Table 5, the values of real part of $I_{is}(x)$ computed by (2. 10), (2. 17) and method based on an integral representation are shown. The real part of $I_{is}(x)$ is equal to $M_{is}(x)$ if it is multiplied by $\pi/\cosh(s\pi)$ as stated in introduction.

Table 5 Real part of $I_{is}(x)$ computed by (2.10), (2.17) and method based on an integral representation.

$s=0.05$ x	by (2.10)	by (2.17)	by a method using an integral representation
2.0	0.22816 1621	0.228	0.22816 1621 E 1
3.0	0.48834 1972	0.488	0.48834 1971 E 1
4.0	0.11306 1254	0.11306	0.11306 1254 E 2
5.0	0.27247 6070	0.27247	0.27247 6070 E 2
6.0	0.67249 8918	0.67249 9	0.67249 8917 E 2
7.0	0.16862 6619	0.16862 663	0.16862 6619 E 3
8.0	0.42763 5832	0.42763 583	0.42763 5831 E 3
9.0	0.10937 5002	0.10937 499	0.10937 5002 E 4
10.0	0.28160 8852	0.28160 885	0.28160 8852 E 4
$s=0.5$ x	by (2.10)	by (2.17)	by a method using an integral representation
3.0	0.51518 4791	0.515	0.51518 4790 E 1
4.0	0.11731 5663	0.1173	0.11731 5663 E 2
5.0	0.28025 8537	0.28026	0.28025 8536 E 2
6.0	0.68802 3969	0.68802	0.68802 3968 E 2
7.0	0.17189 8908	0.17189 89	0.17180 8908 E 3
8.0	0.43479 9165	0.43479 917	0.43479 9164 E 3
9.0	0.11098 7301	0.11098 730	0.11098 7301 E 4
10.0	0.28531 6075	0.28531 607	0.28531 6074 E 4
$s=2.0$ x	by (2.10)	by (2.17)	by a method using an integral representation
4.0	0.21109 0816	0.212	0.21109 0816 E 2
5.0	0.43539 4202	0.435	0.43539 4201 E 2
6.0	0.97868 4534	0.9788	0.97868 4532 E 2
7.0	0.23080 8550	0.23081	0.23080 8549 E 3
8.0	0.56039 5570	0.56039 7	0.56039 5568 E 3
9.0	0.13872 0851	0.13872 09	0.13872 0851 E 4
10.0	0.34816 2792	0.34816 28	0.34816 2792 E 4

§ 5 Possibilities of Methods Based on the Other Asymptotic Expansions

5.1 Debye's Asymptotic Expansion (2. 18)

The steepest descent method to obtain the coefficients b_m in (2. 18) is elucidated by several authors[7)10)11)]. W. Sibagaki[11)] has given the coefficients from b_0 to b_4 as follows

$$b_0=1,\ b_1=\frac{1}{8}\left(1-\frac{5}{3}\lambda\right),\ b_2=\frac{1}{8^2}\left(\frac{3}{2}-\frac{77}{9}\lambda+\frac{385}{54}\lambda^2\right),$$

$$b_3=\frac{1}{8^3}\left(\frac{5}{2}-\frac{1521}{50}+\frac{17017}{270}\lambda^2-\frac{17017}{486}\lambda^3\right), \tag{5.1}$$

$$b_4=\frac{1}{8^4}\left(\frac{35}{8}-\frac{96833}{105}\lambda+\frac{144001}{420}\lambda^2-\frac{1062347}{2430}\lambda^3+\frac{1062347}{5832}\lambda^4\right),$$

where $\lambda=(1-x^2/s^2)^{-1}$

If we write the m-th coefficient in the form

$$b_m=\sum_{n=0}^{m} B_{m,n}(-\lambda)^n, \tag{5.2}$$

we obtain the recurrence formula

$$B_{0,0}=1,\ B_{m,n}=0 \qquad (\text{for } n>m \text{ or } n<0),$$

$$B_{m+1,n+1}=\frac{(2k+5)}{(2m+1)(k+3)}\{(2k+1)B_{m,n}+(2k+5)B_{m,n+1}\}\frac{1}{8}, \tag{5.3}$$

$$k=m+2n.$$

The expressions (2. 18) and (2. 23) can be written as follows

$$K_{is}(x)=\sqrt{\frac{\pi}{2\beta}}\exp\{-\beta-s\sin^{-1}(s/x)\}\left\{1-\frac{1}{\beta}b_1+\frac{3}{\beta^2}b_2-\frac{1\cdot3\cdot5}{\beta^3}b_3+\frac{1\cdot3\cdot5\cdot7}{\beta^4}b_4-\right\}, \tag{5.4}$$

$$M_{is}(x)=\frac{1}{\cosh(s\pi)}\sqrt{\frac{\pi}{2\beta}}\exp\{\beta+s\sin^{-1}(s/x)\}\left\{1+\frac{1}{\beta}b_1+\frac{1\cdot3}{\beta^2}b_2+\frac{1\cdot3\cdot5}{\beta^3}b_3\right\}, \tag{5.5}$$

where $\beta=(x^2-s^2)^{1/2}$. As these series are asymptotic expansions, in practical calculation the series must be stopped when the terms no longer decrease. In Table 6, the numbers of terms necessary to obtain the accuracy of eight decimal digits by (5. 4) are shown.

This table shows that for instance when $s=1$ and $x=10$, we must estimate b_0 to b_{13} to obtain the accuracy of eight decimal digits. The applicable region of (5. 4) is slightly wider than that of the Hankel's asymptotic expansion (2. 16) previously discussed. Considering the fact that the computation of b_n becomes too time-consuming as n increases, the computing times are always larger than that of (2. 16).

The merit of the Debye asymptotic expansion is the wider applicable region and this point

Table 6 Numbers of terms necessary to obtain the accuracy of eight decimal digits by Debye's series (2.18) or (5.4)

x \ s	1	2	3	4	6	8	10	12	14	16	18	20
10	13											
12	9	11										
14	8	9	10	14								
16	7	8	8	10								
18	7	7	8	8	10							
20	7	7	7	7	9	11						
22	6	6	6	7	8	9	12					
24	6	6	6	6	7	8	9	14				
26	6	6	6	6	7	7	8	10				
28	6	6	6	6	6	7	7	8	10			
30	5	6	6	6	6	6	7	8	9	11		
35	5	5	5	5	6	6	6	6	7	8	9	10
40	5	5	5	5	5	5	6	6	6	6	7	7

is emphasized when the high accuracy is not required.

The part of the region where the accuracy of eight decimal digits is not obtained by (2. 16) or revised (2. 9) is covered by these Debye's asymptotic expansions.

5.2 Asymptotic Expansions Available for $x \sim s$.

The asymptotic expansion (2. 21), which is also derived by Debye, is available for $x \sim s$. The higher coefficients $C_n(X)$ are given by Airey[2] as follows:

$$C_6(X)=\frac{X^6}{720}-\frac{7X^4}{1440}+\frac{X^2}{288}-\frac{1}{3600},$$

$$C_7(X)=\frac{X^7}{5040}-\frac{X^5}{900}+\frac{19X^3}{12600}-\frac{13X}{31500}, \tag{5.6}$$

$$C_9(X)=\frac{X^9}{362880}-\frac{X^7}{30240}+\frac{71X^5}{604800}-\frac{121X^3}{907200}+\frac{7939X}{2328480000},$$

for the calculation, C_2, C_5, C_8 etc. are not necessary.

This asymptotic expansion (2. 21) is not suitable for the calculation with high accuracy. Because even for the case of $s=x$, it is the most suitable case of (2. 21), the series is as follows

$$K_{is}(x)\simeq\frac{1}{3}e^{-s\pi/2}(6/x)^{1/3}\frac{\sqrt{3}}{2}\left\{1-\Gamma\left(\frac{7}{3}\right)\frac{1}{280}(6/x)^{5/3}+\Gamma\left(\frac{10}{3}\right)\frac{1}{3600}(6/x)^2\right\}, \tag{5.7}$$

the convergence of (5. 7) is very slow unless the variable x is extremely large. For example, for the case $s=x=30$, only 4 signifficant decimal digits are obtained by taking account of the coefficients from C_0 to C_9.

5.3 Asymptotic Expansion Available for $s>x$.

Another asymptotic expansion involving the Debye's coefficients b_n (2. 20) is available in the region of oscillation. From the simple consideration, it is found that the convergence characteristic of this expansion is almost the same as that of (2. 18). Hence the data in Table

6 are used also for this expansion if we exchange s and x in the table.

It can be proved that the limiting form of this expansion for $s \gg x$ is coincides with (2. 12), *i.e.*, the corresponding limiting form of (2. 9). However this expansion is inferior to the series expansion (2. 9) at computing time, the applicable region and the complication of making program. For the calculation with low accuracy, this expansion will become available as used for evaluation of K_a in the previous paper[3].

§6 Derivatives of $K_{is}(x)$ and $M_{is}(x)$

If the Bessel functions of real order are known, the derivatives of the Bessel functions can be computed by the use of recurrence formula. For the case of pure imaginary order, however, the recurrence formula is not applicable because the Bessel functions of complex order $is \pm 1$ appear. Hence the procedure to compute the derivatives of $K_{is}(x)$ and $M_{is}(x)$ must be provided.

6.1 Series Expansions for $K'_{is}(x)$ and $M'_{is}(x)$

From (2. 4) and (2. 6), we obtain

$$I'_{is}(x) = i\frac{\sinh(s\pi)}{x}\Pi(-is)(x/2)^{is}G(s, x), \tag{6.1}$$

where

$$\begin{aligned} G(s, x) &= F(s, x) + F(s, x)'\frac{x}{is} \\ &= 1 + \left(1 + \frac{2}{is}\right)\frac{(x/2)^2}{1+is} + \left(1 + \frac{4}{is}\right)\frac{(x/2)^4}{2!(1+is)(2+is)} + \left(1 + \frac{6}{is}\right) \\ &\times \frac{(x/2)^6}{3!(1+is)(2+is)(3+is)} + \cdots = E + iF. \end{aligned} \tag{6.2}$$

Hence

$$I'_{is}(x) = i\frac{\sinh(s\pi)}{x}(A+iB)e^{is\log(x/2)}(E+iF), \tag{6.3}$$

$$I'_{-is}(x) = -i\frac{\sinh(s\pi)}{x}(A-iB)e^{-is\log(x/2)}(E-iF), \tag{6.4}$$

Substituting (6. 3) and (6. 4) into the definitions of $K_{is}(x)$ and $M_{is}(x)$, we get

$$K'_{is}(x) = -x\{\cos\alpha(AE-BF) - \sin\alpha(BE+AF)\}, \tag{6. 5}$$

$$M'_{is}(x) = -\tanh(s\pi)x\{\cos\alpha(BE+AF) + \sin\alpha(AE-BF)\}. \tag{6. 6}$$

For the region of oscillation, i.e., $s > x$, we obtain

$$K'_{is}(x) \simeq -\frac{(2\pi s)^{1/2}}{x}e^{-s\pi/2}\cos(\pi/4 - s + s\log(2s/x)), \tag{6.7}$$

$$M'_{is}(x) \simeq \frac{(2\pi s)^{1/2}}{x} e^{-s\pi/2} \sin(\pi/4 - s + s\log(2s/x)). \tag{6.8}$$

The derivatives of the asymptotic expansions (2. 16) and (2. 17) are

$$K'_{is}(x) = (\pi/2x)^{1/2} e^{-x} \Big[-(1+1/2x)\Big\{1 - \frac{4s^2+1}{1!8x} + \frac{(4s^2+1)(4s^2+3^2)}{2!(8x)^2} + \cdots\Big\}$$

$$-1/x\Big\{\frac{4s^2+1}{1!8x} - \frac{2(4s^2+1)(4s^2+3^2)}{2!(8x)^2} + \frac{3(4s^2+1)(4s^2+3^2)(4s^2+5^2)}{3!(8x)^3} - \Big\}\Big], \tag{6.9}$$

$$M'_{is}(x) = \frac{1}{\cosh(s\pi)} (\pi/2x)^{1/2} e^{x} \Big[(1-1/2x)\Big\{1 + \frac{4s^2+1}{1!8x} + \frac{(4s^2+1)(4s^2+3^2)}{2!(8x)^2}\Big\} +$$

$$-1/x\Big\{\frac{4s^2+1}{1!8x} + \frac{2(4s^2+1)(4s^2+3^2)}{2!(8x)^2} + \frac{3(4s^2+1)(4s^2+3^2)(4s^2+5^2)}{3!(8x)^3} + \Big\}\Big]. \tag{6.10}$$

6.2 Computation of $K'_{is}(x)$ and $M'_{is}(x)$

For the region of oscillation, i.e., $s > x$, a method based on the series expansions (6. 5) and (6. 6) is available. This method is consists of the two parts, one is the estimation of the complex series $G(s, x)$ and the other is the estimation of Pai function of imaginary variable $\Pi(is)$. Although the convergence of $G(s, x)$ is slightly slower than that of $F(s, x)$ previously discussed, the estimation of $G(s, x)$ can be carried out by almost the same method used for the estimation of $F(s, x)$.

Similarly to the computation of $K_{is}(x)$, the computation of $K'_{is}(x)$ becomes difficult because of violent cancellation in the region of monotonous decay, i.e., $x > s$. For $x \gg s$, Hankel's asymptotic expansions (6. 9) and (6. 10) are availabel. For the remaining part of $s < x$, revised method based on (6. 9) and (6. 10), which is to estimate $\Pi(is)$ and $G(s, x)$ with high accuracy, is necessary.

Table 7 The values of $K'_{is}(x)$ computed by (6.5), (6.5) revised and the asymptotic expansion (6.9).

$s=0.5$ x	by (6.5)	by (6.5) compensated	by (6.9)
4.0	−0.12067 659	−0.12067 660	−0.1207 E–1
5.0	−0.39376 38	−0.39376 394	−0.39378 E–2
6.0	−0.13144 78	−0.13144 801	−0.13144 8 E–2
7.0	−0.44569 3	−0.44569 74	−0.44569 74 E–3
8.0	−0.15283	−0.15283 981	−0.15283 98 E–3
9.0	−0.5285	−0.52863 515	−0.52863 516 E–4
10.0	−0.184	−0.18407 442	−0.18407 442 E–4
12.0	−0.22	−0.22661 70	−0.22661 695 E–5
$s=5.0$ x	by (6.5)	by (6.5) compensated	by (6.9)
8.0	−0.28028 390	−0.28028 390	−0.25 E–4
9.0	−0.11962 743	−0.11962 742	−0.118 E–4
10.0	−0.49013 30	−0.49013 281	−0.489 E–5
12.0	−0.76421 6	−0.76421 536	−0.76419 E–6
14.0	−0.11253	−0.11251 596	−0.11251 6 E–7
16.0	−0.160	−0.16038 296	−0.16038 296 E–8
18.0		−0.22414 345	−0.22414 345 E–8

Similarly to the computation of $K_{is}(x)$, the region exists where the accuracy of eight decimal places is not obtained by (6. 9) or revised (6. 5). For the computation in this region, the Debye's asymptotic expansion must be used.

In Table 7, the values of $K'_{is}(x)$ comupted by (6. 5), revised (6. 5) and aysmptotic expansion (6. 9) are shown. In Table 8, the real part of $I'_{is}(x)$ computed by (6. 6) and (6. 10) are shown. The computation of the real part of $I'_{is}(x)$ is easier than that of the imaginary part of $I'_{is}(x)$, i.e., $K'_{is}(x)$ because that the cancellation does not occur.

Table 8 Real part of $I'_{is}(x)$.

$s=0.05$ x	by (6.6)	by (6.10)	by a method using an integral representation
2.0	0.15909 2294	0.155	0.15909 2294 E 1
3.0	0.39543 5383	0.3945	0.39543 5382 E 1
4.0	0.97617 8470	0.9759	0.97617 8468 E 1
5.0	0.24340 7377	0.24340	0.24340 7377 E 2
6.0	0.61353 1564	0.61352 9	0.61353 1562 E 2
7.0	0.15606 4230	0.15606 41	0.15606 4230 E 3
8.0	0.39993 0508	0.39993 048	0.39993 0507 E 3
10.0	0.26713 0162	0.26713 0157	0.26713 0161 E 4
$s=0.5$ x	by (6.6)	by (6.10)	by a method using an integral representation
3.0	0.40520 0882	0.403	0.40520 0881 E 1
4.0	0.99932 7464	0.9987	0.99932 7462 E 1
5.0	0.24849 9254	0.24848	0.24849 9253 E 2
6.0	0.62473 8060	0.62473	0.42673 8056 E 2
7.0	0.15857 2968	0.15857 28	0.15857 2967 E 3
8.0	0.40565 1736	0.40565 168	0.40565 1735 E 3
10.0	0.27025 0555	0.27025 0555	0.27025 0554 E 4
$s=2.0$ x	by (6.6)	by (6.10)	by a method using an integral representation
4.0	0.13969 1060	0.135	0.13969 1060 E 2
5.0	0.33764 0222	0.336	0.33764 0222 E 2
6.0	0.82042 3066	0.8199	0.82042 3064 E 2
7.0	0.20187 8399	0.20186	0.20187 8398 E 3
8.0	0.50318 1128	0.50317 6	0.50318 1127 E 3
10.0	0.32234 1506	0.32234 145	0.32234 1505 E 4

§ 7 Methods based on Integral Representations

To check the accuracy of the values obtained by the methods heretofore discussed, different computing methods based on the integral representations are provided.

From Watson[10)]

$$I_\nu(z)=\frac{1}{\pi}\int_0^\pi e^{z\cos\theta}\cos(\nu\theta)d\theta-\frac{\sin(\nu\pi)}{\pi}\int_0^\infty e^{-z\cosh t-\nu t}dt,\ (|\arg z|<\pi/2). \tag{7.1}$$

Hence

$$K_{is}(x)=\frac{\pi/2}{i\sin(s\pi)}\{I_{-is}(x)-I_{is}(x)\}=\int_0^\infty e^{-x\cosh t}\cos(st)dt, \tag{7.2}$$

and

$$M_{is}(x)=\frac{\pi/2}{\cosh(s\pi)}\{I_{-is}(x)+I_{is}(x)\}$$

$$=\frac{1}{\cosh(s\pi)}\int_0^\pi e^{x\cos\theta}\cosh(s\theta)d\theta-\tanh(s\pi)\int_0^\infty e^{-x\cosh t}\sin(st)dt. \tag{7.3}$$

The derivatives of above functions are

$$K'_{is}(x)=-\int_0^\infty \cosh t\, e^{-x\cosh t}\cos(st)dt, \tag{7.4}$$

$$M'_{is}(x)=\frac{1}{\cosh(s\pi)}\int_0^\pi e^{x\cos\theta}\cosh(s\theta)\cos\theta d\theta+\tanh(s\pi)\int_0^\infty e^{-x\cosh t}\sin(st)\cosh t dt. \tag{7.5}$$

Although there are some other different integral representations, they seem to be unsuitable for numerical calculation.

A method to compute the values of $K_{is}(x)$ based on (7. 2) is already presented in the previous paper[3]. As discussed in the paper, the methods based on this integral representations are too time-consuming in the region of oscillation. Hence we state the methods briefly.

A method to evaluate the values of $K'_{is}(x)$ based on (7. 4) is provided by modifying the procedure $K_{itr}(s, x)$ discussed in the previous paper.[3]

The envelope of the integrand of (7. 4), putting $t=\frac{\pi}{2s}z$.

$$g(z)=\cosh\left(\frac{\pi}{2s}z\right)\exp\left\{-x\cosh\left(\frac{\pi}{2s}z\right)\right\}, \tag{7.6}$$

vanishes more slowly than that of $K_{is}(x)$ because of the factor $\cosh(t)$, however, for large t, the double exponential factor is superior to $\cosh(t)$, hence the situation of rapid decay is not changed. Therefore the main process in the procedure needs not be modified except for the cut off point b (the part larger than this can be neglected). The cut off point is determined as the root of

$$g(z)/g(0)=10^{-N}, \tag{7.7}$$

or

$$\cosh\left(\frac{\pi}{2s}z\right)=1+N\log_e 10/x+\log\left\{\cosh\left(\frac{\pi}{2s}z\right)\right\}/x, \tag{7.8}$$

This is not solved explicitly, hence we use the following virtual iteration

$$c_0=1+N\log_e 10/y=1+2.3N/x,$$

$$c_{n+1}=c_n+\log c_n/x,$$

$$c=\lim_{n\to\infty} c_n, \tag{7.9}$$

$$b = \frac{2s}{\pi} \log_e \{c + \sqrt{c^2 - 1}\}.$$

It is sufficient for almost all s and x treated in this paper to apply this iteration only once or twice.

The other integrals having double exponential factor in (7. 3) and (7. 5) can be estimated by the use of the idea in the paper. The finite integrals in the right hand side of (7. 3) and (7. 5) are suitable forms for the Gauss Legendre quadrature formula. For example, the use of 12-point formula yields the accuracy of eight decimal digit for fairly large range of s and x.

§ 8 Practical Procedure and Computing Times

Based on the discussions hitherto given, as an useful procedure for the analyses of potential problems by the use of the expressions of the φ-form, a following procedure is provided (see Fig. 4)

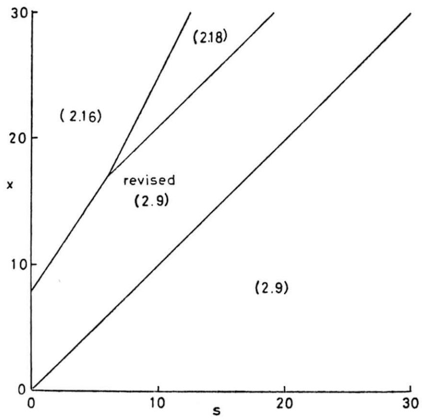

Fig. 4. Computable area of $K_{is}(x)$ by various series expansions.

1) for $x=0$, $K_{is}(x)=0$ and $M_{is}(x)=$undefined,
2) for $s=0$, $K_{is}(x)=K_0(x)$ and $M_{is}(x)=\pi I_0(x)$,
3) for $x<s$ $K_{is}(x)$ is computed by (2. 9), $M_{is}(x)$ is computed by (2. 10),
4) for $x>1.5a+8.0$ and $x>2.0s+5.0$ $K_{is}(x)$ is computed by (2. 16), $M_{is}(x)$ is computed by (2. 17),
5) for $x<2.0s+5.0$ and $x>s+11$ $K_{is}(x)$ is computed by (2. 18) or (5. 4) $M_{is}(x)$ is computed by (2. 23) or (5. 5)
6) for otherwise, $K_{is}(x)$ is computed by revised (2. 9) $M_{is}(x)$ is computed by revised (2. 10)

Above procedure is made to compute the values of $K_{is}(x)$ and $M_{is}(x)$ simulataneously. It is because that the contents of computation of these two values are almost the same as each other and in the problem we aim to analyze, the two values are usually required. As stated already in the computation of $M_{is}(x)$ the cancellation does not occur. Hence the values of $M_{is}(x)$ obtained by revised calculation of(2. 10) are accurate to about 15 decimal places.

The computing times of above procedure on Facom 230–60 of Data processing center at Kyoto University are shown in Table 9. The unit for this table is ms.

Table 9 Computing times of both values of $K_{is}(x)$ and $M_{is}(x)$.

x \ s	1	2	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
1	8	8	8	8	8	8	7	6	6	6	6	5	5	5	5	4	4
2	12	12	12	12	12	11	9	9	8	8	7	7	6	6	6	6	5
3	18	17	14	14	13	12	11	10	10	10	9	8	7	7	7	6	6
4	19	19	19	14	14	13	11	10	10	10	9	9	9	9	9	8	7
5	22	21	20	19	14	14	12	11	11	11	10	10	10	10	10	9	8
6	22	21	21	21	20	14	13	13	12	12	11	11	11	11	11	10	10
8	25	25	24	23	23	23	15	14	14	14	14	13	13	13	13	13	12
10	8	30	28	25	25	25	25	16	16	16	16	15	14	13	13	13	13
12	6	7	29	28	27	27	27	27	18	18	18	17	16	15	14	14	13
14	5	6	8	9	29	29	29	28	27	20	20	19	18	17	16	15	14
16	5	6	7	9	10	31	30	29	29	28	21	20	19	19	18	17	16
18	5	6	7	8	9	10	26	31	31	30	30	21	21	20	20	19	18
20	5	5	6	7	7	8	21	32	32	32	31	30	24	23	21	20	20
22	5	5	6	6	7	7	9	21	35	35	33	32	32	25	25	23	22
24	4	5	6	6	6	7	8	18	22	35	35	34	34	34	25	25	24
27	4	5	5	6	6	6	7	10	18	21	24	38	37	36	35	25	25
30	4	4	5	5	5	6	7	8	10	18	21	25	38	37	35	34	26

(unit: ms)

§ 9 Behaviors of $K_{is}(x)$, $M_{is}(x)$, $I_{is}(x)$ and their Derivatives

9.1 Exact Tables

The exact tables of $K_{is}(x)$ and $M_{is}(x)$ accurate to 8 decimal digits are made for a fairly large range of s and x. For the region of oscillation, the values are computed by revised(2. 9) and (2. 10). Hence the values must be accurate to 14 or 15 decimal digits. However they are rounded to 8 decimal digits, considering the accuracy obtained in the other region.

The values in the region where the accuracy of 8 decimal places is not obtained by series expansion are computed by a elaborated method based on the integral representation.

The short tables of $K'_{is}(x)$ and $M'_{is}(x)$ are also provided by similar method to that of $K_{is}(x)$ and $M_{is}(x)$.

The short tables of $I_{is}(x)$ are provided. The real and imaginary parts of $I_{is}(x)$ are obtained by multiplying the values of $M_{is}(x)$ and $K_{is}(x)$ by $\cosh(s\pi)/\pi$ and $\sinh(s\pi)/\pi$, respectively, as stated in Introduction.

All these tables are shown in **Appendix**.

9.2 Three Dimensional Representation

A three dimensional representation of the behavior of $K_{is}(x)$ is shown in Fig. 5. A corresponding representation of $M_{is}(x)$ is shown in Fig. 6.

9.3 Zeros of Functions $K_{is}(x)$ and $M_{is}(x)$

It has been proved[1] that $K_\nu(x)$, with real x, has zeros only for pure imaginary values of ν. There are no zeros of $K_\nu(x)$ if ν is real or complex.

We state here the solutions of the equation

$$K_{is}(x)=0. \tag{9. 1}$$

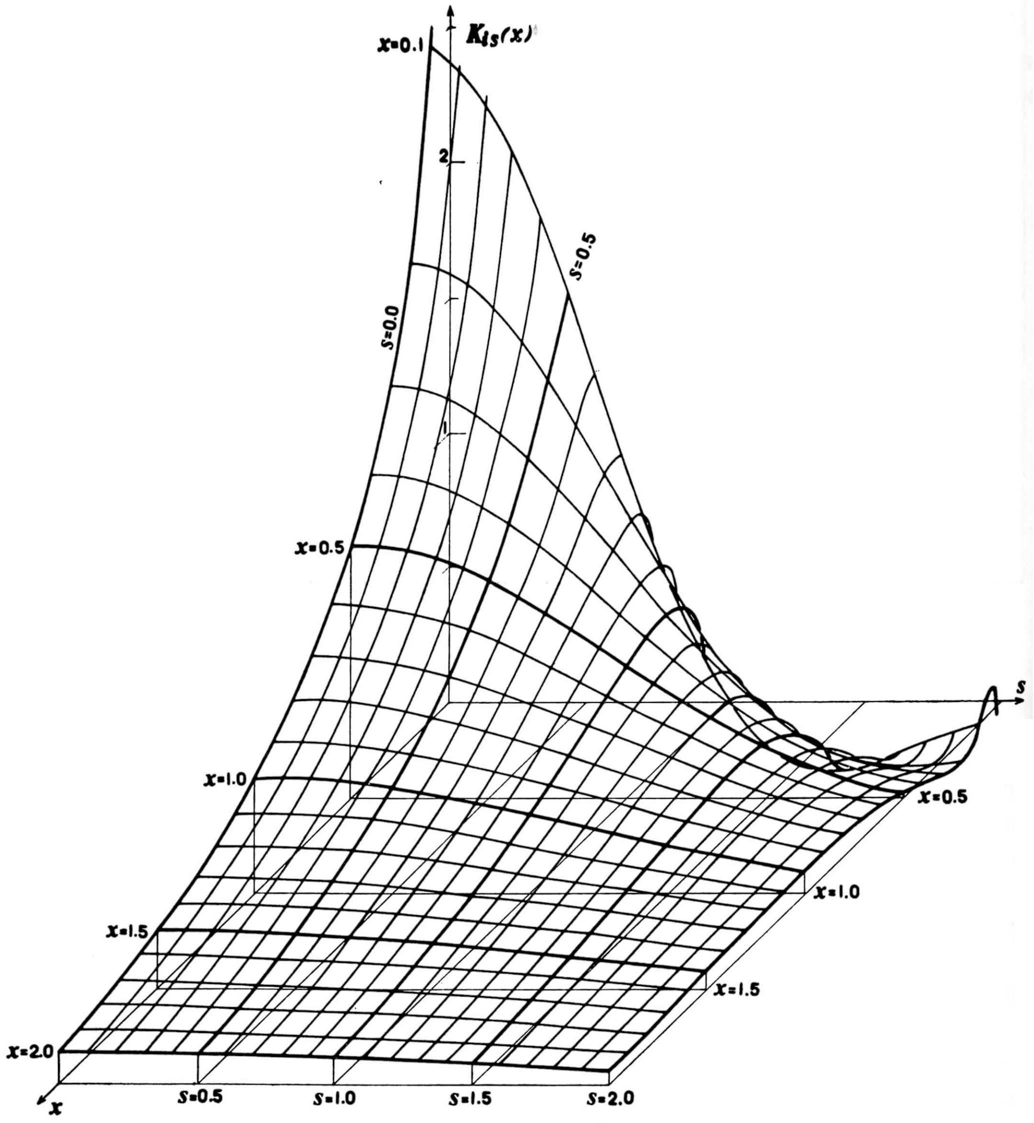

Fig. 5. $K_{is}(x)$ as a function of s and x.

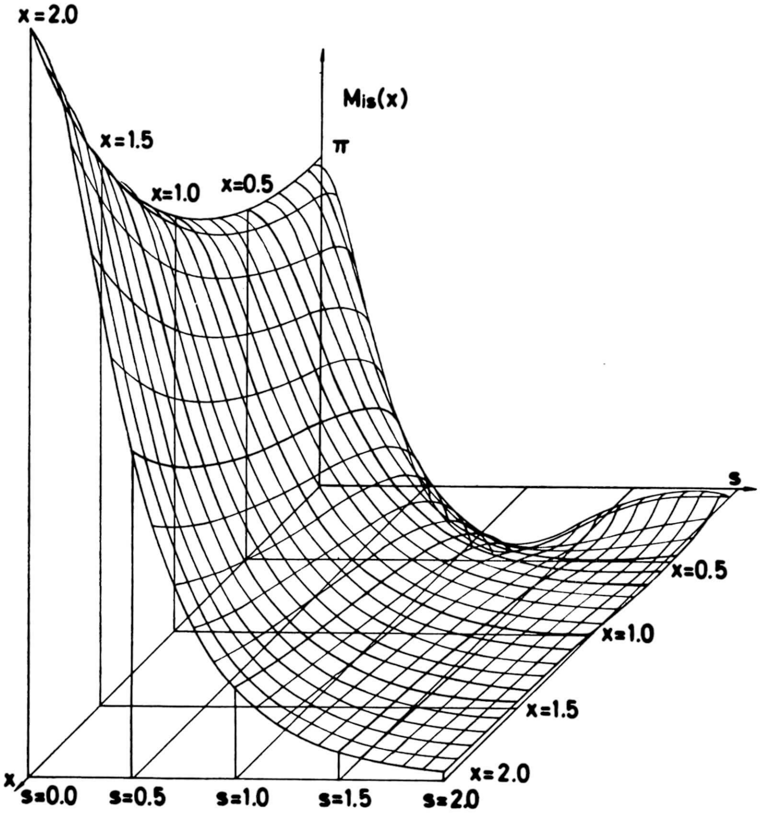

Fig. 6. $M_{is}(x)$ as a function of s and x.

As $K_{is}(x)$ is an even function of s. (9. 1) defines a family of curves

$$x=x_n(s) \tag{9. 2}$$

in the x-s plane, which are symmetric with respect to the x-axis. These curves cannot cross or touch each other except possibly at $x=0$, and none of them can have points of maximum or minimum values or stop at any other value of x. It has been shown[1)] that for any real x, $K_{is}(x)$ regarded as a function of s has an infinite number of zeros. Thus the curves defined by (9. 2) extend themselves to infinitely in the s direction of the x-s plane, so that for any value of x a line parallel to s-axis crosses an infinite number of curves.

The first fifteen zeros in the interval $x<15$, $0<s<20$ are shown in Fig. 7. As shown in the figure, the s-axis is tangent to all curves at the origin, and for any given s, $x=0$ is an accumulation point for the zeros. For all roots it is always $|s|>x$.

Hence the roots exist periodically in the graph of logarithmic scale as shown in Fig. 3 the ratio of a zero to an adjacent zero is nearly equal to constant as follows:

$$x_{n+1}(s)\simeq e^{-\pi/s}x_n(s). \tag{9.3}$$

The corresponding function $M_{is}(x)$ has similar properties to that of $K_{is}(x)$ with respect to its zeros.

The zeros of $M_{is}(x)$ are shown in Fig. 8. As shown in the figure, they fall on the middle of the adjacent zeros of $K_{is}(x)$, in other words the oscillations of $K_{is}(x)$ and $M_{is}(x)$ differ in

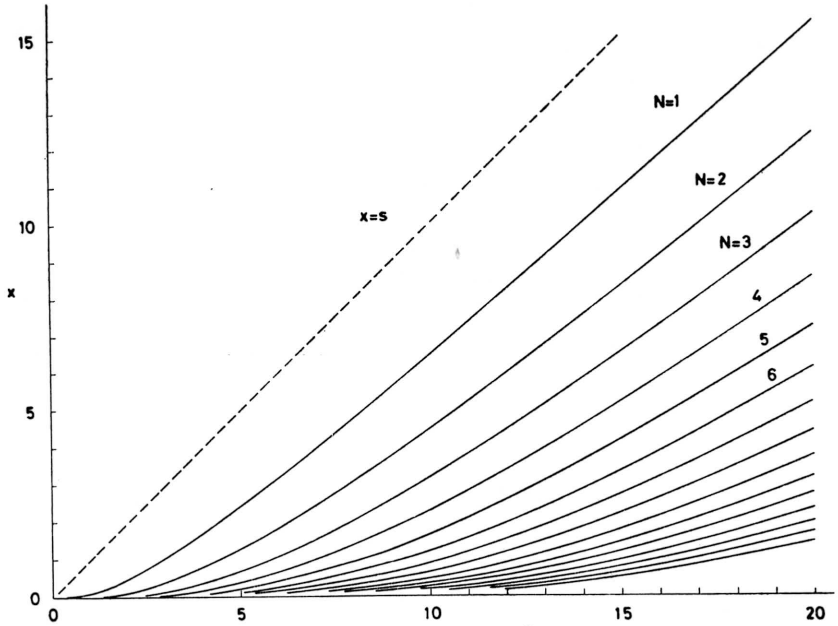

Fig. 7. Zeros of $K_{is}(x)$.

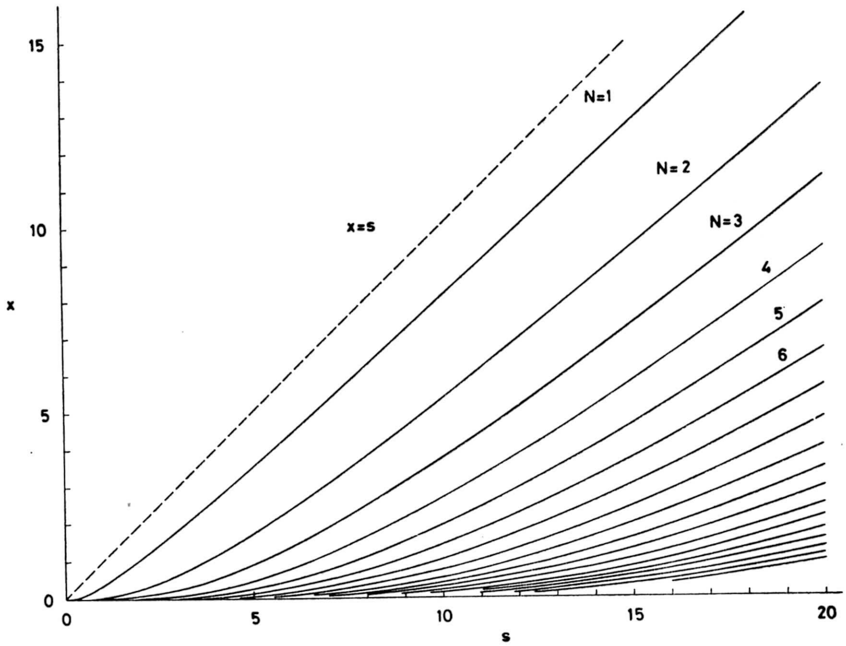

Fig. 8. Zeros of $M_{is}(x)$.

phase by one-forth of period in logarithmic scale. The zeros of $M_{is}(x)$ are nearly equal to the solution of

$$\frac{d}{dx}K_{is}(x)=0, \tag{9.4}$$

but not exactly. The exact values of the zeros of $K_{is}(x)$ and $M_{is}(x)$ are shown in **Appendix**.

§ 10 Some Important Formulas related with the Functions $K_{is}(x)$ and $M_{is}(x)$

Infinite integrals

$$\Gamma(0.5+\mu)\frac{1}{\sqrt{\pi}}(2\beta)^{-\nu}(\alpha+\beta)^{\nu+\mu}\int_0^\infty e^{-at}K_\nu(\beta t)t^{\mu-1}dt$$

$$=\Gamma(\mu+\nu)\Gamma(\mu-\nu)\,{}_2F_1[\nu+\mu,\ \nu+0.5;\ \mu+0.5;\ (\alpha-\beta)/(\alpha+\beta)]$$

$$=[(\alpha+\beta)/(2a)]^{2\nu+2\mu}\Gamma(\mu+\nu)\Gamma(\mu-\nu)\ {}_2F_1(\nu+\mu,\ \mu;\ 2\nu+2\mu;\ 1-\beta^2/\alpha^2) \tag{10.1}$$

$$Re(\mu\pm\nu)>0,\ Re(\alpha+\beta)>0.$$

For $\alpha=0$, we have

$$\int_0^\infty K_\nu(\beta t)t^{\mu-1}dt=2^{\mu-2}\beta^{-\mu}\Gamma\left(\frac{\mu+\nu}{2}\right)\Gamma\left(\frac{\mu-\nu}{2}\right) \tag{10.2}$$

$$Re(\mu\pm\nu)>0,\ Re\,\beta>0.$$

Hence

$$\int_0^\infty K_{is}(t)dt=\frac{\pi/2}{\cosh(\pi s/2)},\quad \int_0^\infty tK_{is}(t)dt=\frac{\pi s/2}{\sinh(\pi s/2)}. \tag{10.3}$$

$$2^{\varrho+1}\alpha^{\nu-\varrho+1}\Gamma(\nu+1)\int_0^\infty K_\mu(\alpha t)J_\nu(\beta t)t^{-\varrho}dt$$

$$=\beta^\nu\Gamma\left(\frac{\nu-\rho+\mu+1}{2}\right)\Gamma\left(\frac{\nu-\rho-\mu+1}{2}\right){}_2F_1\left(\frac{\nu-\rho+\mu+1}{2},\ \frac{\nu-\rho-\mu+1}{2};\ \nu+1;\ -\beta^2/\alpha^2\right), \tag{10.4}$$

$$\mathrm{Re}(\alpha+i\beta)>0,\ \mathrm{Re}(\nu-\rho+1\pm\mu)>0.$$

$$2^{\varrho+1}\Gamma(\nu+1)\alpha^{\nu+1-\varrho}\int_0^\infty K_\nu(\alpha t)I_\nu(\beta t)t^{-\varrho}dt$$

$$=\beta^\nu\Gamma\left(\frac{1-\rho+\mu+\nu}{2}\right)\Gamma\left(\frac{1-\rho-\mu+\nu}{2}\right){}_2F_1\left(\frac{1-\rho+\mu+\nu}{2},\ \frac{1-\rho-\mu+\nu}{2};\ \nu+1;\ \beta^2/\alpha^2\right), \tag{10.5}$$

$$Re(\nu-\rho+1\pm\mu)>0,\ \alpha>\beta.$$

$$2^{\varrho+2}\Gamma(1-\rho)\int_0^\infty K_\mu(\alpha t)K_\nu(\beta t)t^{-\varrho}dt$$

$$=\alpha^{\varrho-\nu-1}\beta^{\nu}{}_2F_1\left(\frac{1+\nu+\mu-\rho}{2},\frac{1+\nu-\mu-\rho}{2};1-\rho;1-\beta^2/\alpha^2\right)$$

$$\times\Gamma\left(\frac{1+\nu+\mu-\rho}{2}\right)\Gamma\left(\frac{1+\nu-\mu-\rho}{2}\right)\Gamma\left(\frac{1-\nu+\mu-\rho}{2}\right)\Gamma\left(\frac{1-\nu-\mu-\rho}{2}\right) \quad (10.6)$$

$$\mathrm{Re}(\alpha+\beta)>0,\ \mathrm{Re}(\rho\pm\mu\pm\nu+1)>0.$$

$$\int_0^\infty K_{is}^2(t)dt=\frac{\pi^2}{4\cosh(s\pi)} \quad (10.7)$$

Macdonald's and Nicholson's formulas

$$\int_0^\infty \exp[-t/2-(z^2+Z^2)/2t]K_\nu(Zz/t)\frac{dt}{t}=2K_\nu(z)K_\nu(Z), \quad (10.8)$$

$$\arg z<\pi,\ \arg Z<\pi,\ \arg(Z+z)<\frac{\pi}{4},$$

$$\int_0^\infty [-t/2-(x^2+X^2)/2t]I_\nu(xX/t)\frac{dt}{t}=\begin{cases}2I_\nu(x)K_\nu(X) & \text{for } X>x\\ 2K_\nu(x)I_\nu(X) & \text{for } x>X,\end{cases} \quad (10.9)$$

$$\int_0^\infty \exp[-t/2-(x^2+X^2)/2t]K_{is}(xX/t)\frac{dt}{t}=2K_{is}(x)K_{is}(X), \quad (10.10)$$

$$\int_0^\infty \exp[-t/2-(x^2+X^2)/2t]M_{is}(xX/t)\frac{dt}{t}=\begin{cases}2M_{is}(x)K_{is}(X) & \text{for } X>x\\ 2K_{is}(x)M_{is}(X) & \text{for } x<X,\end{cases} \quad (10.11)$$

$$K_{is}(x)=K_{-is}(x),\ \ M_{is}(x)=M_{-is}(x). \quad (10.12)$$

Integral with respect to the order

$$K_0[(a^2+b^2-2ab\cos\varphi)^{1/2}]=\frac{2}{\pi}\int_0^\infty K_{is}(a)K_{is}(b)\cosh[(\pi-\varphi)s]ds, \quad (10.13)$$

$$\int_0^\infty K_{is}(a)\cos(sy)ds=\frac{\pi}{2}e^{-a\cosh(y)}, \quad (10.14)$$

$$\int_0^\infty K_{is}(a)\cosh(\pi s/2)\cos(sy)ds=\frac{\pi}{2}\cos(a\sinh(y)), \quad (10.15)$$

$$\int_0^\infty K_{is}(a)\sinh(\pi s/2)\sin(sy)ds=\frac{\pi}{2}\sin(a\sinh(y)), \quad (10.16)$$

$$\int_{-\infty}^\infty K_{i(\xi+\eta)}(a)K_{i(\zeta+\eta)}(b)e^{(\pi-C)\eta}d\eta=K_{i(\xi-\zeta)}(c)e^{-\xi B-\zeta A}, \quad (10.17)$$

where A,B,C, are the angles of the triangle whose sides are of lengths a, b, c.

$$f(x)=\frac{1}{2\pi i}\int_{c-i\infty}^{c+i\infty}[I_\nu(xt)+I_{-\nu}(xt)]\sqrt{xt}\,dt\int_0^\infty K_\nu(vt)\sqrt{vt}\,f(v)dv, \quad (10.18)$$

$$f(x)=\frac{\cosh(s\pi)}{2i}\int_{c-i\infty}^{c+i\infty}M_{is}(xt)\sqrt{xt}\,dt\int_0^\infty K_{is}(vt)\sqrt{vt}\,f(v)dv, \tag{1.19}$$

$$f(x)=\frac{1}{\pi^2}\int_{-\infty}^{\infty}e^{\pi(x+t)/2}K_{i(x+t)}(a)dt\int_{-\infty}^{\infty}e^{\pi(t+v)/2}K_{i(t+v)}(a)f(v)dv, \tag{10.20}$$

$$xf(x)=\frac{2}{\pi^2}\int_0^\infty K_{it}(x)t\sinh(\pi t)dt\int_0^\infty K_{it}(v)f(v)dv. \tag{10.21}$$

Series Expansions

From McLachlan, we obtain

$$\int_z^\infty zK_\nu^2(kz)dz=\frac{z^2}{2}\left\{K_\nu'^2(zk)=\left(1+\frac{\nu^2}{k^2z^2}\right)K_\nu^2(kz)\right\} \tag{10.22}$$

and

$$\int_z^\infty zK_\nu(kz)K_\nu(lz)dz=\frac{z}{k^2-l^2}\{lK_\nu(kz)K_\nu'(lz)-kK_\nu(lz)K_\nu'(kz)\}. \tag{10.23}$$

Supposed that γ_m is the m-th root of the equation $K'_{is}(x)=0$ and α_m is the m-th root of the equation $K_{is}(x)=0$, we obtain the following orthogonality relations:

$$\int_1^\infty xK_{is}(\gamma_m x)K_{is}(\gamma_n x)dx=\begin{cases}0 & m\neq n\\ \dfrac{s^2-\gamma_m^2}{2\gamma_m^2}K_{is}(\gamma_m)^2 & m=n,\end{cases} \tag{10.24}$$

$$\int_1^\infty xK_{is}(\alpha_m x)K_{is}(\alpha_n x)dx=\begin{cases}0 & m\neq n\\ \dfrac{1}{2}K'_{is}(\alpha_m)^2 & m=n.\end{cases} \tag{10.25}$$

Using above relations, we can obtain the following Fourier type series expansion formula:

$$f(x)=\sum_{n=1}^{\infty}a_n\,K_{is}(\gamma_n x)\qquad \text{for } 1<x<\infty \tag{10. 26}$$

where a_n is

$$a_n=\frac{2\gamma_n^2}{(s^2-\gamma_n^2)}\;\frac{\int_1^\infty xf(x)K_{is}(\gamma_n x)dx}{K_{is}^2(\gamma_n)}. \tag{10.27}$$

§ 11 Conclusion

Possibilities to compute the modified Bessel functions of first and second kinds of purely imaginary order $I_{is}(x)$, $K_{is}(x)$ and their related functions are discussed based on their series expansions. The methods to compute the values of $I_{is}(x)$ and $K_{is}(x)$ accurately to eight decimal digits for fairly large range of s and x are established, although the methods presented here will have some margines for improvement and refinement.

For the convenience of practical use, the procedures presented here is made to compute the values of $K_{is}(x)$ and $M_{is}(x)$, which is introduced to express the real part of $I_{is}(x)$ multiplied by $\pi/\cosh(s\pi)$, simultaneously.

If a procedure to compute only the value of $K_{is}(x)$ or that of $M_{is}(x)$ is necessary the remaking of the procedure is easy.

The behaviors of $K_{is}(x)$ and $I_{is}(x)$ are clarified in detail by giving the short tables for $K_{is}(x)$ and $M_{is}(x)$ and some graphical representations.

It is hoped that the studies of applications of $K_{is}(x)$ and $I_{is}(x)$ to the analyses of boundary value problems are developed to a great extent.

The computations in this paper were carried out on the Facom 230–60 of the Data Processing Center at Kyoto University.

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This paper is based partly on the doctoral thesis (Kyoto Universiiy) of one of the anthors.

APPENDIX

TABLES OF MODIFIED BESSEL FUNCTIONS OF PURELY IMAGI NARY ORDER $K_{is}(x)$, $I_{is}(x)$, $M_{is}(x)$ AND THEIR RELATED FUNCTIONS

CONTENTS

DEFINITIONS

$$I_{is}(x)=\frac{\cosh(s\pi)}{\pi}M_{is}(x)-i\frac{\sinh(s\pi)}{\pi}K_{is}(x)$$

$$I_{is}(x)=\frac{\cosh(s\pi)}{\pi}M_{is}(x)+i\frac{\sinh(s\pi)}{\pi}K_{is}(x)$$

$$K_{is}(x)=\frac{\pi/2}{i\sinh(s\pi)}\{I_{-is}(x)-I_{is}(x)\}$$

$$M_{is}(x)=\frac{\pi/2}{\cosh(s\pi)}\{I_{-is}(x)+I_{is}(x)\}$$

s	$\frac{\cosh(s\pi)}{\pi}$	$\frac{\sinh(s\pi)}{\pi}$	s	$\frac{\cosh(s\pi)}{\pi}$	$\frac{\sinh(s\pi)}{\pi}$
0.0	0.318309886E 00	0.0	1.80	0.454676917E 02	0.454665774E 02
0.01	0.318466979F 00	0.100016450E–01	1.90	0.622498130E 02	0.622489991E 02
0.02	0.318938411E 00	0.200131621E–01	2.00	0.852264412E 02	0.852258467E 02
0.03	0.319724650E 00	0.300444327E–01	2.50	0.409978500E 03	0.409978376E 03
0.04	0.320826469E 00	0.401053590E–01	3.00	0.197219201E 04	0.197219199E 04
0.05	0.322244958E 00	0.502058704E–01	3.50	0.948718502E 04	0.948718501E 04
0.10	0.334147468E 00	0.101653070E 00	4.00	0.456378889E 05	0.456378889E 05
0.20	0.383236218E 00	0.213421684E 00	4.50	0.219540032E 06	0.219540032E 06
0.30	0.470460979E 00	0.346427986E 00	5.00	0.105609236E 07	0.105609236E 07
0.40	0.604501533E 00	0.513907502E 00	5.50	0.508030841E 07	0.508030841E 07
0.50	0.798696316E 00	0.732526192E 00	6.00	0.244387087E 08	0.244387087E 08
0.60	0.107236972E 01	0.102403888E 01	6.50	0.117561855E 09	0.117561855E 09
0.70	0.145275518E 01	0.141745420E 01	7.00	0.565528646E 09	0.565528646E 09
0.80	0.197770491E 01	0.195192098E 01	10.00	0.700783181E 13	0.700783181E 13
0.90	0.269945707E 01	0.268062442E 01	12.00	0.375263546E 16	0.375263546E 16
1.00	0.368983333E 01	0.367607791E 01	14.00	0.200950497E 19	0.200950497E 19
1.10	0.504738656E 01	0.503733957E 01	16.00	0.107607315E 22	0.107607315E 22
1.20	0.690720750E 01	0.689986915E 01	18.00	0.576228190E 24	0.576228190E 24
1.30	0.945436865E 01	0.944900869E 01	20.00	0.308565387E 27	0.308565387E 27
1.40	0.129423376E 02	0.129384227E 02	22.50	0.794855334E 30	0.794855334E 30
1.50	0.177182044E 02	0.177153450E 02	25.00	0.204752389E 34	0.204752389E 34
1.60	0.242572177E 02	0.242551292E 02	27.50	0.527436113E 37	0.527436113E 37
1.70	0.332100777E 02	0.332085522E 02	30.00	0.135865987E 41	0.135865987E 41

TABLE OF KIS(X)

X	S= 0.01	S= 0.02	S= 0.03	S= 0.04	S= 0.05
0.01	0.47191429E 01	0.47128414E 01	0.47023515E 01	0.46876923E 01	0.46688904E 01
0.02	0.40270768E 01	0.40229372E 01	0.40160445E 01	0.40064086E 01	0.39940431E 01
0.03	0.36224790E 01	0.36193287E 01	0.36140825E 01	0.36067469E 01	0.35973307E 01
0.04	0.33356885E 01	0.33331304E 01	0.33288701E 01	0.33229121E 01	0.33152631E 01
0.05	0.31135150E 01	0.31113588E 01	0.31077673E 01	0.31027445E 01	0.30962951E 01
0.06	0.29322584E 01	0.29303956E 01	0.29272928E 01	0.29229530E 01	0.29173800E 01
0.07	0.27792717E 01	0.27776340E 01	0.27749059E 01	0.27710900E 01	0.27661896E 01
0.08	0.26470030E 01	0.26455441E 01	0.26431137E 01	0.26397141E 01	0.26353478E 01
0.09	0.25305793E 01	0.25292661E 01	0.25270786E 01	0.25240184E 01	0.25200880E 01
0.10	0.24266716E 01	0.24254798E 01	0.24234944E 01	0.24207168E 01	0.24171492E 01
0.20	0.17525095E 01	0.17519265E 01	0.17509551E 01	0.17495960E 01	0.17478497E 01
0.30	0.13723417E 01	0.13719867E 01	0.13713953E 01	0.13705676E 01	0.13695040E 01
0.40	0.11144497E 01	0.11142112E 01	0.11138139E 01	0.11132579E 01	0.11125433E 01
0.50	0.92436254E 00	0.92419297E 00	0.92391041E 00	0.92351495E 00	0.92300670E 00
0.60	0.77748035E 00	0.77735510E 00	0.77714640E 00	0.77685431E 00	0.77647889E 00
0.70	0.66048817E 00	0.66039313E 00	0.66023476E 00	0.66001311E 00	0.65972820E 00
0.80	0.56532258E 00	0.56524897E 00	0.56512631E 00	0.56495464E 00	0.56473398E 00
0.90	0.48671100E 00	0.48665307E 00	0.48655656E 00	0.48642146E 00	0.48624782E 00
1.00	0.42100905E 00	0.42096288E 00	0.42088594E 00	0.42077825E 00	0.42063983E 00
1.10	0.36559000E 00	0.36555281E 00	0.36549082E 00	0.36540406E 00	0.36529254E 00
1.20	0.31849815E 00	0.31846792E 00	0.31841753E 00	0.31834701E 00	0.31825636E 00
1.30	0.27823938E 00	0.27821463E 00	0.27817336E 00	0.27811560E 00	0.27804136E 00
1.40	0.24364825E 00	0.24362784E 00	0.24359382E 00	0.24354620E 00	0.24348499E 00
1.50	0.21379992E 00	0.21378300E 00	0.21375479E 00	0.21371530E 00	0.21366455E 00
1.60	0.18795005E 00	0.18793594E 00	0.18791244E 00	0.18787954E 00	0.18783724E 00
1.70	0.16549239E 00	0.16548058E 00	0.16546090E 00	0.16543335E 00	0.16539795E 00
1.80	0.14592809E 00	0.14591817E 00	0.14590163E 00	0.14587848E 00	0.14584872E 00
1.90	0.12884319E 00	0.12883482E 00	0.12882087E 00	0.12880134E 00	0.12877624E 00
2.00	0.11389151E 00	0.11388443E 00	0.11387262E 00	0.11385610E 00	0.11383486E 00
2.50	0.62346487E-01	0.62343289E-01	0.62337959E-01	0.62330497E-01	0.62320906E-01
3.00	0.34738999E-01	0.34737481E-01	0.34734951E-01	0.34731410E-01	0.34726858E-01
3.50	0.19598648E-01	0.19597902E-01	0.19596659E-01	0.19594918E-01	0.19592681E-01
4.00	0.11159551E-01	0.11159174E-01	0.11158547E-01	0.11157668E-01	0.11156539E-01
4.50	0.63997926E-02	0.63995987E-02	0.63992755E-02	0.63988231E-02	0.63982415E-02
5.00	0.36910645E-02	0.36909630E-02	0.36907938E-02	0.36905570E-02	0.36902525E-02
6.00	0.12439847E-02	0.12439558E-02	0.12439077E-02	0.12438403E-02	0.12437537E-02
7.00	0.42479290E-03	0.42478436E-03	0.42477014E-03	0.42475022E-03	0.42472462E-03
8.00	0.14646984E-03	0.14646725E-03	0.14646292E-03	0.14645687E-03	0.14644909E-03
9.00	0.50881044E-04	0.50880239E-04	0.50878896E-04	0.50877016E-04	0.50874599E-04
10.00	0.17779977E-04	0.17779723E-04	0.17779299E-04	0.17778704E-04	0.17777941E-04
12.00	0.22008166E-05	0.22007901E-05	0.22007461E-05	0.22006843E-05	0.22006050E-05
14.00	0.27613613E-06	0.27613327E-06	0.27612850E-06	0.27612183E-06	0.27611325E-06
16.00	0.34994010E-07	0.34993692E-07	0.34993161E-07	0.34992418E-07	0.34991463E-07
18.00	0.44687413E-08	0.44687050E-08	0.44686446E-08	0.44685600E-08	0.44684512E-08
20.00	0.57412237E-09	0.57411818E-09	0.57411118E-09	0.57410136E-09	0.57408875E-09
22.50	0.44461124E-10	0.44460833E-10	0.44460350E-10	0.44459674E-10	0.44458803E-10
25.00	0.34641547E-11	0.34641344E-11	0.34641004E-11	0.34640528E-11	0.34639917E-11
27.50	0.27124085E-12	0.27123940E-12	0.27123698E-12	0.27123358E-12	0.27122923E-12
30.00	0.21324740E-13	0.21324635E-13	0.21324460E-13	0.21324215E-13	0.21323901E-13

TABLE OF KIS(X)

X	S= 0.10	S= 0.20	S= 0.30	S= 0.40	S= 0.50
0.01	0.45141925E 01	0.39297807E 01	0.30698503E 01	0.20783687E 01	0.11098861E 01
0.02	0.38920254E 01	0.35018801E 01	0.29119673E 01	0.22012569E 01	0.14597743E 01
0.03	0.35195361E 01	0.32201279E 01	0.27610211E 01	0.21954485E 01	0.15859465E 01
0.04	0.32520096E 01	0.30075497E 01	0.26292608E 01	0.21565009E 01	0.16364071E 01
0.05	0.30429254E 01	0.28360376E 01	0.25137600E 01	0.21067995E 01	0.16524459E 01
0.06	0.28712390E 01	0.26919523E 01	0.24112338E 01	0.20539088E 01	0.16504480E 01
0.07	0.27255990E 01	0.25675788E 01	0.23191327E 01	0.20008486E 01	0.16382143E 01
0.08	0.25991699E 01	0.24581047E 01	0.22355521E 01	0.19489176E 01	0.16199033E 01
0.09	0.24875109E 01	0.23603157E 01	0.21590575E 01	0.18986757E 01	0.15979095E 01
0.10	0.23875716E 01	0.22719527E 01	0.20885485E 01	0.18503386E 01	0.15736895E 01
0.20	0.17333499E 01	0.16762848E 01	0.15844273E 01	0.14624096E 01	0.13162514E 01
0.30	0.13606662E 01	0.13257704E 01	0.12692014E 01	0.11932481E 01	0.11009282E 01
0.40	0.11066033E 01	0.10831012E 01	0.10448360E 01	0.99311784E 00	0.92968957E 00
0.50	0.91878030E 00	0.90203482E 00	0.87468770E 00	0.83755618E 00	0.79173431E 00
0.60	0.77335629E 00	0.76097116E 00	0.74069923E 00	0.71308026E 00	0.67884016E 00
0.70	0.65735807E 00	0.64794971E 00	0.63252302E 00	0.61144933E 00	0.58523002E 00
0.80	0.56289804E 00	0.55560531E 00	0.54363059E 00	0.52723742E 00	0.50678268E 00
0.90	0.48480281E 00	0.47905987E 00	0.46961883E 00	0.45667136E 00	0.44047762E 00
1.00	0.41948783E 00	0.41490725E 00	0.40736964E 00	0.39701711E 00	0.38404302E 00
1.10	0.36436435E 00	0.36067222E 00	0.35459146E 00	0.34622919E 00	0.33573142E 00
1.20	0.31750181E 00	0.31449938E 00	0.30955087E 00	0.30273816E 00	0.29417299E 00
1.30	0.27742330E 00	0.27496323E 00	0.27090603E 00	0.26531498E 00	0.25827661E 00
1.40	0.24297541E 00	0.24094656E 00	0.23759864E 00	0.23298106E 00	0.22716148E 00
1.50	0.21324199E 00	0.21155924E 00	0.20878101E 00	0.20494625E 00	0.20010833E 00
1.60	0.18748508E 00	0.18608237E 00	0.18376544E 00	0.18056522E 00	0.17652411E 00
1.70	0.16510314E 00	0.16392866E 00	0.16198791E 00	0.15930561E 00	0.15591571E 00
1.80	0.14560094E 00	0.14461363E 00	0.14298156E 00	0.14072461E 00	0.13787013E 00
1.90	0.12856724E 00	0.12773430E 00	0.12635693E 00	0.12445123E 00	0.12203933E 00
2.00	0.11365799E 00	0.11295299E 00	0.11178684E 00	0.11017262E 00	0.10812833E 00
2.50	0.62241026E-01	0.61922451E-01	0.61394830E-01	0.60663112E-01	0.59734133E-01
3.00	0.34688945E-01	0.34537678E-01	0.34286927E-01	0.33938719E-01	0.33495853E-01
3.50	0.19574042E-01	0.19499654E-01	0.19376262E-01	0.19204742E-01	0.18986305E-01
4.00	0.11147132E-01	0.11109581E-01	0.11047261E-01	0.10960566E-01	0.10850042E-01
4.50	0.63933968E-02	0.63740523E-02	0.63419344E-02	0.62972271E-02	0.62401847E-02
5.00	0.36877163E-02	0.36775880E-02	0.36607663E-02	0.36373388E-02	0.36074271E-02
6.00	0.12430320E-02	0.12401491E-02	0.12353586E-02	0.12286817E-02	0.12201479E-02
7.00	0.42451133E-03	0.42365918E-03	0.42224261E-03	0.42026705E-03	0.41774012E-03
8.00	0.14638426E-03	0.14612521E-03	0.14569444E-03	0.14509344E-03	0.14432424E-03
9.00	0.50854462E-04	0.50773990E-04	0.50640144E-04	0.50453335E-04	0.50214132E-04
10.00	0.17771577E-04	0.17746145E-04	0.17703836E-04	0.17644770E-04	0.17569108E-04
12.00	0.21999437E-05	0.21973007E-05	0.21929027E-05	0.21867598E-05	0.21788865E-05
14.00	0.27604175E-06	0.27575597E-06	0.27528029E-06	0.27461571E-06	0.27376354E-06
16.00	0.34983503E-07	0.34951682E-07	0.34898710E-07	0.34824681E-07	0.34729727E-07
18.00	0.44675448E-08	0.44639209E-08	0.44578876E-08	0.44494545E-08	0.44386349E-08
20.00	0.57398368E-09	0.57356356E-09	0.57286403E-09	0.57188612E-09	0.57063121E-09
22.50	0.44451551E-10	0.44422555E-10	0.44374269E-10	0.44306756E-10	0.44220103E-10
25.00	0.34634821E-11	0.34614445E-11	0.34580510E-11	0.34533057E-11	0.34472141E-11
27.50	0.27119289E-12	0.27104760E-12	0.27080560E-12	0.27046718E-12	0.27003267E-12
30.00	0.21321278E-13	0.21310792E-13	0.21293326E-13	0.21268897E-13	0.21237529E-13

TABLE OF KIS(X)

X	S= 0.60	S= 0.70	S= 0.80	S= 0.90	S= 1.00
0.01	0.29747097E 00	-0.27204895E 00	-0.57006827E 00	-0.62365445E 00	-0.50063372E 00
0.02	0.77333273E 00	0.21002905E 00	-0.18896240E 00	-0.41282425E 00	-0.47860842E 00
0.03	0.99505001E 00	0.47653850E 00	0.68701550E-01	-0.20936785E 00	-0.35806366E 00
0.04	0.11175430E 01	0.64369281E 00	0.24875465E 00	-0.46551293E-01	-0.23578658E 00
0.05	0.11899357E 01	0.75580180E 00	0.37987163E 00	0.82444793E-01	-0.12703351E 00
0.06	0.12334296E 01	0.83391896E 00	0.47825146E 00	0.18562170E 00	-0.33255088E-01
0.07	0.12588290E 01	0.88950527E 00	0.55362885E 00	0.26909120E 00	0.47017069E-01
0.08	0.12722558E 01	0.92939605E 00	0.61221647E 00	0.33729648E 00	0.11572325E 00
0.09	0.12774453E 01	0.95794420E 00	0.65817846E 00	0.39348132E 00	0.17466625E 00
0.10	0.12768049E 01	0.97806226E 00	0.69441819E 00	0.44005226E 00	0.22538188E 00
0.20	0.11529420E 01	0.97996794E 00	0.80482531E 00	0.63455425E 00	0.47533346E 00
0.30	0.99581751E 00	0.88185149E 00	0.76311347E 00	0.64362298E 00	0.52713838E 00
0.40	0.85664235E 00	0.77631581E 00	0.69118939E 00	0.60377069E 00	0.51648739E 00
0.50	0.73854609E 00	0.67948979E 00	0.61617620E 00	0.55026405E 00	0.48339609E 00
0.60	0.63886319E 00	0.59415840E 00	0.54582211E 00	0.49499825E 00	0.44283818E 00
0.70	0.55447882E 00	0.51990069E 00	0.48226787E 00	0.44239425E 00	0.40110918E 00
0.80	0.46270506E 00	0.45551106E 00	0.42575920E 00	0.39404285E 00	0.36097256E 00
0.90	0.42135847E 00	0.39968602E 00	0.37587284E 00	0.35036006E 00	0.32360524E 00
1.00	0.36868651E 00	0.35122596E 00	0.33197136E 00	0.31125605E 00	0.28942804E 00
1.10	0.32327919E 00	0.30908388E 00	0.29338181E 00	0.27642828E 00	0.25849134E 00
1.20	0.28399421E 00	0.27236440E 00	0.25946592E 00	0.24549658E 00	0.23066505E 00
1.30	0.24989861E 00	0.24030739E 00	0.22964514E 00	0.21806669E 00	0.20573601E 00
1.40	0.22022425E 00	0.21226860E 00	0.20340643E 00	0.19375994E 00	0.18345907E 00
1.50	0.19433388E 00	0.18770142E 00	0.18029973E 00	0.17222602E 00	0.16358399E 00
1.60	0.17169516E 00	0.16614098E 00	0.15993248E 00	0.15314754E 00	0.14586945E 00
1.70	0.15186071E 00	0.14719084E 00	0.14196315E 00	0.13624037E 00	0.13008981E 00
1.80	0.13445237E 00	0.13051189E 00	0.12609480E 00	0.12125195E 00	0.11603800E 00
1.90	0.11914900E 00	0.11581315E 00	0.11206928E 00	0.10795877E 00	0.10352624E 00
2.00	0.10567660E 00	0.10284427E 00	0.99661935E-01	0.96163476E-01	0.92385460E-01
2.50	0.58616501E-01	0.57320488E-01	0.55857870E-01	0.54241768E-01	0.52486461E-01
3.00	0.32961867E-01	0.32340995E-01	0.31638113E-01	0.30858676E-01	0.30008659E-01
3.50	0.18722486E-01	0.18415126E-01	0.18066353E-01	0.17678555E-01	0.17254357E-01
4.00	0.10716384E-01	0.10560424E-01	0.10383128E-01	0.10185583E-01	0.99689872E-02
4.50	0.61711306E-02	0.60904541E-02	0.59986069E-02	0.58960989E-02	0.57834940E-02
5.00	0.35711861E-02	0.35288021E-02	0.34804920E-02	0.34265007E-02	0.33671000E-02
6.00	0.12097947E-02	0.11976675E-02	0.11838192E-02	0.11683097E-02	0.11512059E-02
7.00	0.41467150E-03	0.41107291E-03	0.40695802E-03	0.40234240E-03	0.39724338E-03
8.00	0.14338945E-03	0.14229224E-03	0.14103630E-03	0.13962586E-03	0.13806560E-03
9.00	0.49923266E-04	0.49581620E-04	0.49190230E-04	0.48750274E-04	0.48263072E-04
10.00	0.17477060E-04	0.17368881E-04	0.17244868E-04	0.17105359E-04	0.16950736E-04
12.00	0.21693011E-05	0.21580260E-05	0.21450873E-05	0.21305150E-05	0.21143426E-05
14.00	0.27272552E-06	0.27150374E-06	0.27010065E-06	0.26851906E-06	0.26676214E-06
16.00	0.34614017E-07	0.34477758E-07	0.34321189E-07	0.34144588E-07	0.33948265E-07
18.00	0.44254461E-08	0.44099090E-08	0.43920483E-08	0.43718920E-08	0.43494721E-08
20.00	0.56910113E-09	0.56729804E-09	0.56522455E-09	0.56288361E-09	0.56027857E-09
22.50	0.44114420E-10	0.43989844E-10	0.43846533E-10	0.43684670E-10	0.43504463E-10
25.00	0.34397832E-11	0.34310216E-11	0.34209395E-11	0.34095485E-11	0.33968616E-11
27.50	0.26950255E-12	0.26887737E-12	0.26815778E-12	0.26734456E-12	0.26643854E-12
30.00	0.21199253E-13	0.21154105E-13	0.21102130E-13	0.21043377E-13	0.20977905E-13

TABLE OF KIS(X)

X	S= 1.10	S= 1.20	S= 1.30	S= 1.40	S= 1.50
0.01	-0.28748368E 00	-0.66495068E-01	0.10195905E 00	0.18837471E 00	0.19352416E 00
0.02	-0.42393795E 00	-0.29691558E 00	-0.14562947E 00	-0.94433019E-02	0.86415468E-01
0.03	-0.39441680E 00	-0.34693318E 00	-0.24929550E 00	-0.13418610E 00	-0.28312976E-01
0.04	-0.32573428E 00	-0.33355401E 00	-0.28279793E 00	-0.19905718E 00	-0.10598424E 00
0.05	-0.24973831E 00	-0.29584943E 00	-0.28193332E 00	-0.22781815E 00	-0.15348467E 00
0.06	-0.17631701E 00	-0.24924473E 00	-0.26369718E 00	-0.23502631E 00	-0.17984510E 00
0.07	-0.10861496E 00	-0.20048678E 00	-0.23673456E 00	-0.22925110E 00	-0.19177113E 00
0.08	-0.47387995E-01	-0.15267367E 00	-0.20569269E 00	-0.21565012E 00	-0.19387787E 00
0.09	0.75043703E-02	-0.10722446E 00	-0.17316417E 00	-0.19741419E 00	-0.18931505E 00
0.10	0.56528822E-01	-0.64738851E-01	-0.14062455E 00	-0.17656411E 00	-0.18024888E 00
0.20	0.33216212E 00	0.20864980E 00	0.10692331E 00	0.27649147E-01	-0.29840211E-01
0.30	0.41698546E 00	0.31592214E 00	0.22604554E 00	0.14874506E 00	0.84700670E-01
0.40	0.43158849E 00	0.35105988E 00	0.27655835E 00	0.20936650E 00	0.15036960E 00
0.50	0.41713855E 00	0.35292715E 00	0.29202183E 00	0.23547202E 00	0.18409341E 00
0.60	0.39046201E 00	0.33892281E 00	0.28917546E 00	0.24205108E 00	0.19823785E 00
0.70	0.35923167E 00	0.31754617E 00	0.27678068E 00	0.23758810E 00	0.20053129E 00
0.80	0.32715839E 00	0.29319305E 00	0.25963633E 00	0.22700140E 00	0.19574341E 00
0.90	0.29606991E 00	0.26820760E 00	0.24045262E 00	0.21320991E 00	0.18684630E 00
1.00	0.26684112E 00	0.24384624E 00	0.22078323E 00	0.19797325E 00	0.17571212E 00
1.10	0.23984528E 00	0.22076433E 00	0.20151651E 00	0.18235796E 00	0.16352776E 00
1.20	0.21518611E 00	0.19927591E 00	0.18314736E 00	0.16700586E 00	0.15104525E 00
1.30	0.19282271E 00	0.17949849E 00	0.16593362E 00	0.15229364E 00	0.13873629E 00
1.40	0.17263878E 00	0.16143641E 00	0.14998891E 00	0.13843040E 00	0.12688968E 00
1.50	0.15448179E 00	0.14502991E 00	0.13533916E 00	0.12551866E 00	0.11567397E 00
1.60	0.13818539E 00	0.13018476E 00	0.12195766E 00	0.11359327E 00	0.10517838E 00
1.70	0.12358212E 00	0.11679002E 00	0.10978709E 00	0.10264650E 00	0.95439861E-01
1.80	0.11051050E 00	0.10472887E 00	0.98753456E-01	0.92644520E-01	0.86461324E-01
1.90	0.98818768E-01	0.93885129E-01	0.88774994E-01	0.83538173E-01	0.78223854E-01
2.00	0.88366564E-01	0.84146962E-01	0.79767695E-01	0.75270066E-01	0.70695017E-01
2.50	0.50607191E-01	0.48619956E-01	0.46541293E-01	0.44388072E-01	0.42177270E-01
3.00	0.29094478E-01	0.28122917E-01	0.27101049E-01	0.26036154E-01	0.24935637E-01
3.50	0.16796594E-01	0.16308281E-01	0.15792578E-01	0.15252759E-01	0.14692184E-01
4.00	0.97346404E-02	0.94839288E-02	0.92183142E-02	0.89393193E-02	0.86485143E-02
4.50	0.56614049E-02	0.55304882E-02	0.53914380E-02	0.52449810E-02	0.50918699E-02
5.00	0.33025857E-02	0.32332758E-02	0.31595076E-02	0.30816350E-02	0.30000265E-02
6.00	0.11325804E-02	0.11125121E-02	0.10910849E-02	0.10683871E-02	0.10445114E-02
7.00	0.39167995E-03	0.38567270E-03	0.37924362E-03	0.37241603E-03	0.36521442E-03
8.00	0.13636071E-03	0.13451678E-03	0.13253983E-03	0.13043625E-03	0.12821278E-03
9.00	0.47730075E-04	0.47152864E-04	0.46533133E-04	0.45872691E-04	0.45173447E-04
10.00	0.16781417E-04	0.16597858E-04	0.16400551E-04	0.16190019E-04	0.15966818E-04
12.00	0.20966073E-05	0.20773494E-05	0.20566127E-05	0.20344440E-05	0.20108930E-05
14.00	0.26483336E-06	0.26273656E-06	0.26047585E-06	0.25805568E-06	0.25548076E-06
16.00	0.33732565E-07	0.33497866E-07	0.33244576E-07	0.32973134E-07	0.32684007E-07
18.00	0.43248237E-08	0.42979854E-08	0.42689990E-08	0.42379097E-08	0.42047653E-08
20.00	0.55741313E-09	0.55429135E-09	0.55091763E-09	0.54729672E-09	0.54343371E-09
22.50	0.43306139E-10	0.43089950E-10	0.42856169E-10	0.42605091E-10	0.42337031E-10
25.00	0.33828936E-11	0.33676603E-11	0.33511792E-11	0.33334691E-11	0.33145501E-11
27.50	0.26544069E-12	0.26435204E-12	0.26317373E-12	0.26190700E-12	0.26055314E-12
30.00	0.20905774E-13	0.20827056E-13	0.20741826E-13	0.20650164E-13	0.20552159E-13

TABLE OF KIS(X)

X	S= 1.60	S= 1.70	S= 1.80	S= 1.90	S= 2.00
0.01	0.14026356E 00	0.61438804E-01	-0.12001668E-01	-0.59422897E-01	-0.73834842E-01
0.02	0.13238656E 00	0.13258759E 00	0.10038894E 00	0.53000582E-01	0.64838690E-02
0.03	0.50647040E-01	0.94941337E-01	0.10567858E 00	0.90366755E-01	0.59792900E-01
0.04	-0.22281231E-01	0.39999784E-01	0.75775487E-01	0.86052554E-01	0.76219240E-01
0.05	-0.76431757E-01	-0.98434757E-02	0.38287794E-01	0.65103333E-01	0.72056079E-01
0.06	-0.11380335E 00	-0.49852460E-01	0.28283798E-02	0.39194769E-01	0.58054100E-01
0.07	-0.13801415E 00	-0.80120111E-01	-0.27543144E-01	0.13517817E-01	0.40160187E-01
0.08	-0.15228754E 00	-0.10199014E 00	-0.52232196E-01	-0.97364297E-02	0.21531261E-01
0.09	-0.15915764E 00	-0.11697728E 00	-0.71564374E-01	-0.29779757E-01	0.37881069E-02
0.10	-0.16054570E 00	-0.12644789E 00	-0.86171724E-01	-0.46481857E-01	-0.12290334E-01
0.20	-0.67335226E-01	-0.87479308E-01	-0.93467887E-01	-0.88744821E-01	-0.76721622E-01
0.30	0.33923557E-01	-0.41674951E-02	-0.30642241E-01	-0.46937124E-01	-0.54725607E-01
0.40	0.10005447E 00	0.58528502E-01	0.25556250E-01	0.60991044E-03	-0.17070502E-01
0.50	0.13845684E 00	0.98888906E-01	0.65483302E-01	0.38121697E-01	0.16502019E-01
0.60	0.15826890E 00	0.12251712E 00	0.91196796E-01	0.64371506E-01	0.41967226E-01
0.70	0.16607234E 00	0.13456615E 00	0.10625841E 00	0.81287654E-01	0.59690994E-01
0.80	0.16625059E 00	0.13883822E 00	0.11374538E 00	0.91134461E-01	0.71093276E-01
0.90	0.16168345E 00	0.13799258E 00	0.11599108E 00	0.95841015E-01	0.77649415E-01
1.00	0.15426473E 00	0.13386062E 00	0.11469088E 00	0.96906347E-01	0.80616998E-01
1.10	0.14524360E 00	0.12769813E 00	0.11105622E 00	0.95453212E-01	0.80993967E-01
1.20	0.13544443E 00	0.12036439E 00	0.10594591E 00	0.92307914E-01	0.79546435E-01
1.30	0.12540875E 00	0.11244533E 00	0.99965498E-01	0.88072434E-01	0.76652037E-01
1.40	0.11548808E 00	0.10433760E 00	0.93539273E-01	0.83181921E-01	0.73341247E-01
1.50	0.10590534E 00	0.96306205E-01	0.86961852E-01	0.77948380E-01	0.69331856E-01
1.60	0.96796019E-01	0.88524230E-01	0.80434963E-01	0.72593208E-01	0.65056263E-01
1.70	0.88236108E-01	0.81100505E-01	0.74093755E-01	0.67271262E-01	0.60682507E-01
1.80	0.80261242E-01	0.74098939E-01	0.68025656E-01	0.62088581E-01	0.56330319E-01
1.90	0.72879899E-01	0.67552181E-01	0.62283979E-01	0.57115471E-01	0.52083279E-01
2.00	0.66082571E-01	0.61471278E-01	0.56897739E-01	0.52396162E-01	0.47997991E-01
2.50	0.39925775E-01	0.37650172E-01	0.35366564E-01	0.33090394E-01	0.30836285E-01
3.00	0.23806950E-01	0.22657508E-01	0.21494616E-01	0.20325399E-01	0.19156728E-01
3.50	0.14114259E-01	0.13522408E-01	0.12920039E-01	0.12310514E-01	0.11697119E-01
4.00	0.83475022E-02	0.80379059E-02	0.77213538E-02	0.73994658E-02	0.70738409E-02
4.50	0.49328769E-02	0.47687885E-02	0.46003982E-02	0.44285015E-02	0.42538889E-02
5.00	0.29150615E-02	0.28271280E-02	0.27366197E-02	0.26439333E-02	0.25494653E-02
6.00	0.10195538E-02	0.99361324E-03	0.96679070E-03	0.93918882E-03	0.91091120E-03
7.00	0.35766431E-03	0.34979211E-03	0.34162494E-03	0.33319055E-03	0.32451707E-03
8.00	0.12587645E-03	0.12343458E-03	0.12089472E-03	0.11826462E-03	0.11555217E-03
9.00	0.44437402E-04	0.43666642E-04	0.42863328E-04	0.42029685E-04	0.41167988E-04
10.00	0.15731531E-04	0.15484767E-04	0.15227157E-04	0.14959355E-04	0.14682033E-04
12.00	0.19860119E-05	0.19598558E-05	0.19324818E-05	0.19039493E-05	0.18743195E-05
14.00	0.25275607E-06	0.24988665E-06	0.24687659E-06	0.24373696E-06	0.24046790E-06
16.00	0.32377691E-07	0.32054708E-07	0.31715606E-07	0.31360955E-07	0.30991345E-07
18.00	0.41696170E-08	0.41325185E-08	0.40935262E-08	0.40526992E-08	0.40100986E-08
20.00	0.53933398E-09	0.53500321E-09	0.53044738E-09	0.52567277E-09	0.52068588E-09
22.50	0.42052323E-10	0.41751323E-10	0.41434401E-10	0.41101950E-10	0.40754376E-10
25.00	0.32944436E-11	0.32731723E-11	0.32507600E-11	0.32272318E-11	0.32026138E-11
27.50	0.25911357E-12	0.25758975E-12	0.25598327E-12	0.25429576E-12	0.25252893E-12
30.00	0.20447904E-13	0.20337499E-13	0.20221046E-13	0.20098657E-13	0.19970445E-13

TABLE OF KIS(X)

X	S= 2.50	S= 3.00	S= 3.50	S= 4.00	S= 4.50
0.01	0.29355202E-01	-0.12297294E-01	0.53432316E-02	-0.23364273E-02	0.99088330E-03
0.02	-0.15270683E-01	0.96728776E-02	-0.48535239E-02	0.22289068E-02	-0.98672579E-03
0.03	-0.31202969E-01	0.11503822E-01	-0.32652491E-02	0.59947575E-03	0.57548772E-04
0.04	-0.24430559E-01	0.28774341E-02	0.19824023E-02	-0.18212335E-02	0.98207113E-03
0.05	-0.10424645E-01	-0.56105858E-02	0.50104726E-02	-0.22874876E-02	0.71167081E-03
0.06	0.35991609E-02	-0.10891746E-01	0.53585228E-02	-0.13755139E-02	-0.34863328E-04
0.07	0.14997759E-01	-0.12915805E-01	0.39885890E-02	-0.27272491E-04	-0.66966933E-03
0.08	0.23148027E-01	-0.12477790E-01	0.18629406E-02	0.11678959E-02	-0.97691492E-03
0.09	0.28240955E-01	-0.10442766E-01	-0.36099129E-03	0.19613235E-02	-0.96468328E-03
0.10	0.30748132E-01	-0.75188390E-02	-0.23103322E-02	0.23123935E-02	-0.72778302E-03
0.20	0.60459334E-03	0.12934834E-01	-0.15341055E-02	-0.20243402E-02	0.74452348E-03
0.30	-0.26195563E-01	0.58810977E-02	0.49780385E-02	-0.10795136E-02	-0.84166029E-03
0.40	-0.31134596E-01	-0.49567333E-02	0.46514034E-02	0.14530036E-02	-0.76479604E-03
0.50	-0.24450932E-01	-0.11362531E-01	0.12654449E-02	0.23488760E-02	0.13881860E-03
0.60	-0.13530202E-01	-0.13116929E-01	-0.21480823E-02	0.17887503E-02	0.82340334E-03
0.70	-0.21544053E-02	-0.11719681E-01	-0.44411654E-02	0.59397005E-03	0.10095820E-02
0.80	0.79982087E-02	-0.86012641E-02	-0.54626761E-02	-0.63159526E-03	0.79994327E-03
0.90	0.16329680E-01	-0.47778829E-02	-0.54425856E-02	-0.15827776E-02	0.38463285E-03
1.00	0.22763532E-01	-0.88614793E-03	-0.46989229E-02	-0.21607136E-02	-0.76995651E-04
1.10	0.27456165E-01	0.27125509E-02	-0.35214242E-02	-0.23793940E-02	-0.48348158E-03
1.20	0.30651578E-01	0.58384311E-02	-0.21365118E-02	-0.23029248E-02	-0.78423281E-03
1.30	0.32610407E-01	0.84248120E-02	-0.70579191E-03	-0.20096718E-02	-0.96423272E-03
1.40	0.33577237E-01	0.10471821E-01	0.66373752E-03	-0.15741498E-02	-0.10299429E-02
1.50	0.33767414E-01	0.12016433E-01	0.19070485E-02	-0.10593099E-02	-0.99886901E-03
1.60	0.33363611E-01	0.13113654E-01	0.29895589E-02	-0.51443407E-03	-0.89269297E-03
1.70	0.32517037E-01	0.13825073E-01	0.38977878E-02	0.24210026E-04	-0.73316044E-03
1.80	0.31350663E-01	0.14212145E-01	0.46322329E-02	0.53154699E-03	-0.53987428E-03
1.90	0.29963084E-01	0.14332486E-01	0.52021531E-02	0.99154608E-03	-0.32931507E-03
2.00	0.28432376E-01	0.14238041E-01	0.56218634E-02	0.13951624E-02	-0.11460025E-03
2.50	0.20335298E-01	0.11924338E-01	0.60626894E-02	0.25395419E-02	0.76298170E-03
3.00	0.13537393E-01	0.87304814E-02	0.50748616E-02	0.26036465E-02	0.11327530E-02
3.50	0.86785394E-02	0.59713448E-02	0.37828583E-02	0.21822338E-02	0.11259409E-02
4.00	0.54426469E-02	0.39263859E-02	0.26436067E-02	0.16501956E-02	0.94560270E-03
4.50	0.33667460E-02	0.25185716E-02	0.17751875E-02	0.11737683E-02	0.72359722E-03
5.00	0.20639617E-02	0.15891029E-02	0.11609487E-02	0.80234103E-03	0.52238970E-03
6.00	0.76300096E-03	0.61323939E-03	0.47230830E-03	0.34800074E-03	0.24476550E-03
7.00	0.27856073E-03	0.23084418E-03	0.18453481E-03	0.14215010E-03	0.10538057E-03
8.00	0.10103794E-03	0.85676600E-04	0.70415987E-04	0.56054741E-04	0.43183450E-04
9.00	0.36520997E-04	0.31528110E-04	0.26476200E-04	0.21617536E-04	0.17151219E-04
10.00	0.13176998E-04	0.11540111E-04	0.98592047E-05	0.82140857E-05	0.66708026E-05
12.00	0.17119628E-05	0.15320827E-05	0.13431790E-05	0.11533479E-05	0.96974100E-06
14.00	0.22242924E-06	0.20217375E-06	0.18055471E-06	0.15841182E-06	0.13651940E-06
16.00	0.28940979E-07	0.26615090E-07	0.24101982E-07	0.21490648E-07	0.18865722E-07
18.00	0.37727869E-08	0.35014274E-08	0.32053913E-08	0.28942965E-08	0.25775045E-08
20.00	0.49281199E-09	0.46073316E-09	0.42546497E-09	0.38806498E-09	0.34958135E-09
22.50	0.38805022E-10	0.36547013E-10	0.34045075E-10	0.31367590E-10	0.28583544E-10
25.00	0.30641664E-11	0.29029587E-11	0.27232120E-11	0.25294366E-11	0.23262475E-11
27.50	0.24257019E-12	0.23092438E-12	0.21787214E-12	0.20371610E-12	0.18876944E-12
30.00	0.19246411E-13	0.18396675E-13	0.17440198E-13	0.16397587E-13	0.15290369E-13

TABLE OF KIS(X)

X	S= 5.00	S= 6.00	S= 7.00	S= 8.00	S= 9.00
0.01	-0.38948310E-03	-0.31178954E-04	0.76307617E-05	0.30882002E-05	0.26578233E-06
0.02	0.43102575E-03	0.81441965E-04	0.14868380E-04	0.23662171E-05	0.24110111E-06
0.03	-0.13617951E-03	-0.52923067E-04	-0.12511862E-04	-0.25565585E-05	-0.48079730E-06
0.04	-0.42768742E-03	-0.54449040E-04	-0.34925948E-05	0.41278777E-06	0.21592117E-06
0.05	-0.11577041E-03	0.47910055E-04	0.15473940E-04	0.29050422E-05	0.42116585E-06
0.06	0.26069135E-03	0.81752871E-04	0.79657129E-05	-0.72272290E-06	-0.46376621E-06
0.07	0.42978725E-03	0.39879460E-04	-0.83623977E-05	-0.30746966E-05	-0.46772998E-06
0.08	0.37986958E-03	-0.24182613E-04	-0.15840648E-04	-0.17557933E-05	0.19025121E-06
0.09	0.19795182E-03	-0.69663329E-04	-0.11712317E-04	0.10249261E-05	0.59468879E-06
0.10	-0.23714179E-04	-0.82412649E-04	-0.14443733E-05	0.28586694E-05	0.44036121E-06
0.20	0.16035128E-03	0.38848723E-04	-0.15678831E-04	0.13219512E-05	0.45893893E-06
0.30	0.29351276E-03	-0.77030241E-04	0.15376577E-04	-0.15961601E-05	-0.20967671E-06
0.40	-0.27930614E-03	0.41278063E-04	-0.28951555E-05	-0.91326299E-06	0.47761624E-06
0.50	-0.42411715E-03	0.79333640E-04	-0.15681239E-04	0.30815285E-05	-0.53970759E-06
0.60	-0.18137468E-03	0.15969917E-04	-0.20216410E-05	0.62643362E-06	-0.23928938E-06
0.70	0.14423747E-03	-0.54976373E-04	0.12933855E-04	-0.26471731E-05	0.50317706E-06
0.80	0.36766280E-03	-0.82838091E-04	0.15204933E-04	-0.26914508E-05	0.49918525E-06
0.90	0.43861397E-03	-0.66128248E-04	0.68902161E-05	-0.35748181E-06	-0.54323011E-07
1.00	0.38046182E-03	-0.24318213E-04	-0.44821978E-05	0.20491847E-05	-0.52169283E-06
1.10	0.24144587E-03	0.21929110E-04	-0.12953294E-04	0.30916025E-05	-0.57828710E-06
1.20	0.68753456E-04	0.58606950E-04	-0.16004789E-04	0.25727070E-05	-0.28106734E-06
1.30	-0.10159957E-03	0.79266938E-04	-0.13864640E-04	0.10449425E-05	0.14075669E-06
1.40	-0.24652984E-03	0.83185059E-04	-0.81939465E-05	-0.74619444E-06	0.47461992E-06
1.50	-0.35406010E-03	0.73040310E-04	-0.10117697E-05	-0.22036065E-05	0.60865877E-06
1.60	-0.42043508E-03	0.53006565E-04	0.59407006E-05	-0.30008574E-05	0.53367157E-06
1.70	-0.44733762E-03	0.27469338E-04	0.11464926E-04	-0.30662793E-05	0.30742368E-06
1.80	-0.43963079E-03	0.29624563E-06	0.14931859E-04	-0.25071306E-05	0.13660816E-07
1.90	-0.40370162E-03	-0.25489699E-04	0.16187158E-04	-0.15244717E-05	-0.26866714E-06
2.00	-0.34633788E-03	-0.47779430E-04	0.15413790E-04	-0.34356893E-06	-0.48228586E-06
2.50	0.62487561E-04	-0.83271902E-04	-0.37246029E-05	0.31675172E-05	-0.17729867E-06
3.00	0.37941675E-03	-0.27921892E-04	-0.16465783E-04	0.52615130E-06	0.59603325E-06
3.50	0.50287215E-03	0.40748091E-04	-0.11928931E-04	-0.26749249E-05	0.34207096E-06
4.00	0.48966527E-03	0.84217378E-04	0.33679310E-06	-0.31229188E-05	-0.31835891E-06
4.50	0.41217797E-03	0.98810962E-04	0.11364059E-04	-0.14022429E-05	-0.64564325E-06
5.00	0.31859102E-03	0.93833140E-04	0.17676473E-04	0.88626253E-06	-0.50800998E-06
6.00	0.16387417E-03	0.62340858E-04	0.18217621E-04	0.36336950E-05	0.29475531E-06
7.00	0.75060449E-04	0.33482896E-04	0.12312673E-04	0.35709323E-05	0.74050240E-06
8.00	0.32161473E-04	0.16031980E-04	0.68458801E-05	0.24484653E-05	0.70506962E-06
9.00	0.13213431E-04	0.71549809E-05	0.34014136E-05	0.14007757E-05	0.48944119E-06
10.00	0.52781218E-05	0.30482163E-05	0.15724229E-05	0.71823135E-06	0.28684153E-06
12.00	0.79817117E-06	0.50653674E-06	0.29380554E-06	0.15506822E-06	0.74034006E-07
14.00	0.11554514E-06	0.78333606E-07	0.49260872E-07	0.28660797E-07	0.15376768E-07
16.00	0.16303194E-07	0.11607866E-07	0.77466791E-08	0.48377116E-08	0.28211369E-08
18.00	0.22636742E-08	0.16739636E-08	0.11693438E-08	0.77074161E-09	0.47867411E-09
20.00	0.31100591E-09	0.23703628E-09	0.17169428E-09	0.11809677E-09	0.77060663E-10
22.50	0.25759675E-10	0.20233444E-10	0.15193887E-10	0.10901665E-10	0.74687485E-11
25.00	0.21181863E-11	0.17042967E-11	0.13171074E-11	0.97727154E-12	0.69585169E-12
27.50	0.17334464E-12	0.14224503E-12	0.11253718E-12	0.85813381E-13	0.63046007E-13
30.00	0.14140262E-13	0.11795162E-13	0.95155774E-14	0.74224915E-14	0.55966478E-14

TABLE OF KIS(X)

X	S= 10.00	S= 12.00	S= 14.00	S= 16.00	S= 18.00
0.01	-0.86737929E-07	0.22415751E-08	-0.92584169E-10	0.55583705E-11	-0.30438048E-12
0.02	-0.19546045E-07	-0.47099871E-08	0.43723490E-10	0.57166407E-11	-0.30865425E-12
0.03	-0.81310759E-07	-0.56987078E-09	0.14048254E-09	0.66200864E-11	-0.13405684E-12
0.04	0.55574556E-07	0.19721900E-08	0.85223653E-11	-0.44764853E-11	-0.31044510E-12
0.05	0.49394539E-07	0.15116727E-09	-0.52065860E-11	0.15075488E-11	0.19436259E-12
0.06	-0.11765550E-06	-0.39289163E-08	-0.10038557E-09	-0.31325634E-11	-0.15862283E-12
0.07	-0.24109005E-07	0.35833674E-08	0.18847320E-09	0.67878525E-11	0.24381956E-12
0.08	0.10814400E-06	0.29459194E-08	-0.60096900E-10	-0.65635926E-11	-0.30973742E-12
0.09	0.88292623E-07	-0.31707764E-08	-0.17346589E-09	-0.16587287E-11	0.14309426E-12
0.10	-0.26280913E-07	-0.42804338E-08	0.56934424E-10	0.75796559E-11	0.21530206E-12
0.20	-0.91263267E-07	0.36760451E-08	-0.10419553E-09	-0.77334073E-13	0.23457321E-12
0.30	0.11684823E-06	-0.23579105E-08	0.41561844E-11	0.14643663E-11	-0.48911991E-13
0.40	-0.11931525E-06	0.10046674E-08	0.14323652E-09	-0.75962201E-11	0.25218416E-12
0.50	0.67717247E-07	-0.29662966E-08	-0.14087371E-09	0.66526579E-11	-0.22948212E-13
0.60	0.78731205E-07	0.47051355E-08	0.47111438E-10	-0.73186010E-11	-0.20084883E-13
0.70	-0.87402913E-07	-0.98588449E-09	0.12627712E-09	0.70426150E-11	-0.92971625E-13
0.80	-0.10006162E-06	-0.45834382E-08	-0.17092617E-09	-0.12907094E-11	0.26855000E-12
0.90	0.21793132E-07	0.36836734E-09	-0.66878772E-10	-0.67611559E-11	-0.27308877E-12
1.00	0.11294551E-06	0.45937882E-08	0.16903777E-09	0.42643007E-11	-0.53818398E-13
1.10	0.98270576E-07	0.29090641E-08	0.12186866E-09	0.65284253E-11	0.31063213E-12
1.20	0.11648277E-07	-0.17332918E-08	-0.92621485E-10	-0.27018188E-11	0.12422287E-13
1.30	-0.76996288E-07	-0.45909857E-08	-0.18862501E-09	-0.76161378E-11	-0.30624249E-12
1.40	-0.11887591E-06	-0.37816328E-08	-0.87317273E-10	-0.24122519E-11	-0.12511450E-12
1.50	-0.10283933E-06	-0.49585043E-09	0.87396989E-10	0.53603827E-11	0.22822000E-12
1.60	-0.45700967E-07	0.29134098E-08	0.18566659E-09	0.74303586E-11	0.28528507E-12
1.70	0.24858356E-07	0.46534675E-08	0.15057739E-09	0.27710344E-11	0.22929239E-13
1.80	0.83919867E-07	0.41781327E-08	0.23834235E-10	-0.39179117E-11	-0.25324645E-12
1.90	0.11623095E-06	0.20121738E-08	-0.11068549E-09	-0.75333594E-11	-0.29275752E-12
2.00	0.11735704E-06	-0.79908213E-09	-0.18427132E-09	-0.61316428E-11	-0.93652479E-13
2.50	-0.90307340E-07	-0.15961823E-08	0.18194064E-09	0.39170275E-11	-0.15996495E-12
3.00	-0.63759940E-07	0.46752512E-08	-0.11376807E-09	-0.55357382E-11	0.18678953E-12
3.50	0.97434995E-07	-0.20012434E-08	-0.75125650E-10	0.77082776E-11	-0.70849226E-13
4.00	0.10436663E-06	-0.45047626E-08	0.18972057E-09	-0.40305675E-11	-0.16770712E-12
4.50	-0.96231354E-08	0.64637215E-09	0.32996539E-10	-0.54542170E-11	0.31469697E-12
5.00	-0.10825398E-06	0.47527393E-08	-0.18295254E-09	0.57862933E-11	-0.58537576E-13
6.00	-0.75812093E-07	-0.51054182E-09	0.81706438E-10	-0.33159401E-11	0.54130699E-13
7.00	0.76597612E-07	-0.51969246E-08	0.14561329E-09	-0.35225719E-11	0.12082655E-12
8.00	0.15035345E-06	-0.11975567E-08	-0.14606259E-09	0.81096399E-11	-0.31912786E-12
9.00	0.14001114E-06	0.40700294E-08	-0.18603840E-09	0.89341457E-12	0.16926617E-12
10.00	0.98241575E-07	0.61805886E-08	0.10004979E-10	-0.81804962E-11	0.28564212E-12
12.00	0.31716266E-07	0.39955494E-08	0.25436746E-09	0.22510227E-11	-0.35866310E-12
14.00	0.75748816E-08	0.13889221E-08	0.16402860E-09	0.10501090E-10	0.15167277E-12
16.00	0.15323055E-08	0.36025308E-09	0.60508053E-10	0.67801273E-11	0.43498991E-12
18.00	0.27963863E-09	0.78739199E-10	0.16816119E-10	0.26269997E-11	0.28172776E-12
20.00	0.47645831E-10	0.15403376E-10	0.39306088E-11	0.77433741E-12	0.11378564E-12
22.50	0.48818626E-11	0.18042443E-11	0.54500524E-12	0.13275054E-12	0.25576514E-13
25.00	0.47520158E-12	0.19497476E-12	0.67052114E-13	0.19155237E-13	0.44908760E-14
27.50	0.44608840E-13	0.19909125E-13	0.75919612E-14	0.24580294E-14	0.67013806E-15
30.00	0.40778471E-14	0.19505104E-14	0.80934833E-15	0.28998844E-15	0.89188854E-16

TABLE OF KIS(X)

X	S= 20.00	S= 22.50	S= 25.00	S= 27.50	S= 30.00
0.01	0.10660524E-13	-0.20434748E-15	0.94875008E-18	0.29288830E-19	-0.10207424E-20
0.02	0.95835114E-14	0.21638036E-15	0.43588672E-17	0.44980663E-19	-0.73292823E-21
0.03	-0.10527062E-13	-0.23494774E-15	-0.37786303E-17	-0.62028778E-19	-0.12165265E-20
0.04	-0.54699143E-14	-0.22569511E-15	-0.51380808E-18	0.58658198E-19	0.15563632E-20
0.05	0.12489167E-13	-0.13571197E-15	-0.32349835E-17	0.49434763E-19	0.14971955E-20
0.06	-0.97405117E-14	0.23646409E-15	-0.24785785E-17	-0.49027757E-19	0.13629193E-20
0.07	0.10203734E-13	-0.22386539E-15	0.42675936E-17	-0.37301076E-19	-0.88855525E-21
0.08	-0.12546309E-13	0.23217558E-15	-0.44101320E-17	0.69708354E-19	-0.40438999E-21
0.09	0.10389291E-13	-0.22585152E-15	0.42671885E-17	-0.73766038E-19	0.95168397E-21
0.10	0.10132447E-14	0.11317065E-15	-0.31692123E-17	0.62361440E-19	-0.97540223E-21
0.20	-0.11939256E-13	-0.89151427E-16	0.29199655E-17	0.72490160E-19	-0.78474723E-21
0.30	-0.12656113E-14	0.19887700E-16	-0.45531224E-19	-0.28875558E-19	-0.12533762E-20
0.40	-0.75002574E-14	0.63780243E-16	0.34566025E-17	0.79364225E-19	0.15484145E-20
0.50	-0.81056068E-14	-0.19776199E-15	0.84511868E-18	0.74913436E-19	0.15143242E-20
0.60	0.11837397E-13	0.73176858E-17	-0.44175539E-17	-0.12050906E-19	0.13307185E-20
0.70	-0.11534767E-13	0.68632603E-16	0.32412710E-17	-0.67586648E-19	-0.94146283E-21
0.80	0.78136979E-14	-0.36659374E-16	-0.25967902E-17	0.82707303E-19	-0.33939337E-21
0.90	0.16189926E-14	-0.78387152E-16	0.32522497E-17	-0.83053798E-19	0.89603391E-21
1.00	-0.11699084E-13	0.21199304E-15	-0.43003690E-17	0.80661474E-19	-0.91861277E-21
1.10	0.85838656E-14	-0.20300064E-15	0.38240062E-17	-0.60015589E-19	0.52616127E-21
1.20	0.78606176E-14	-0.36549741E-16	-0.33603253E-18	0.46953805E-20	0.29701968E-21
1.30	-0.10236782E-13	0.23604270E-15	-0.38733260E-17	0.64355852E-19	-0.12590895E-20
1.40	-0.84987445E-14	-0.39098610E-16	0.31204164E-17	-0.75817229E-19	0.15048881E-20
1.50	0.76769406E-14	-0.23426737E-15	0.26299775E-17	-0.80925014E-20	-0.33234533E-21
1.60	0.11921773E-13	0.52439828E-17	-0.36589837E-17	0.82656918E-19	-0.13141547E-20
1.70	0.31783651E-18	0.23261802E-15	-0.26974654E-17	-0.16270171E-19	0.11478905E-20
1.80	-0.11583379E-13	0.10871208E-15	0.30806050E-17	-0.81547706E-19	0.89568615E-21
1.90	-0.10197493E-13	-0.15894568E-15	0.37802370E-17	0.89280023E-20	-0.13284343E-20
2.00	0.12091369E-14	-0.22531121E-15	-0.11155811E-17	0.83011489E-19	-0.87921289E-21
2.50	-0.12566731E-13	-0.13350597E-15	0.20160960E-17	0.81137687E-19	-0.31612065E-21
3.00	0.12276058E-13	0.23730548E-15	0.35199412E-17	0.44161752E-20	-0.13536796E-20
3.50	-0.12601959E-13	-0.23065575E-15	-0.44403957E-17	-0.75079092E-19	-0.63578983E-21
4.00	0.12166324E-13	0.23780461E-15	0.43732304E-17	0.83386787E-19	0.14928349E-20
4.50	-0.50382437E-14	-0.21293814E-15	-0.44495795E-17	-0.83135519E-19	-0.15742931E-20
5.00	-0.82646567E-14	0.65292789E-16	0.36577998E-17	0.82342004E-19	0.15772248E-20
6.00	0.41985795E-14	-0.21604880E-15	-0.34469300E-17	0.15199177E-20	0.99420549E-21
7.00	-0.69085971E-14	0.23321154E-15	0.13166823E-17	-0.70861225E-19	-0.14074239E-20
8.00	0.12475588E-13	-0.20368562E-15	-0.11354886E-17	0.83465920E-19	0.54905260E-21
9.00	-0.10676880E-13	0.72305138E-16	0.26758184E-17	-0.82886299E-19	-0.16626371E-21
10.00	-0.49508445E-14	0.15989344E-15	-0.44822371E-17	0.67642782E-19	0.39428877E-21
12.00	0.63390772E-14	-0.64723594E-16	0.17296727E-17	-0.61631867E-19	0.16219930E-20
14.00	-0.14277608E-13	0.14211552E-15	-0.10710843E-17	0.16483590E-19	-0.66706502E-21
16.00	0.82107395E-14	-0.27958822E-15	0.32061946E-17	-0.22474624E-19	0.14064547E-21
18.00	0.18076710E-13	0.87152436E-16	-0.52711125E-17	0.70988807E-19	-0.53513982E-21
20.00	0.11754807E-13	0.34050392E-15	0.31638750E-18	-0.95278450E-19	0.15285858E-20
22.50	0.37868519E-14	0.22269397E-15	0.64972124E-17	0.20290704E-19	-0.19169433E-20
25.00	0.84959103E-15	0.75422552E-16	0.42363962E-17	0.12413664E-18	0.61744727E-21
27.50	0.15216832E-15	0.18018660E-16	0.14979337E-17	0.80860669E-19	0.23752294E-20
30.00	0.23367689E-16	0.34425253E-17	0.37812723E-18	0.29686704E-19	0.15476681E-20

TABLE OF MIS(X)

X	S= 0.01	S= 0.02	S= 0.03	S= 0.04	S= 0.05
0.01	0.31368805E 01	0.31225390E 01	0.30987375E 01	0.30656266E 01	0.30234141E 01
0.02	0.31380677E 01	0.31265725E 01	0.31074875E 01	0.30809226E 01	0.30470294E 01
0.03	0.31389468E 01	0.31289070E 01	0.31122354E 01	0.30890229E 01	0.30593958E 01
0.04	0.31398102E 01	0.31307088E 01	0.31155934E 01	0.30945442E 01	0.30676717E 01
0.05	0.31407422E 01	0.31323143E 01	0.31183164E 01	0.30988209E 01	0.30739278E 01
0.06	0.31417785E 01	0.31338654E 01	0.31207218E 01	0.31024144E 01	0.30790356E 01
0.07	0.31429371E 01	0.31354342E 01	0.31229714E 01	0.31056110E 01	0.30834394E 01
0.08	0.31442285E 01	0.31370621E 01	0.31251580E 01	0.31085748E 01	0.30873942E 01
0.09	0.31456591E 01	0.31387751E 01	0.31273395E 01	0.31114084E 01	0.30910594E 01
0.10	0.31472335E 01	0.31405903E 01	0.31295544E 01	0.31141796E 01	0.30945402E 01
0.20	0.31713021E 01	0.31659554E 01	0.31570722E 01	0.31446945E 01	0.31288800E 01
0.30	0.32110602E 01	0.32062170E 01	0.31981704E 01	0.31869577E 01	0.31726311E 01
0.40	0.32669750E 01	0.32623515E 01	0.32546697E 01	0.32439655E 01	0.32302886E 01
0.50	0.33395124E 01	0.33349621E 01	0.33274022E 01	0.33168679E 01	0.33034083E 01
0.60	0.34292364E 01	0.34246675E 01	0.34170767E 01	0.34064996E 01	0.33929856E 01
0.70	0.35368317E 01	0.35321782E 01	0.35244468E 01	0.35136741E 01	0.34999104E 01
0.80	0.36631153E 01	0.36583245E 01	0.36503654E 01	0.36392753E 01	0.36251065E 01
0.90	0.38090450E 01	0.38040718E 01	0.37958096E 01	0.37842974E 01	0.37695897E 01
1.00	0.39757282E 01	0.39705312E 01	0.39618972E 01	0.39498673E 01	0.39344982E 01
1.10	0.41644320E 01	0.41589717E 01	0.41499001E 01	0.41372607E 01	0.41211132E 01
1.20	0.43765939E 01	0.43708309E 01	0.43612565E 01	0.43479166E 01	0.43308746E 01
1.30	0.46138339E 01	0.46077282E 01	0.45975847E 01	0.45834520E 01	0.45653973E 01
1.40	0.48779680E 01	0.48714783E 01	0.48606970E 01	0.48456757E 01	0.48264861E 01
1.50	0.51710241E 01	0.51641070E 01	0.51526157E 01	0.51366053E 01	0.51161522E 01
1.60	0.54952588E 01	0.54878682E 01	0.54755902E 01	0.54584841E 01	0.54366312E 01
1.70	0.58531765E 01	0.58452631E 01	0.58321167E 01	0.58138006E 01	0.57904024E 01
1.80	0.62475508E 01	0.62390617E 01	0.62249588E 01	0.62053102E 01	0.61802100E 01
1.90	0.66814474E 01	0.66723253E 01	0.66571710E 01	0.66360575E 01	0.66090863E 01
2.00	0.71582508E 01	0.71484339E 01	0.71321253E 01	0.71094037E 01	0.70803783E 01
2.50	0.10330518E 02	0.10316091E 02	0.10292125E 02	0.10258735E 02	0.10216083E 02
3.00	0.15326228E 02	0.15304562E 02	0.15268570E 02	0.15218426E 02	0.15154371E 02
3.50	0.23168284E 02	0.23135261E 02	0.23080402E 02	0.23003973E 02	0.22906343E 02
4.00	0.35489049E 02	0.35438172E 02	0.35353655E 02	0.35235908E 02	0.35085500E 02
4.50	0.54892338E 02	0.54813316E 02	0.54682044E 02	0.54499159E 02	0.54265547E 02
5.00	0.85535339E 02	0.85411818E 02	0.85206619E 02	0.84920742E 02	0.84555573E 02
6.00	0.21112087E 03	0.21081463E 03	0.21030590E 03	0.20959716E 03	0.20869184E 03
7.00	0.52939622E 03	0.52862602E 03	0.52734653E 03	0.52556400E 03	0.52328706E 03
8.00	0.13425787E 04	0.13406212E 04	0.13373693E 04	0.13328390E 04	0.13270521E 04
9.00	0.34339348E 04	0.34289197E 04	0.34205887E 04	0.34089824E 04	0.33941569E 04
10.00	0.88415178E 04	0.88285889E 04	0.88071111E 04	0.87771892E 04	0.87389685E 04
12.00	0.59500699E 05	0.59413526E 05	0.59268714E 05	0.59066968E 05	0.58809269E 05
14.00	0.40638136E 06	0.40578519E 06	0.40479483E 06	0.40341511E 06	0.40165273E 06
16.00	0.28054686E 07	0.28013489E 07	0.27945052E 07	0.27849709E 07	0.27727924E 07
18.00	0.19526138E 08	0.19497443E 08	0.19449775E 08	0.19383366E 08	0.19298539E 08
20.00	0.13677523E 09	0.13657411E 09	0.13624001E 09	0.13577456E 09	0.13518001E 09
22.50	0.15698215E 10	0.15675118E 10	0.15636748E 10	0.15583295E 10	0.15515017E 10
25.00	0.18132405E 11	0.18105714E 11	0.18061375E 11	0.17999604E 11	0.17920700E 11
27.50	0.21051826E 12	0.21020825E 12	0.20969327E 12	0.20897583E 12	0.20805941E 12
30.00	0.24544887E 13	0.24508732E 13	0.24448669E 13	0.24364994E 13	0.24258112E 13

TABLE OF MIS(X)

X	S= 0.10	S= 0.20	S= 0.30	S= 0.40	S= 0.50
0.01	0.26867775E 01	0.15737284E 01	0.32804756E 00	-0.62776658E 00	-0.11227308E 01
0.02	0.27756361E 01	0.18611520E 01	0.78767017E 00	-0.12021369E 00	-0.71028924E 00
0.03	0.28216854E 01	0.20132068E 01	0.10420828E 01	0.18348353E 00	-0.42628785E 00
0.04	0.28517926E 01	0.21132959E 01	0.12135541E 01	0.39652053E 00	-0.21351645E 00
0.05	0.28737760E 01	0.21863194E 01	0.13405083E 01	0.55833128E 00	-0.45229743E-01
0.06	0.28909381E 01	0.22429576E 01	0.14399267E 01	0.68734862E 00	0.92779055E-01
0.07	0.29049663E 01	0.22887284E 01	0.15207686E 01	0.79367098E 00	0.20891723E 00
0.08	0.29168318E 01	0.23268339E 01	0.15883167E 01	0.88342172E 00	0.30856220E 00
0.09	0.29271411E 01	0.23592880E 01	0.16459360E 01	0.96058738E 00	0.39535744E 00
0.10	0.29362966E 01	0.23874342E 01	0.16958953E 01	0.10279041E 01	0.47188321E 00
0.20	0.30013041E 01	0.25563622E 01	0.19880932E 01	0.14252186E 01	0.93610387E 00
0.30	0.30570289E 01	0.26533445E 01	0.21360729E 01	0.16203149E 01	0.11666591E 01
0.40	0.31199278E 01	0.27345192E 01	0.22404618E 01	0.17471701E 01	0.13117839E 01
0.50	0.31948097E 01	0.28156842E 01	0.23299826E 01	0.18453149E 01	0.14175220E 01
0.60	0.32839605E 01	0.29035294E 01	0.24166426E 01	0.19314522E 01	0.15037990E 01
0.70	0.33888838E 01	0.30016675E 01	0.25066457E 01	0.20141540E 01	0.15809347E 01
0.80	0.35108245E 01	0.31124532E 01	0.26037277E 01	0.20984498E 01	0.16549588E 01
0.90	0.36509731E 01	0.32376825E 01	0.27104466E 01	0.21876255E 01	0.17297396E 01
1.00	0.38105600E 01	0.33789080E 01	0.28287653E 01	0.22840429E 01	0.18079669E 01
1.10	0.39909083E 01	0.35376008E 01	0.29603462E 01	0.23895555E 01	0.18916560E 01
1.20	0.41934665E 01	0.37152407E 01	0.31067142E 01	0.25057380E 01	0.19824273E 01
1.30	0.44198341E 01	0.39133750E 01	0.32693554E 01	0.26340225E 01	0.20816720E 01
1.40	0.46717815E 01	0.41336572E 01	0.34497796E 01	0.27757850E 01	0.21906565E 01
1.50	0.49512707E 01	0.43778789E 01	0.36495667E 01	0.29324032E 01	0.23105915E 01
1.60	0.52604738E 01	0.46479949E 01	0.38703992E 01	0.31052989E 01	0.24426802E 01
1.70	0.56017948E 01	0.49461470E 01	0.41140913E 01	0.32959701E 01	0.25881542E 01
1.80	0.59778899E 01	0.52746876E 01	0.43826132E 01	0.35060171E 01	0.27483017E 01
1.90	0.63916913E 01	0.56362021E 01	0.46781142E 01	0.37371664E 01	0.29244903E 01
2.00	0.68464334E 01	0.60335343E 01	0.50029457E 01	0.39912918E 01	0.31181881E 01
2.50	0.98723390E 01	0.86784828E 01	0.71665698E 01	0.56851274E 01	0.44100403E 01
3.00	0.14638181E 02	0.12845931E 02	0.10577751E 02	0.83578036E 01	0.64503213E 01
3.50	0.22119620E 02	0.19388601E 02	0.15933944E 02	0.12555321E 02	0.96555514E 01
4.00	0.33873508E 02	0.29666820E 02	0.24347222E 02	0.19147525E 02	0.14688394E 02
4.50	0.52383136E 02	0.45850194E 02	0.37590937E 02	0.29521116E 02	0.22604823E 02
5.00	0.81613152E 02	0.71402266E 02	0.58495633E 02	0.45889011E 02	0.35089499E 02
6.00	0.20139722E 03	0.17608627E 03	0.14410192E 03	0.11287540E 03	0.86143375E 02
7.00	0.50494111E 03	0.44128944E 03	0.36087114E 03	0.28238336E 03	0.21522437E 03
8.00	0.12804258E 04	0.11186654E 04	0.91432437E 03	0.71493570E 03	0.54438609E 03
9.00	0.32747065E 04	0.28603167E 04	0.23369031E 04	0.18262673E 04	0.13896057E 04
10.00	0.84310215E 04	0.73627516E 04	0.60135426E 04	0.46974594E 04	0.35722723E 04
12.00	0.56732993E 05	0.49530786E 05	0.40435675E 05	0.31565753E 05	0.23984795E 05
14.00	0.38745345E 06	0.33820075E 06	0.27600898E 06	0.21536618E 06	0.16354743E 06
16.00	0.26746719E 07	0.23343340E 07	0.19046157E 07	0.14856469E 07	0.11277012E 07
18.00	0.18615108E 08	0.16244630E 08	0.13251768E 08	0.10334027E 08	0.78415757E 07
20.00	0.13038992E 09	0.11377583E 09	0.92800474E 08	0.72353006E 08	0.54887752E 08
22.50	0.14964916E 10	0.13056964E 10	0.10648268E 10	0.83003534E 09	0.62950802E 09
25.00	0.17285002E 11	0.15080200E 11	0.12296838E 11	0.95838587E 10	0.72669850E 10
27.50	0.20067610E 12	0.17506876E 12	0.14274270E 12	0.11123548E 12	0.84330215E 11
30.00	0.23397000E 13	0.20410456E 13	0.16640403E 13	0.12965984E 13	0.98284257E 12

TABLE OF MIS(X)

X	S= 0.60	S= 0.70	S= 0.80	S= 0.90	S= 1.00
0.01	-0.11846967E 01	-0.94288549E 00	-0.55431508E 00	-0.15877108E 00	0.14574796E 00
0.02	-0.96902576E 00	-0.95791060E 00	-0.76752840E 00	-0.49063711E 00	-0.20656792E 00
0.03	-0.76272403E 00	-0.86230004E 00	-0.78700645E 00	-0.60465699E 00	-0.37790202E 00
0.04	-0.58834724E 00	-0.75201392E 00	-0.75088884E 00	-0.63779123E 00	-0.46360660E 00
0.05	-0.44081395E 00	-0.64533037E 00	-0.69549759E 00	-0.63428196E 00	-0.50413890E 00
0.06	-0.31432924E 00	-0.54642768E 00	-0.63379115E 00	-0.61250651E 00	-0.51879677E 00
0.07	-0.20442311E 00	-0.45585380E 00	-0.57111578E 00	-0.58127813E 00	-0.51782379E 00
0.08	-0.10779039E 00	-0.37311192E 00	-0.50982773E 00	-0.54522486E 00	-0.50709450E 00
0.09	-0.21970066E-01	-0.29743536E 00	-0.45096682E 00	-0.50692680E 00	-0.49017425E 00
0.10	0.54902466E-01	-0.22804064E 00	-0.39495003E 00	-0.46787950E 00	-0.46932045E 00
0.20	0.54218455E 00	0.24122653E 00	0.22318484E-01	-0.12735027E 00	-0.22013741E 00
0.30	0.79356003E 00	0.49854435E 00	0.27187559E 00	0.10270707E 00	-0.18852739E-01
0.40	0.95115945E 00	0.66229591E 00	0.43550666E 00	0.26035728E 00	0.12764593E 00
0.50	0.10626198E 01	0.77707477E 00	0.55088776E 00	0.37350354E 00	0.23578229E 00
0.60	0.11493265E 01	0.86399333E 00	0.63732114E 00	0.45838607E 00	0.31782246E 00
0.70	0.12225773E 01	0.93455036E 00	0.70579068E 00	0.52485794E 00	0.38199714E 00
0.80	0.12890277E 01	0.99563895E 00	0.76306012E 00	0.57922529E 00	0.43387761E 00
0.90	0.13529355E 01	0.10517021E 01	0.81355882E 00	0.62572016E 00	0.47733668E 00
1.00	0.14172199E 01	0.11057801E 01	0.86033906E 00	0.66730213E 00	0.51514514E 00
1.10	0.14840129E 01	0.11600680E 01	0.90560158E 00	0.70611930E 00	0.54934204E 00
1.20	0.15549681E 01	0.12162332E 01	0.95100203E 00	0.74378632E 00	0.58146995E 00
1.30	0.16314456E 01	0.12756074E 01	0.99783953E 00	0.78155966E 00	0.61272863E 00
1.40	0.17146277E 01	0.13393079E 01	0.10471773E 01	0.82045212E 00	0.64407822E 00
1.50	0.18055958E 01	0.14083183E 01	0.10999237E 01	0.86131035E 00	0.67631067E 00
1.60	0.19053829E 01	0.14835437E 01	0.11568874E 01	0.90486872E 00	0.71009997E 00
1.70	0.20150126E 01	0.15658503E 01	0.12188174E 01	0.95178825E 00	0.74603882E 00
1.80	0.21355273E 01	0.16560950E 01	0.12864328E 01	0.10026851E 01	0.78466587E 00
1.90	0.22680122E 01	0.17551488E 01	0.13604448E 01	0.10581525E 01	0.82648627E 00
2.00	0.24136145E 01	0.18639149E 01	0.14415752E 01	0.11187780E 01	0.87198807E 00
2.50	0.33849677E 01	0.25892258E 01	0.19817370E 01	0.15210432E 01	0.11720798E 01
3.00	0.49204911E 01	0.37366666E 01	0.28365518E 01	0.21573462E 01	0.16459499E 01
3.50	0.73335867E 01	0.55405835E 01	0.41809638E 01	0.31584532E 01	0.23916703E 01
4.00	0.11121817E 02	0.83718598E 01	0.62905751E 01	0.47290258E 01	0.35613419E 01
4.50	0.17077578E 02	0.12820634E 02	0.96033728E 01	0.71937450E 01	0.53956759E 01
5.00	0.26464570E 02	0.19827608E 02	0.14817112E 02	0.11069474E 02	0.82774997E 01
6.00	0.64814367E 02	0.48422080E 02	0.36066588E 02	0.26843230E 02	0.19987887E 02
7.00	0.16167471E 03	0.12055518E 03	0.89595913E 02	0.66515997E 02	0.49389213E 02
8.00	0.40846318E 03	0.30415781E 03	0.22568880E 03	0.16724854E 03	0.12393319E 03
9.00	0.10417290E 04	0.77490396E 03	0.57429552E 03	0.42500434E 03	0.31445100E 03
10.00	0.26761296E 04	0.19890453E 04	0.14727242E 04	0.10887124E 04	0.80454604E 03
12.00	0.17949662E 05	0.13325106E 05	0.98524294E 04	0.72719313E 04	0.53643950E 04
14.00	0.12230772E 06	0.90719705E 05	0.67011752E 05	0.49405734E 05	0.36400842E 05
16.00	0.84289723E 06	0.62481430E 06	0.46119757E 06	0.33974898E 06	0.25008924E 06
18.00	0.58587781E 07	0.43408452E 07	0.32023518E 07	0.23575809E 07	0.17341936E 07
20.00	0.40995736E 08	0.30362667E 08	0.22389430E 08	0.16474922E 08	0.12111878E 08
22.50	0.47002933E 09	0.34798557E 09	0.25649209E 09	0.18864205E 09	0.13860707E 09
25.00	0.54245902E 10	0.40148746E 10	0.29582393E 10	0.21748344E 10	0.15972804E 10
27.50	0.62936917E 11	0.46569722E 11	0.34303752E 11	0.25211270E 11	0.18509447E 11
30.00	0.73338349E 12	0.54255102E 12	0.39955463E 12	0.29357104E 12	0.21546771E 12

TABLE OF MIS(X)

X	S= 1.10	S= 1.20	S= 1.30	S= 1.40	S= 1.50
0.01	0.31215155E 00	0.34074773E 00	0.26633435E 00	0.14039418E 00	0.13456584E-01
0.02	0.27574479E-01	0.18043555E 00	0.24523149E 00	0.23470783E 00	0.17365801E 00
0.03	-0.15761784E 00	0.20831782E-01	0.13875211E 00	0.19283809E 00	0.19189543E 00
0.04	-0.27228099E 00	-0.97653842E-01	0.38164354E-01	0.12485303E 00	0.16248151E 00
0.05	-0.34312277E 00	-0.18231705E 00	-0.44247564E-01	0.57677982E-01	0.11867833E 00
0.06	-0.38592114E 00	-0.24210885E 00	-0.10914850E 00	-0.16642093E-02	0.72849412E-01
0.07	-0.41012415E 00	-0.28377853E 00	-0.15940741E 00	-0.51909317E-01	0.29733690E-01
0.08	-0.42163553E 00	-0.31211728E 00	-0.19786771E 00	-0.93573553E-01	-0.89769759E-02
0.09	-0.42429518E 00	-0.33052435E 00	-0.22690760E 00	-0.12767121E 00	-0.42875600E-01
0.10	-0.42068654E 00	-0.34144375E 00	-0.24842472E 00	-0.15527539E 00	-0.72102614E-01
0.20	-0.26738725E 00	-0.27940971E 00	-0.26552681E 00	-0.23405943E 00	-0.19225630E 00
0.30	-0.10136686E 00	-0.15223131E 00	-0.17791637E 00	-0.18414612E 00	-0.17599625E 00
0.40	0.29725674E-01	-0.39713545E-01	-0.85956348E-01	-0.11352048E 00	-0.12633415E 00
0.50	0.13030974E 00	0.51155822E-01	-0.64707472E-02	-0.46521856E-01	-0.72330575E-01
0.60	0.20813549E 00	0.12344606E 00	0.59122743E-01	0.11455425E-01	-0.22593640E-01
0.70	0.26946082E 00	0.18124255E 00	0.11268909E 00	0.60151706E-01	0.20715093E-01
0.80	0.31890541E 00	0.22806377E 00	0.15656662E 00	0.10071670E 00	0.57614286E-01
0.90	0.35984823E 00	0.26669219E 00	0.19287369E 00	0.13457340E 00	0.88836260E-01
1.00	0.39478732E 00	0.29928453E 00	0.22337509E 00	0.16306350E 00	0.11528851E 00
1.10	0.42560094E 00	0.32751345E 00	0.24950198E 00	0.18735142E 00	0.13785471E 00
1.20	0.45372885E 00	0.35268757E 00	0.27240767E 00	0.20841629E 00	0.15732735E 00
1.30	0.48029784E 00	0.37584410E 00	0.29302437E 00	0.22707231E 00	0.17439298E 00
1.40	0.50620951E 00	0.39781804E 00	0.31211177E 00	0.24399570E 00	0.18963760E 00
1.50	0.53220280E 00	0.41929382E 00	0.33029631E 00	0.25975075E 00	0.20355928E 00
1.60	0.55889916E 00	0.44084388E 00	0.34810214E 00	0.27481237E 00	0.21658212E 00
1.70	0.58683597E 00	0.46295790E 00	0.36597545E 00	0.28958513E 00	0.22906947E 00
1.80	0.61649142E 00	0.48606509E 00	0.38430358E 00	0.30441871E 00	0.24133571E 00
1.90	0.64830390E 00	0.51055159E 00	0.40343021E 00	0.31962067E 00	0.25365627E 00
2.00	0.68268695E 00	0.53677413E 00	0.42366745E 00	0.33546683E 00	0.26627622E 00
2.50	0.90726154E 00	0.70559363E 00	0.55133650E 00	0.43276140E 00	0.34113944E 00
3.00	0.12605987E 01	0.96952127E 00	0.74891858E 00	0.58107987E 00	0.45284966E 00
3.50	0.18166219E 01	0.13846459E 01	0.10593160E 01	0.81355298E 00	0.62727161E 00
4.00	0.26885685E 01	0.20354834E 01	0.15458109E 01	0.11777503E 01	0.90033327E 00
4.50	0.40550458E 01	0.30547329E 01	0.23071553E 01	0.17473032E 01	0.13270582E 01
5.00	0.61997671E 01	0.46528536E 01	0.34996520E 01	0.26384479E 01	0.19940119E 01
6.00	0.14900187E 02	0.11124167E 02	0.83192055E 01	0.62328235E 01	0.46784997E 01
7.00	0.36702395E 02	0.27306685E 02	0.20344205E 02	0.15179475E 02	0.11343418E 02
8.00	0.91891045E 02	0.68198355E 02	0.50672631E 02	0.37697944E 02	0.28082250E 02
9.00	0.23275608E 03	0.17242168E 03	0.12785232E 03	0.94906590E 02	0.70530960E 02
10.00	0.59473180E 03	0.43992432E 03	0.32568977E 03	0.24134834E 03	0.17902876E 03
12.00	0.39576968E 04	0.29212504E 04	0.21576550E 04	0.15948744E 04	0.11798481E 04
14.00	0.26818797E 05	0.19765806E 05	0.14575364E 05	0.10754695E 05	0.79409824E 04
16.00	0.18407024E 06	0.13551188E 06	0.99806445E 05	0.73548074E 05	0.54229934E 05
18.00	0.12754044E 07	0.93814741E 06	0.69031808E 06	0.50819035E 06	0.37430541E 06
20.00	0.89021175E 07	0.65436841E 07	0.48115011E 07	0.35392572E 07	0.26045962E 07
22.50	0.10181236E 09	0.74788926E 08	0.54951285E 08	0.40389283E 08	0.29697892E 08
25.00	0.11726926E 10	0.86097118E 09	0.63223208E 09	0.46439967E 09	0.34123860E 09
27.50	0.13583876E 11	0.99687089E 10	0.73167988E 10	0.53717311E 10	0.39449524E 10
30.00	0.15807714E 12	0.11596507E 12	0.85082180E 11	0.62437757E 11	0.45832826E 11

TABLE OF MIS(X)

X	S= 1.60	S= 1.70	S= 1.80	S= 1.90	S= 2.00
0.01	-0.78058889E-01	-0.11805756E 00	-0.10988403E 00	-0.70170438E-01	-0.20377287E-01
0.02	0.90783112E-01	0.11610189E-01	-0.46276560E-01	-0.75140972E-01	-0.76320887E-01
0.03	0.15232165E 00	0.93277866E-01	0.32438731E-01	-0.17019860E-01	-0.47875568E-01
0.04	0.15897400E 00	0.12694703E 00	0.80492556E-01	0.32425391E-01	-0.76374243E-02
0.05	0.14117914E 00	0.13274241E 00	0.10371166E 00	0.64951882E-01	0.26002766E-01
0.06	0.11325797E 00	0.12342974E 00	0.11052411E 00	0.83197955E-01	0.49985641E-01
0.07	0.82075726E-01	0.10632149E 00	0.10708345E 00	0.90975579E-01	0.65243704E-01
0.08	0.50980222E-01	0.85587893E-01	0.97465623E-01	0.91465097E-01	0.73531294E-01
0.09	0.21583604E-01	0.63622089E-01	0.84314061E-01	0.87036831E-01	0.76531621E-01
0.10	-0.53899076E-02	0.41796290E-01	0.69336932E-01	0.79394329E-01	0.75640630E-01
0.20	-0.14620348E 00	-0.10075353E 00	-0.59501632E-01	-0.24822871E-01	0.20279821E-02
0.30	-0.15792951E 00	-0.13379569E 00	-0.10681938E 00	-0.79592826E-01	-0.54084017E-01
0.40	-0.12784287E 00	-0.12106666E 00	-0.10862641E 00	-0.92754913E-01	-0.75303217E-01
0.50	-0.86759726E-01	-0.92295879E-01	-0.91105640E-01	-0.85067945E-01	-0.75792681E-01
0.60	-0.45565849E-01	-0.59625352E-01	-0.66636866E-01	-0.68215264E-01	-0.65756788E-01
0.70	-0.79995876E-02	-0.27972616E-01	-0.40879915E-01	-0.48156276E-01	-0.51037385E-01
0.80	0.24942329E-01	0.81275654E-03	-0.16341161E-01	-0.27839296E-01	-0.34805832E-01
0.90	0.53339537E-01	0.26224769E-01	0.59781551E-02	-0.86537751E-02	-0.18723362E-01
1.00	0.77673752E-01	0.48345703E-01	0.25802726E-01	0.88215605E-02	-0.36092367E-02
1.10	0.98545466E-01	0.67501601E-01	0.43202988E-01	0.24429035E-01	0.10185056E-01
1.20	0.11655494E 00	0.84101737E-01	0.58405069E-01	0.38225396E-01	0.22565638E-01
1.30	0.13225526E 00	0.98564221E-01	0.71694773E-01	0.50370794E-01	0.33577221E-01
1.40	0.14613757E 00	0.11128307E 00	0.83369412E-01	0.61068870E-01	0.43335273E-01
1.50	0.15863052E 00	0.12261560E 00	0.93714559E-01	0.70534745E-01	0.51987393E-01
1.60	0.17010567E 00	0.13287963E 00	0.10299387E 00	0.78978421E-01	0.59691529E-01
1.70	0.18088501E 00	0.14235543E 00	0.11144575E 00	0.86596809E-01	0.66604044E-01
1.80	0.19124875E 00	0.15128961E 00	0.11928359E 00	0.93570547E-01	0.72873550E-01
1.90	0.20144266E 00	0.15989974E 00	0.12669773E 00	0.10006346E 00	0.78638101E-01
2.00	0.21168466E 00	0.16837899E 00	0.13385815E 00	0.10622343E 00	0.84024385E-01
2.50	0.26996621E 00	0.21438183E 00	0.17074244E 00	0.13630500E 00	0.10899555E 00
3.00	0.35445037E 00	0.27860076E 00	0.21986387E 00	0.17416722E 00	0.13844990E 00
3.50	0.48557276E 00	0.37738784E 00	0.29447604E 00	0.23068610E 00	0.18141339E 00
4.00	0.69062160E 00	0.53160612E 00	0.41065131E 00	0.31835018E 00	0.24768231E 00
4.50	0.10108212E 01	0.77223372E 00	0.59174919E 00	0.45484540E 00	0.35071004E 00
5.00	0.15107417E 01	0.11475164E 01	0.87388580E 00	0.66726418E 00	0.51086752E 00
6.00	0.35185779E 01	0.26514378E 01	0.20019900E 01	0.15146782E 01	0.11483344E 01
7.00	0.84902136E 01	0.63649020E 01	0.47793777E 01	0.35947152E 01	0.27081801E 01
8.00	0.20947437E 02	0.15646735E 02	0.11703520E 02	0.87662539E 01	0.65753722E 01
9.00	0.52477460E 02	0.39091612E 02	0.29155282E 02	0.21770959E 02	0.16276738E 02
10.00	0.13293920E 03	0.98819529E 02	0.73535416E 02	0.54779435E 02	0.40851500E 02
12.00	0.87356216E 03	0.64734660E 03	0.48013057E 03	0.35642147E 03	0.26482074E 03
14.00	0.58676021E 04	0.43387468E 04	0.32106213E 04	0.23775919E 04	0.17620181E 04
16.00	0.40010557E 05	0.29538248E 05	0.21820928E 05	0.16130293E 05	0.11931447E 05
18.00	0.27584234E 06	0.20339379E 06	0.15005832E 06	0.11077206E 06	0.81818074E 05
20.00	0.19176882E 07	0.14126406E 07	0.10411303E 07	0.76771550E 06	0.56639372E 06
22.50	0.21845844E 08	0.16076907E 08	0.11836689E 08	0.87187475E 07	0.64250296E 07
25.00	0.25083482E 09	0.18445380E 09	0.13569415E 09	0.99864320E 08	0.73525224E 08
27.50	0.28981187E 10	0.21298261E 10	0.15657747E 10	0.11515255E 10	0.84718461E 09
30.00	0.33654190E 11	0.24719605E 11	0.18162990E 11	0.13349917E 11	0.98155863E 10

TABLE OF MIS(X)

X	S= 2.50	S= 3.00	S= 3.50	S= 4.00	S= 4.50
0.01	0.10674267E-01	-0.42183023E-02	0.12513203E-02	-0.13794257E-03	-0.17426991E-03
0.02	0.27248742E-01	-0.86865122E-02	0.25611663E-02	-0.71410323E-03	0.19646642E-03
0.03	0.14479322E-02	0.60569273E-02	-0.44107804E-02	0.22624496E-02	-0.10044535E-02
0.04	-0.19465775E-01	0.12678745E-01	-0.51173931E-02	0.14701262E-02	-0.21861322E-03
0.05	-0.29447508E-01	0.11728560E-01	-0.22391556E-02	-0.49568938E-03	0.71119724E-03
0.06	-0.31031419E-01	0.71004913E-02	0.11858071E-02	-0.18937915E-02	0.10055285E-02
0.07	-0.27405434E-01	0.14966858E-02	0.37699522E-02	-0.23405022E-02	0.75091746E-03
0.08	-0.20902349E-01	-0.36572600E-02	0.51626099E-02	-0.20285352E-02	0.24084642E-03
0.09	-0.13366186E-01	-0.77481474E-02	0.54767423E-02	-0.12776620E-02	-0.28600076E-03
0.10	-0.55576039E-02	-0.10609820E-01	0.49789103E-02	-0.36380330E-03	-0.69482907E-03
0.20	0.31272903E-01	-0.14302335E-02	-0.52733172E-02	0.11774572E-02	0.67738908E-03
0.30	0.17191550E-01	0.11627291E-01	-0.23318774E-02	-0.20801693E-02	0.55314986E-03
0.40	-0.41462294E-02	0.12075271E-01	0.29433724E-02	-0.18419063E-02	-0.65660792E-03
0.50	-0.19873264E-01	0.64848366E-02	0.53667387E-02	-0.36679716E-04	-0.99947350E-03
0.60	-0.28591406E-01	-0.26346388E-03	0.50909301E-02	0.15287482E-02	-0.58557217E-03
0.70	-0.31704955E-01	-0.59938651E-02	0.33108248E-02	0.22815620E-02	0.69363065E-04
0.80	-0.30932862E-01	-0.10032408E-01	0.10120978E-02	0.22769792E-02	0.62278262E-03
0.90	-0.27692646E-01	-0.12384099E-01	-0.12042136E-02	0.17627524E-02	0.94024530E-03
1.00	-0.23021140E-01	-0.13311393E-01	-0.30375904E-02	0.98822315E-03	0.10153147E-02
1.10	-0.17633654E-01	-0.13139247E-01	-0.43784771E-02	0.14336128E-03	0.89910960E-03
1.20	-0.12003966E-01	-0.12172941E-01	-0.52252081E-02	-0.64776636E-03	0.65809184E-03
1.30	-0.64334008E-02	-0.10669082E-01	-0.56301457E-02	-0.13151741E-02	0.35345792E-03
1.40	-0.11035471E-02	-0.88304291E-02	-0.56675100E-02	-0.18277181E-02	0.33339214E-04
1.50	0.38855731E-02	-0.68105228E-02	-0.54154105E-02	-0.21797487E-02	-0.26841698E-03
1.60	0.84885308E-02	-0.47215585E-02	-0.49465968E-02	-0.23809538E-02	-0.53055650E-03
1.70	0.12695721E-01	-0.26426102E-02	-0.43243371E-02	-0.24492189E-02	-0.74176821E-03
1.80	0.16520429E-01	-0.62702094E-03	-0.36011795E-02	-0.24058889E-02	-0.89801211E-03
1.90	0.19989992E-01	0.12913996E-02	-0.28192443E-02	-0.22727938E-02	-0.10002136E-02
2.00	0.23139834E-01	0.30933931E-02	-0.20112495E-02	-0.20705039E-02	-0.10524358E-02
2.50	0.35498936E-01	0.10277796E-01	0.17684085E-02	-0.57486586E-03	-0.78339552E-03
3.00	0.45655622E-01	0.15214475E-01	0.45677640E-02	0.91089444E-03	-0.14973638E-03
3.50	0.57516186E-01	0.19413117E-01	0.65847551E-02	0.20328059E-02	0.44742784E-03
4.00	0.74473532E-01	0.24273608E-01	0.83420463E-02	0.28701197E-02	0.90602580E-03
4.50	0.10030228E 00	0.31100035E-01	0.10360880E-01	0.36127669E-02	0.12577596E-02
5.00	0.14014091E 00	0.41369117E-01	0.13151475E-01	0.44602168E-02	0.15740496E-02
6.00	0.29689015E 00	0.81182174E-01	0.23589958E-01	0.73117915E-02	0.24154419E-02
7.00	0.67418307E 00	0.17539483E 00	0.47832160E-01	0.13727479E-01	0.41633605E-02
8.00	0.15948467E 01	0.40121064E 00	0.10485943E 00	0.28538293E-01	0.81127030E-02
9.00	0.38729898E 01	0.95094566E 00	0.24116633E 00	0.63255481E-01	0.17189725E-01
10.00	0.95777645E 01	0.23084666E 01	0.57233973E 00	0.14608407E 00	0.38426018E-01
12.00	0.60769437E 02	0.14261295E 02	0.34237761E 01	0.84117772E 00	0.21159615E 00
14.00	0.39835934E 03	0.91782267E 02	0.21554519E 02	0.51606674E 01	0.12600052E 01
16.00	0.26680624E 04	0.60648012E 03	0.14015347E 03	0.32931811E 02	0.78690161E 01
18.00	0.18142475E 05	0.40815445E 04	0.93167995E 03	0.21580521E 03	0.50728931E 02
20.00	0.12475827E 06	0.27838271E 05	0.62930507E 04	0.14412974E 04	0.33446554E 03
22.50	0.14058962E 07	0.31117397E 06	0.69669393E 05	0.15779317E 05	0.36154590E 04
25.00	0.16004140E 08	0.35195396E 07	0.78200455E 06	0.17555609E 06	0.39821826E 05
27.50	0.18361878E 09	0.40169480E 08	0.88700275E 07	0.19770296E 07	0.44480757E 06
30.00	0.21198962E 10	0.46175055E 09	0.10143838E 09	0.22475363E 08	0.50226077E 07

TABLE OF MIS(X)

X	S= 5.00	S= 6.00	S= 7.00	S= 8.00	S= 9.00
0.01	0.19411507E-03	0.76470022E-04	0.13942018E-04	0.12120734E-06	-0.54429961E-06
0.02	-0.59963609E-04	-0.13675710E-04	-0.56160883E-05	-0.19881425E-05	-0.55567367E-06
0.03	0.41332287E-03	0.63395693E-04	0.98012106E-05	0.17365883E-05	0.36842646E-06
0.04	-0.80415623E-04	-0.62090510E-04	-0.15505289E-04	-0.30629052E-05	-0.56593613E-06
0.05	-0.41950410E-03	-0.67265437E-04	-0.36292766E-05	0.10547880E-05	0.43534699E-06
0.06	-0.34846880E-03	0.11686824E-04	0.13753714E-04	0.30049293E-05	0.38965502E-06
0.07	-0.68396941E-04	0.72317787E-04	0.13516317E-04	0.31347268E-06	-0.38489182E-06
0.08	0.21236710E-03	0.78965646E-04	0.13031419E-05	-0.25434866E-05	-0.57508336E-06
0.09	0.38758478E-03	0.44357065E-04	-0.10744777E-04	-0.29157822E-05	-0.11517572E-06
0.10	0.43457041E-03	-0.53720510E-05	-0.15828683E-04	-0.11749078E-05	0.41594045E-06
0.20	-0.40473531E-03	0.72898887E-04	-0.75628930E-06	-0.27941098E-05	0.39543223E-06
0.30	0.32180144E-03	-0.29907061E-04	-0.40492775E-05	0.26477455E-05	-0.56845340E-06
0.40	0.33459017E-03	-0.71628860E-04	0.15640694E-04	-0.29545544E-05	0.37301913E-06
0.50	-0.10207062E-03	0.23432965E-04	-0.27093625E-05	-0.27251809E-06	0.27600425E-06
0.60	-0.39724551E-03	0.81228976E-04	-0.15793516E-04	0.30308087E-05	-0.55718097E-06
0.70	-0.41277153E-03	0.61991590E-04	-0.93042986E-05	0.16063427E-05	-0.33884496E-06
0.80	-0.23784749E-03	0.41630282E-05	0.48010028E-05	-0.15346384E-05	0.34518997E-06
0.90	0.28500007E-05	-0.50225858E-04	0.14394545E-04	-0.30795977E-05	0.60479441E-06
1.00	0.21991951E-03	-0.79513058E-04	0.15332332E-04	-0.23295494E-05	0.31144151E-06
1.10	0.36827983E-03	-0.80330547E-04	0.93771073E-05	-0.28942270E-06	-0.18767622E-06
1.20	0.43600120E-03	-0.59341367E-04	0.41001679E-06	0.17436612E-05	-0.53959828E-06
1.30	0.43068577E-03	-0.26407915E-04	-0.80469626E-05	0.29302374E-05	-0.59239159E-06
1.40	0.36894234E-03	0.93566689E-05	-0.13804340E-04	0.30235827E-05	-0.38223053E-06
1.50	0.26966175E-03	0.41247788E-04	-0.16045409E-04	0.22057449E-05	-0.39653046E-07
1.60	0.15031008E-03	0.65252580E-04	-0.14967504E-04	0.86028130E-06	0.29657460E-06
1.70	0.25247443E-04	0.79666816E-04	-0.11347927E-04	-0.60740048E-06	0.52823071E-06
1.80	-0.94735540E-04	0.84484203E-04	-0.61826985E-05	-0.18742600E-05	0.61170061E-06
1.90	-0.20222396E-03	0.80789066E-04	-0.44097224E-06	-0.27393260E-05	0.55051113E-06
2.00	-0.29268283E-03	0.70252310E-04	0.50728904E-05	-0.31210747E-05	0.37891851E-06
2.50	-0.46104407E-03	-0.23190154E-04	0.16001770E-04	0.10859317E-06	-0.59183459E-06
3.00	-0.29646705E-03	-0.83886465E-04	0.27461995E-05	0.31637339E-05	-0.18309892E-06
3.50	-0.29906018E-04	-0.81370545E-04	-0.12154996E-04	0.18541064E-05	0.52974991E-06
4.00	0.21419244E-03	-0.42671549E-04	-0.17456402E-04	-0.11080910E-05	0.55432115E-06
4.50	0.40440405E-03	0.48123973E-05	-0.13966686E-04	-0.30827956E-05	0.72776860E-07
5.00	0.55351759E-03	0.47121236E-04	-0.61219203E-05	-0.33625099E-05	-0.42516446E-06
6.00	0.84202742E-03	0.10823832E-03	0.10078104E-04	-0.85743434E-06	-0.63135219E-06
7.00	0.13379354E-02	0.16177532E-03	0.21368079E-04	0.21250495E-05	-0.11323473E-06
8.00	0.24178198E-02	0.25056831E-03	0.31464587E-04	0.42478364E-05	0.44453952E-06
9.00	0.48512432E-02	0.43817383E-03	0.47707130E-04	0.61752640E-05	0.84892737E-06
10.00	0.10430865E-01	0.85136740E-03	0.81087799E-04	0.91953523E-05	0.12203842E-05
12.00	0.54527283E-01	0.39047473E-02	0.31144259E-03	0.28034976E-04	0.29026145E-05
14.00	0.31381224E 00	0.20692594E-01	0.14852121E-02	0.11667738E-03	0.10117324E-04
16.00	0.19124880E 01	0.11897748E 00	0.79460714E-02	0.57137341E-03	0.44410822E-04
18.00	0.12103227E 02	0.72077546E 00	0.45641187E-01	0.30785290E-02	0.22169353E-03
20.00	0.78648703E 02	0.45266196E 01	0.27504881E 00	0.17665030E-01	0.12009697E-02
22.50	0.83809407E 03	0.46647751E 02	0.27225348E 01	0.16674677E 00	0.10727388E-01
25.00	0.91273086E 04	0.49478585E 03	0.27978837E 02	0.16512507E 01	0.10177674E 00
27.50	0.10102177E 06	0.53605867E 04	0.29549078E 03	0.16926943E 02	0.10081330E 01
30.00	0.11320869E 07	0.59021506E 05	0.31856838E 04	0.17806693E 03	0.10311033E 02

TABLE OF MIS(X)

X	S= 10.00	S= 12.00	S= 14.00	S= 16.00	S= 18.00
0.01	-0.82135788E-07	0.41451134E-08	-0.16423623E-09	0.52140275E-11	-0.61359275E-13
0.02	-0.11784621E-06	0.15055909E-09	0.18339479E-09	-0.50400018E-11	-0.33838392E-13
0.03	0.87512131E-07	0.46778127E-08	0.12573819E-09	-0.37757266E-11	-0.28007378E-12
0.04	-0.10574181E-06	-0.42798604E-08	-0.18834243E-09	-0.61678856E-11	-0.60413912E-14
0.05	0.10876629E-06	0.47099846E-08	0.18846346E-09	0.74705511E-11	0.24214867E-12
0.06	0.20668459E-07	-0.26020200E-08	-0.15958828E-09	-0.69475901E-11	-0.26693024E-12
0.07	-0.11699936E-06	-0.30604688E-08	0.48635521E-11	0.34651358E-11	0.19226329E-12
0.08	-0.50745217E-07	0.36781333E-08	0.17870170E-09	0.38731809E-11	0.21819778E-13
0.09	0.80465732E-07	0.34861746E-08	-0.73862520E-10	-0.74384869E-11	-0.27556788E-12
0.10	0.11653227E-06	-0.19711084E-08	-0.17973517E-09	-0.79466932E-12	0.22373853E-12
0.20	0.77094692E-07	-0.29489611E-08	0.15713770E-09	-0.76210297E-11	0.20345458E-12
0.30	0.24951984E-07	-0.40809028E-08	0.18851049E-09	-0.74797965E-11	0.30664865E-12
0.40	0.67033742E-08	0.46053795E-08	-0.12265032E-09	-0.63014532E-12	0.18121620E-12
0.50	-0.98497797E-07	-0.36642691E-08	0.12538952E-09	0.37218231E-11	-0.30971423E-12
0.60	0.89981352E-07	-0.30973014E-09	-0.18264280E-09	-0.21354991E-11	0.30993945E-12
0.70	0.81640781E-07	0.46121863E-08	0.14015611E-09	-0.29220843E-11	-0.29638060E-12
0.80	-0.65596051E-07	-0.11170844E-08	0.79921708E-10	0.75158549E-11	0.15616782E-12
0.90	-0.11769607E-06	-0.47045937E-08	-0.17648197E-09	-0.35298823E-11	0.14817326E-12
1.00	-0.39802220E-07	-0.10865957E-08	-0.84036564E-10	-0.63253949E-11	-0.30604684E-12
1.10	0.68548326E-07	0.37198372E-08	0.14423261E-09	0.39494842E-11	-0.10003876E-13
1.20	0.11931831E-06	0.43947006E-08	0.16461238E-09	0.71375854E-11	0.31060007E-12
1.30	0.91990108E-07	0.11224953E-08	-0.10927159E-10	-0.51759440E-12	0.53661984E-13
1.40	0.16694712E-07	-0.28385669E-08	-0.16762812E-09	-0.72446762E-11	-0.28469424E-12
1.50	-0.62091786E-07	-0.47047879E-08	-0.16766586E-09	-0.54409338E-11	-0.21133744E-12
1.60	-0.11119991E-06	-0.37305855E-08	-0.36145122E-10	0.17784138E-11	0.12412416E-12
1.70	-0.11772985E-06	-0.88116370E-09	0.11460974E-09	0.71226566E-11	0.31035172E-12
1.80	-0.86380377E-07	0.22365309E-08	0.18781157E-09	0.65651425E-11	0.18100505E-12
1.90	-0.31968145E-07	0.42941082E-08	0.15370177E-09	0.13199521E-11	-0.10604420E-12
2.00	0.28072243E-07	0.46776841E-08	0.44224485E-10	-0.45762199E-11	-0.29705290E-12
2.50	0.81097134E-07	-0.44892206E-08	-0.54957944E-10	0.65922440E-11	0.26788829E-12
3.00	-0.10432885E-06	0.10348263E-08	0.15310969E-09	-0.53367894E-11	-0.25076910E-12
3.50	-0.75669490E-07	0.43820171E-08	-0.17623870E-09	0.31484345E-12	0.30538880E-12
4.00	0.68236185E-07	-0.18021506E-08	-0.32978302E-10	0.66130127E-11	-0.26598952E-12
4.50	0.12591532E-06	-0.48495674E-08	0.19087866E-09	-0.55465368E-11	-0.22986371E-13
5.00	0.68630108E-07	-0.13465529E-08	0.67561413E-10	-0.52579923E-11	0.31131993E-12
6.00	-0.10942331E-06	0.50327054E-08	-0.18064051E-09	0.71854428E-11	-0.31512736E-12
7.00	-0.11748419E-06	-0.46985539E-09	0.14063295E-09	-0.72205090E-11	0.30001662E-12
8.00	-0.13057210E-07	-0.53016520E-08	0.14784952E-09	-0.11047878E-11	-0.75619530E-13
9.00	0.92552831E-07	-0.40456382E-08	-0.10749408E-09	0.83253107E-11	-0.28735152E-12
10.00	0.17036696E-06	0.87107243E-10	-0.22398369E-09	0.26885401E-11	0.18489956E-12
12.00	0.35073696E-06	0.69271119E-08	0.22799939E-10	-0.90384156E-11	-0.13600478E-13
14.00	0.98099244E-06	0.13710172E-07	0.28432701E-09	0.15712484E-11	-0.35819003E-12
16.00	0.37524640E-05	0.35748532E-07	0.54502036E-09	0.11751174E-10	0.86640225E-13
18.00	0.17095665E-04	0.12707727E-06	0.13407078E-08	0.21932275E-10	0.48823838E-12
20.00	0.86590209E-04	0.54234252E-06	0.44698728E-08	0.51362057E-10	0.89076194E-12
22.50	0.72574335E-03	0.38858237E-05	0.25996204E-07	0.22290731E-09	0.25703949E-11
25.00	0.65565008E-02	0.31185754E-04	0.17941846E-06	0.12662694E-08	0.11209439E-10
27.50	0.62459730E-01	0.27061904E-03	0.13858071E-05	0.84635317E-08	0.62439640E-10
30.00	0.61877847E 00	0.24853798E-02	0.11593055E-04	0.63192195E-07	0.40591373E-09

TABLE OF MIS(X)

X	S= 20.00	S= 22.50	S= 25.00	S= 27.50	S= 30.00
0.01	-0.69565407E-14	-0.11898424E-15	0.43169048E-17	-0.77695434E-19	0.11880585E-20
0.02	0.83783411E-14	0.95366124E-16	-0.73217127E-18	-0.69793676E-19	-0.13842741E-20
0.03	0.71569098E-14	-0.26734709E-16	-0.22929803E-17	-0.55198281E-19	-0.98664204E-21
0.04	0.11494371E-13	-0.70547447E-16	-0.43899679E-17	-0.58767665E-19	-0.17644748E-21
0.05	0.24619957E-14	0.19364280E-15	-0.30117623E-17	-0.66713049E-19	0.46022491E-21
0.06	-0.81953260E-14	0.26508413E-18	0.36595761E-17	-0.67012766E-19	-0.77191567E-21
0.07	0.76108481E-14	-0.76155695E-16	-0.11504401E-17	0.74182662E-19	-0.12899125E-20
0.08	-0.21521225E-14	0.44832924E-16	0.29432409E-18	-0.45113079E-19	0.15132334E-20
0.09	-0.73555750E-14	0.70047666E-16	-0.11519637E-17	0.38118550E-19	-0.12440686E-20
0.10	0.12689191E-13	-0.20762488E-15	0.30809156E-17	-0.54822547E-19	0.12255619E-20
0.20	0.44161595E-14	0.21901910E-15	0.33181648E-17	-0.40494124E-19	-0.13555900E-20
0.30	-0.12667148E-13	-0.23563653E-15	-0.44198556E-17	-0.77852599E-19	-0.93945117E-21
0.40	-0.10286821E-13	-0.22771921E-15	-0.27550295E-17	-0.24422605E-19	-0.23670347E-21
0.50	0.98178348E-14	-0.12968854E-15	-0.43388326E-17	-0.35826399E-19	0.40070031E-21
0.60	-0.46892448E-14	0.23639256E-15	-0.16318280E-18	-0.82163437E-19	-0.82648442E-21
0.70	0.53933706E-14	-0.22634427E-15	0.30062608E-17	0.48256523E-19	-0.12520835E-20
0.80	-0.10055635E-13	0.23368041E-15	-0.35780534E-17	-0.75387494E-20	0.15294057E-20
0.90	0.12632615E-13	-0.22319339E-15	0.29952153E-17	-0.41517032E-21	-0.12851555E-20
1.00	-0.50372684E-14	0.10502041E-15	-0.10287081E-17	-0.19816630E-19	0.12692168E-20
1.10	-0.94128895E-14	0.12154293E-15	-0.22207377E-17	0.57428733E-19	-0.14758731E-20
1.20	0.10027095E-13	-0.23379219E-15	0.44096918E-17	-0.82939335E-19	0.15385513E-20
1.30	0.75888756E-14	0.17098433E-16	-0.21353128E-17	0.52539945E-19	-0.93295000E-21
1.40	-0.94978423E-14	0.23344116E-15	-0.31351950E-17	0.33986804E-19	-0.43747294E-21
1.50	-0.10176507E-13	-0.34034642E-16	0.35572760E-17	-0.82699409E-19	0.15316702E-20
1.60	0.45200932E-14	-0.23670502E-15	0.24875083E-17	0.85984013E-20	-0.85433497E-21
1.70	0.12752540E-13	-0.44316564E-16	-0.35078088E-17	0.81503930E-19	-0.10675624E-20
1.80	0.53407975E-14	0.21041922E-15	-0.31774859E-17	-0.16099184E-19	0.12866885E-20
1.90	-0.76671798E-14	0.17564578E-15	0.23026446E-17	-0.82651064E-19	0.83282051E-21
2.00	-0.12704032E-13	-0.73292330E-16	0.42841550E-17	-0.46678991E-20	-0.12984016E-20
2.50	0.23227353E-14	0.19605857E-15	0.39458085E-17	-0.18431480E-19	-0.15368863E-20
3.00	0.36315228E-14	-0.10195475E-16	-0.26995858E-17	-0.83163997E-19	-0.79579845E-21
3.50	-0.24007514E-14	-0.58314961E-16	-0.11251792E-18	0.36249051E-19	0.14373653E-20
4.00	-0.41656620E-14	0.16344854E-16	0.81558058E-18	0.38814453E-20	-0.49690963E-21
4.50	0.11870474E-13	0.10827247E-15	0.24667038E-18	-0.87730992E-20	-0.55147825E-22
5.00	-0.99515737E-14	-0.23039674E-15	-0.25609388E-17	-0.15195456E-19	0.22793303E-22
6.00	0.12337360E-13	0.10645997E-15	-0.28708030E-17	-0.84035975E-19	-0.12310487E-20
7.00	-0.11189841E-13	-0.66629592E-16	0.43144495E-17	0.45908118E-19	-0.73628035E-21
8.00	0.45933295E-14	0.13537000E-15	-0.43963991E-17	-0.15458911E-19	0.14979954E-20
9.00	0.82073537E-14	-0.23614319E-15	0.37116531E-17	0.20623713E-19	-0.15950054E-20
10.00	-0.12745694E-13	0.19190728E-15	-0.11045779E-17	-0.53146234E-19	0.15641367E-20
12.00	0.12728038E-13	-0.24871391E-15	0.43894991E-17	-0.62145299E-19	0.21354109E-21
14.00	-0.46889432E-14	0.22606227E-15	-0.47342761E-17	0.87948061E-19	-0.15258662E-20
16.00	-0.14090940E-13	-0.31949987E-16	0.38861558E-17	-0.89245804E-19	0.16968256E-20
18.00	0.43610981E-14	-0.29057253E-15	0.50718507E-18	0.63758573E-19	-0.16666950E-20
20.00	0.20369769E-13	0.70974710E-17	-0.56673813E-17	0.30525236E-19	0.97463863E-21
22.50	0.42965116E-13	0.38587669E-15	0.45672763E-18	-0.10696259E-18	0.14136063E-21
25.00	0.12958001E-12	0.79045782E-15	0.73402885E-17	0.13982178E-19	-0.20002969E-20
27.50	0.56742612E-12	0.22538696E-14	0.14662472E-16	0.14009908E-18	0.35526537E-21
30.00	0.31085836E-11	0.92672530E-14	0.39815547E-16	0.27376483E-18	0.26813946E-20

TABLE OF DMIS(X)

X	S= 0.02	S= 0.04	S= 0.06	S= 0.08	S= 0.10
0.02	0.28363770E 00	0.10322118E 01	0.22532845E 01	0.39084083E 01	0.59463937E 01
0.04	0.16706885E 00	0.47683337E 00	0.98355128E 00	0.16733652E 01	0.25277870E 01
0.06	0.15511943E 00	0.33603677E 00	0.63240537E 00	0.10367379E 01	0.15390361E 01
0.08	0.16670123E 00	0.28851015E 00	0.48823201E 00	0.76108724E 00	0.11006903E 01
0.10	0.18705887E 00	0.27570691E 00	0.42115161E 00	0.62005103E 00	0.86793889E 00
0.20	0.32567526E 00	0.35529515E 00	0.40397827E 00	0.47073209E 00	0.55422914E 00
0.40	0.64274931E 00	0.64805897E 00	0.65680517E 00	0.66883776E 00	0.68395548E 00
0.60	0.98480181E 00	0.98263425E 00	0.97907996E 00	0.97422338E 00	0.96817687E 00
0.80	0.13577413E 01	0.13513552E 01	0.13408580E 01	0.13264622E 01	0.13084511E 01
1.00	0.17722480E 01	0.17625585E 01	0.17466244E 01	0.17247580E 01	0.16973759E 01
1.20	0.22409256E 01	0.22281070E 01	0.22070235E 01	0.21780824E 01	0.21418276E 01
1.40	0.27783338E 01	0.27622218E 01	0.27357188E 01	0.26993333E 01	0.26537439E 01
1.60	0.34013959E 01	0.33816148E 01	0.33490747E 01	0.33043973E 01	0.32484124E 01
1.80	0.41299515E 01	0.41059551E 01	0.40664796E 01	0.40122771E 01	0.39443521E 01
2.00	0.49874288E 01	0.49585059E 01	0.49109250E 01	0.48455917E 01	0.47637144E 01
3.00	0.12395897E 02	0.12324419E 02	0.12206828E 02	0.12045358E 02	0.11842990E 02
4.00	0.30601006E 02	0.30424390E 02	0.30133834E 02	0.29734859E 02	0.29234834E 02
6.00	0.19233723E 03	0.19122212E 03	0.18938764E 03	0.18686867E 03	0.18371178E 03
8.00	0.12537917E 04	0.12464989E 04	0.12345018E 04	0.12180284E 04	0.11973835E 04
10.00	0.83747781E 04	0.83259614E 04	0.82456541E 04	0.81353843E 04	0.79971930E 04

TABLE OF DKIS(X)

X	S= 0.02	S= 0.04	S= 0.06	S= 0.08	S= 0.10
0.02	-0.49776240E 02	-0.49242402E 02	-0.48357966E 02	-0.47130822E 02	-0.45571901E 02
0.04	-0.24859603E 02	-0.24668987E 02	-0.24352724E 02	-0.23912952E 02	-0.23352638E 02
0.06	-0.16529788E 02	-0.16428154E 02	-0.16259404E 02	-0.16024488E 02	-0.15724735E 02
0.08	-0.12352801E 02	-0.12288682E 02	-0.12182170E 02	-0.12033790E 02	-0.11844273E 02
0.10	-0.98390129E 01	-0.97945828E 01	-0.97207510E 01	-0.96178441E 01	-0.94863169E 01
0.20	-0.47715293E 01	-0.47582129E 01	-0.47360642E 01	-0.47051502E 01	-0.46655653E 01
0.40	-0.21831938E 01	-0.21797143E 01	-0.21739226E 01	-0.21658304E 01	-0.21554535E 01
0.60	-0.13023538E 01	-0.13009110E 01	-0.12985087E 01	-0.12951505E 01	-0.12908414E 01
0.80	-0.86153923E 00	-0.86081229E 00	-0.85960171E 00	-0.85790892E 00	-0.85573597E 00
1.00	-0.60177110E 00	-0.60136287E 00	-0.60068294E 00	-0.59973200E 00	-0.59851101E 00
1.20	-0.43451047E 00	-0.43426476E 00	-0.43385549E 00	-0.43328300E 00	-0.43254780E 00
1.40	-0.32078416E 00	-0.32062899E 00	-0.32037049E 00	-0.32000887E 00	-0.31954440E 00
1.60	-0.24060006E 00	-0.24049854E 00	-0.24032940E 00	-0.24009277E 00	-0.23978882E 00
1.80	-0.18260034E 00	-0.18253210E 00	-0.18241840E 00	-0.18225932E 00	-0.18205496E 00
2.00	-0.13985026E 00	-0.13980339E 00	-0.13972531E 00	-0.13961606E 00	-0.13947570E 00
3.00	-0.40153493E-01	-0.40144680E-01	-0.40129995E-01	-0.40109444E-01	-0.40083036E-01
4.00	-0.12482823E-01	-0.12480797E-01	-0.12477420E-01	-0.12472693E-01	-0.12466618E-01
6.00	-0.13438721E-02	-0.13437294E-02	-0.13434914E-02	-0.13431584E-02	-0.13427304E-02
8.00	-0.15536513E-03	-0.15535290E-03	-0.15533251E-03	-0.15530397E-03	-0.15526727E-03
10.00	-0.18648385E-04	-0.18647219E-04	-0.18645277E-04	-0.18642558E-04	-0.18639062E-04

TABLE OF DMIS(X)

X	S= 0.20	S= 0.40	S= 0.60	S= 0.80	S= 1.00
0.02	0.19515881E 02	0.37419792E 02	0.22143994E 02	-0.74637239E 01	-0.23839859E 02
0.04	0.84086158E 01	0.18327352E 02	0.15989578E 02	0.48986790E 01	-0.58749775E 01
0.06	0.50531362E 01	0.11640381E 02	0.11755888E 02	0.62750529E 01	-0.55947183E 00
0.08	0.35011760E 01	0.82918415E 01	0.90872889E 01	0.60181328E 01	0.14286986E 01
0.10	0.26329957E 01	0.63093672E 01	0.72907372E 01	0.54541832E 01	0.22280700E 01
0.20	0.11605030E 01	0.25665633E 01	0.32945733E 01	0.31401657E 01	0.23331953E 01
0.40	0.79629412E 00	0.10861810E 01	0.12964055E 01	0.13525628E 01	0.12486344E 01
0.60	0.92527880E 00	0.83371913E 00	0.78588183E 00	0.76058486E 00	0.71996865E 00
0.80	0.11773547E 01	0.86283422E 00	0.64605108E 00	0.53283176E 00	0.47131431E 00
1.00	0.14971557E 01	0.10068503E 01	0.65230939E 00	0.45707789E 00	0.35710409E 00
1.20	0.18762148E 01	0.12200179E 01	0.73507561E 00	0.45925319E 00	0.31516106E 00
1.40	0.23194066E 01	0.14895823E 01	0.86900333E 00	0.50900568E 00	0.31670277E 00
1.60	0.28376030E 01	0.18152606E 01	0.10453710E 01	0.59325364E 00	0.34770584E 00
1.80	0.34457592E 01	0.22029884E 01	0.12631443E 01	0.70694770E 00	0.40141434E 00
2.00	0.41625844E 01	0.26627906E 01	0.15256228E 01	0.84935920E 00	0.47503580E 00
3.00	0.10356835E 02	0.66442020E 01	0.38192193E 01	0.21273898E 01	0.11797595E 01
4.00	0.25562884E 02	0.16391476E 02	0.94159083E 01	0.52411610E 01	0.29044859E 01
6.00	0.16053204E 03	0.10266975E 03	0.58728080E 02	0.32502316E 02	0.17884779E 02
8.00	0.10458095E 04	0.66759428E 03	0.38067190E 03	0.20975603E 03	0.11477468E 03
10.00	0.69826537E 04	0.44517933E 04	0.25331682E 04	0.13917297E 04	0.75866544E 03

TABLE OF DKIS(X)

X	S= 0.20	S= 0.40	S= 0.60	S= 0.80	S= 1.00
0.02	-0.33360165E 02	0.28465988E 01	0.30444015E 02	0.31101737E 02	0.10363614E 02
0.04	-0.18901559E 02	-0.46238180E 01	0.92527249E 01	0.15211767E 02	0.11626523E 02
0.06	-0.13324584E 02	-0.53286566E 01	0.33144963E 01	0.85615327E 01	0.86706603E 01
0.08	-0.10319044E 02	-0.51142933E 01	0.88200684E 00	0.51704868E 01	0.63545418E 01
0.10	-0.84239078E 01	-0.47359372E 01	-0.29676595E 00	0.32127660E 01	0.47046381E 01
0.20	-0.43426749E 01	-0.31699773E 01	-0.15937732E 01	-0.40246603E-01	0.11176156E 01
0.40	-0.20701718E 01	-0.17496483E 01	-0.12834122E 01	-0.75593440E 00	-0.25565594E 00
0.60	-0.12553059E 01	-0.11196674E 01	-0.91542257E 00	-0.67090769E 00	-0.41803835E 00
0.80	-0.83778012E 00	-0.76861545E 00	-0.66235246E 00	-0.53100368E 00	-0.38867448E 00
1.00	-0.58840783E 00	-0.54925357E 00	-0.48829158E 00	-0.41134926E 00	-0.32545977E 00
1.20	-0.42645839E 00	-0.40275571E 00	-0.36549815E 00	-0.31777355E 00	-0.26338275E 00
1.40	-0.31569458E 00	-0.30065969E 00	-0.27685658E 00	-0.24602707E 00	-0.21034729E 00
1.60	-0.23726792E 00	-0.22739736E 00	-0.21168251E 00	-0.19115288E 00	-0.16710983E 00
1.80	-0.18035928E 00	-0.17370598E 00	-0.16306544E 00	-0.14906865E 00	-0.13252079E 00
2.00	-0.13831064E 00	-0.13373143E 00	-0.12638078E 00	-0.11665678E 00	-0.10507148E 00
3.00	-0.39863561E-01	-0.38996227E-01	-0.37587604E-01	-0.35690847E-01	-0.33376056E-01
4.00	-0.12416101E-01	-0.12215889E-01	-0.11888711E-01	-0.11444026E-01	-0.10894476E-01
6.00	-0.13391682E-02	-0.13250080E-02	-0.13017194E-02	-0.12697598E-02	-0.12297496E-02
8.00	-0.15496184E-03	-0.15374584E-03	-0.15173936E-03	-0.14897222E-03	-0.14548511E-03
10.00	-0.18609956E-04	-0.18493972E-04	-0.18302211E-04	-0.18036959E-04	-0.17701358E-04

TABLE OF DMIS(X)

X	S= 1.20	S= 1.40	S= 1.60	S= 1.80	S= 2.00
0.02	-0.17793809E 02	-0.65999357E 00	0.10589673E 02	0.90342479E 01	0.64820379E 00
0.04	-0.99935124E 01	-0.69621680E 01	-0.89007902E 00	0.34095497E 01	0.38102951E 01
0.06	-0.49789034E 01	-0.54789721E 01	-0.30320058E 01	0.85595559E-01	0.19347265E 01
0.08	-0.22897919E 01	-0.37699232E 01	-0.30421783E 01	-0.11733887E 01	0.53852186E 00
0.10	-0.78145342E 00	-0.24696025E 01	-0.25649793E 01	-0.15484059E 01	-0.24480212E 00
0.20	0.12288623E 01	0.18424690E 00	-0.53973387E 00	-0.83863315E 00	-0.76410212E 00
0.40	0.10146486E 01	0.70513023E 00	0.38394620E 00	0.10763881E 00	-0.87042032E-01
0.60	0.64394550E 00	0.53202622E 00	0.39692833E 00	0.25716910E 00	0.13079730E 00
0.80	0.42318096E 00	0.36974809E 00	0.30609190E 00	0.23518178E 00	0.16347534E 00
1.00	0.30165717E 00	0.26210824E 00	0.22500539E 00	0.18583384E 00	0.14486209E 00
1.20	0.24011286E 00	0.19737149E 00	0.16767706E 00	0.14196220E 00	0.11681073E 00
1.40	0.21621230E 00	0.16253310E 00	0.13121174E 00	0.10963932E 00	0.91790989E-01
1.60	0.21756113E 00	0.14854807E 00	0.11077322E 00	0.88279882E-01	0.72827755E-01
1.80	0.23735350E 00	0.14969467E 00	0.10240386E 00	0.75960649E-01	0.59949609E-01
2.00	0.27204392E 00	0.16254035E 00	0.10332935E 00	0.70857124E-01	0.52365656E-01
3.00	0.65672165E 00	0.36802299E 00	0.20809212E 00	0.11913872E 00	0.69477484E-01
4.00	0.16153131E 01	0.90344480E 00	0.50836563E 00	0.28778635E 00	0.16390578E 00
6.00	0.98655820E 01	0.54683361E 01	0.30476156E 01	0.17080421E 01	0.96263912E 00
8.00	0.62881761E 02	0.34577027E 02	0.19095572E 02	0.10593639E 02	0.59040495E 01
10.00	0.41374194E 03	0.22627183E 03	0.12418000E 03	0.68403742E 02	0.37821773E 02

TABLE OF DKIS(X)

X	S= 1.20	S= 1.40	S= 1.60	S= 1.80	S= 2.00
0.02	-0.10837976E 02	-0.16433441E 02	-0.72624943E 01	0.41650329E 01	0.76318495E 01
0.04	0.29290352E 01	-0.43713422E 01	-0.63582035E 01	-0.36212129E 01	0.38211770E 00
0.06	0.48406866E 01	0.36436950E-01	-0.30199049E 01	-0.33143770E 01	-0.16652514E 01
0.08	0.46780906E 01	0.16333466E 01	-0.10204879E 01	-0.21918684E 01	-0.18369464E 01
0.10	0.40919557E 01	0.21678567E 01	0.83868004E-01	-0.12476408E 01	-0.15114335E 01
0.20	0.16730974E 01	0.16287944E 01	0.11612659E 01	0.53079091E 00	-0.21738666E-01
0.40	0.14449349E 00	0.40110680E 00	0.50567211E 00	0.48085224E 00	0.36980848E 00
0.60	-0.18668907E 00	0.10429768E-03	0.12919023E 00	0.19813459E 00	0.21391779E 00
0.80	-0.24947701E 00	-0.12558899E 00	-0.25783244E-01	0.45358353E-01	0.87479940E-01
1.00	-0.23796198E 00	-0.15561652E 00	-0.83869362E-01	-0.26361221E-01	0.15266581E-01
1.20	-0.20640993E 00	-0.15078460E 00	-0.99893771E-01	-0.56291645E-01	-0.21537003E-01
1.40	-0.17220715E 00	-0.13397912E 00	-0.97804582E-01	-0.65421596E-01	-0.38051419E-01
1.60	-0.14100695E 00	-0.11432186E 00	-0.88433979E-01	-0.64520689E-01	-0.43481939E-01
1.80	-0.11433349E 00	-0.95450936E-01	-0.76777648E-01	-0.59114712E-01	-0.43110312E-01
2.00	-0.92211010E-01	-0.78691758E-01	-0.65116443E-01	-0.52034256E-01	-0.39908387E-01
3.00	-0.30726341E-01	-0.27833285E-01	-0.24792119E-01	-0.21696934E-01	-0.18636257E-01
4.00	-0.10255334E-01	-0.95438457E-02	-0.87785085E-02	-0.79783248E-02	-0.71620721E-02
6.00	-0.11824530E-02	-0.11287553E-02	-0.10696364E-02	-0.10061425E-02	-0.93935695E-03
8.00	-0.14132872E-03	-0.13656253E-03	-0.13125342E-03	-0.12547420E-03	-0.11930203E-03
10.00	-0.17299341E-04	-0.16835559E-04	-0.16315299E-04	-0.15744378E-04	-0.15129048E-04

TABLE OF DMIS(X)

X	S= 3.00	S= 4.00	S= 6.00	S= 8.00	S= 10.00
0.02	0.14508939E 01	0.44577570E 00	0.24432454E-01	0.94648360E-03	-0.97730147E-05
0.04	0.21581564E 00	-0.18211305E 00	-0.81672131E-02	0.82555594E-04	0.13893508E-04
0.06	-0.54446796E 00	-0.91694564E-01	0.81748990E-02	-0.96358999E-04	-0.19608895E-04
0.08	-0.46778199E 00	0.58379028E-01	-0.18134537E-02	-0.17557226E-03	0.13517551E-04
0.10	-0.22550546E 00	0.92467461E-01	-0.49440981E-02	0.22867506E-03	-0.26279035E-05
0.20	0.19362000E 00	-0.40432218E-01	0.11650288E-02	0.52857474E-04	-0.45621833E-05
0.40	-0.36633691E-01	0.14439743E-01	0.61744241E-03	-0.18251879E-04	-0.29805045E-05
0.60	-0.64409034E-01	0.11825796E-01	0.15958513E-03	0.83433515E-05	0.13101145E-05
0.80	-0.31636159E-01	-0.30430587E-02	-0.61584865E-03	-0.26791253E-04	-0.12470630E-05
1.00	-0.32348775E-02	-0.83561935E-02	-0.14502794E-03	0.16248770E-04	0.11236521E-05
1.20	0.12733067E-01	-0.73720065E-02	0.28629271E-03	0.16976911E-04	0.97093350E-07
1.40	0.19511432E-01	-0.43166641E-02	0.34715272E-03	-0.41657546E-05	-0.84072002E-06
1.60	0.20947639E-01	-0.13134160E-02	0.19330688E-03	-0.14695274E-04	-0.28289266E-06
1.80	0.19712798E-01	0.91787815E-03	0.31686989E-05	-0.10889253E-04	0.45789400E-06
2.00	0.17401835E-01	0.23054971E-02	-0.13332963E-03	-0.13823375E-05	0.57534793E-06
3.00	0.86346967E-02	0.26213441E-02	-0.53001564E-04	0.13865336E-05	-0.20455737E-06
4.00	0.11244319E-01	0.15127371E-02	0.93125529E-04	-0.54769320E-05	0.24104560E-06
6.00	0.59301436E-01	0.41256095E-02	0.51022684E-04	0.32460565E-05	-0.10657771E-06
8.00	0.34012273E 00	0.21942904E-01	0.12440508E-03	0.18427282E-05	0.11660735E-06
10.00	0.20691447E 01	0.12456044E 00	0.60061886E-03	0.41205861E-05	0.69173895E-07

TABLE OF DKIS(X)

X	S= 3.00	S= 4.00	S= 6.00	S= 8.00	S= 10.00
0.02	0.13029605E 01	0.14282028E 00	0.41027126E-02	0.79525491E-03	0.58922987E-04
0.04	-0.95062404E 00	-0.14700784E 00	0.93133457E-02	0.61257363E-03	0.26435254E-04
0.06	-0.35499335E 00	0.12623697E 00	-0.11685592E-02	-0.40064649E-03	-0.34447168E-05
0.08	0.13705343E 00	0.10141042E 00	-0.59219373E-02	0.25433506E-03	0.63429940E-05
0.10	0.31809784E 00	0.14554656E-01	0.32216810E-03	0.93987595E-04	-0.11652663E-04
0.20	0.21540269E-01	-0.23533361E-01	-0.21856792E-02	0.11173203E-03	-0.38540617E-05
0.40	-0.89939315E-01	0.18349492E-01	0.10723318E-02	0.59015505E-04	-0.16768819E-06
0.60	0.89067945E-03	-0.10051340E-01	-0.80820001E-03	-0.40295836E-04	-0.14967796E-05
0.80	0.36053315E-01	-0.11184793E-01	-0.31861236E-04	0.15253955E-04	0.81695032E-06
1.00	0.37876084E-01	-0.39022335E-02	0.47026078E-03	0.18508551E-04	0.39661180E-06
1.20	0.28604471E-01	0.19798883E-02	0.29187342E-03	-0.11470774E-04	-0.98713770E-06
1.40	0.17876634E-01	0.48454299E-02	-0.37376269E-04	-0.17023671E-04	-0.11892518E-06
1.60	0.89390310E-02	0.54680168E-02	-0.23489722E-03	-0.42543071E-05	0.68576909E-06
1.80	0.24453784E-02	0.48569266E-02	-0.26906412E-03	0.80837569E-05	0.47290808E-06
2.00	-0.18610519E-02	0.37378659E-02	-0.20054760E-03	0.12089339E-04	-0.13634871E-06
3.00	-0.61541141E-02	-0.52565860E-03	0.14495378E-03	-0.78203727E-05	0.33090811E-06
4.00	-0.34034071E-02	-0.10388390E-02	0.55936223E-04	0.18042878E-05	-0.15413018E-06
6.00	-0.59301639E-03	-0.30310235E-03	-0.33620109E-04	0.10967287E-05	0.14350723E-06
8.00	-0.85343434E-04	-0.52874517E-04	-0.12453198E-04	-0.11864412E-05	0.23348689E-07
10.00	-0.11621065E-04	-0.79954764E-05	-0.26557900E-05	-0.50914824E-06	-0.43869989E-07

ZEROS OF $K_{is}(x)$

N	S = 0.4	S = 0.6	S = 0.8	S = 1.0	S = 1.5	S = 2.0	S = 3.0
1	0.4625648D-03	0.6755453D-02	0.2694345D-01	0.6395506D-01	0.2217745D 00	0.4480753D 00	0.1023637D 01
2	0.1795691D-06	0.3594928D-04	0.5308047D-03	0.2762339D-02	0.2720886D-01	0.9225519D-01	0.3509716D 00
3	0.6970930D-10	0.1913064D-06	0.1045838D-04	0.1193714D-03	0.3350439D-02	0.1917016D-01	0.1228303D 00
4	0.2706137D-13	0.1018050D-08	0.2060601D-06	0.5158505D-05	0.4125885D-03	0.3985015D-02	0.4308934D-01
5	0.1050531D-16	0.5417618D-11	0.4059975D-08	0.2229192D-06	0.5080810D-04	0.8284026D-03	0.1512029D-01
6	0.4078195D-20	0.2883021D-13	0.7999317D-10	0.9633213D-08	0.6256748D-05	0.1722080D-03	0.5305982D-02
7	0.1583168D-23	0.1534218D-15	0.1576095D-11	0.4162889D-09	0.7704855D-06	0.3579852D-04	0.1861973D-02
8	0.6145911D-27	0.8164443D-18	0.3105361D-13	0.1798947D-10	0.9488121D-07	0.7441782D-05	0.6534031D-03
9	0.2385862D-30	0.4344761D-20	0.6118452D-15	0.7773956D-12	0.1168412D-07	0.1546994D-05	0.2292921D-03
10	0.9261993D-34	0.2312093D-22	0.1205511D-16	0.3359431D-13	0.1438837D-08	0.3215885D-06	0.8046314D-04
11	0.3595535D-37	0.1230395D-24	0.2375203D-18	0.1451742D-14	0.1771852D-09	0.6685169D-07	0.2823611D-04
12	0.1395798D-40	0.6547629D-27	0.4679832D-20	0.6273545D-16	0.2181942D-10	0.1389710D-07	0.9908610D-05
13	0.5418533D-44	0.3484364D-29	0.9220613D-22	0.2711045D-17	0.2686947D-11	0.2888923D-08	0.3477127D-05
14	0.2103492D-47	0.1854227D-31	0.1816726D-23	0.1171549D-18	0.3308833D-12	0.6005482D-09	0.1220193D-05
15	0.8165823D-51	0.9867389D-34	0.3579471D-25	0.5062721D-20	0.4074652D-13	0.1248417D-09	0.4281899D-06
16	0.3169999D-54	0.5250995D-36	0.7052587D-27	0.2187800D-21	0.5017719D-14	0.2595204D-10	0.1502603D-06
17	0.1230604D-57	0.2794351D-38	0.1389562D-28	0.9454341D-23	0.6179055D-15	0.5394899D-11	0.5272932D-07
18	0.4777242D-61	0.1487032D-40	0.2737837D-30	0.4085591D-24	0.7609180D-16	0.1121489D-11	0.1850376D-07
19	0.1854541D-64	0.7913340D-43	0.5394325D-32	0.1765544D-25	0.9370303D-17	0.2331347D-12	0.6493336D-08
20	0.7199386D-68	0.4211135D-45	0.1062837D-33	0.7629607D-27	0.1153903D-17	0.4846395D-13	0.2278640D-08
21		0.2240983D-47	0.2094094D-35	0.3297052D-28	0.1420971D-18	0.1007467D-13	0.7996200D-09
22		0.1192554D-49	0.4125967D-37	0.1424785D-29	0.1749850D-19	0.2094317D-14	0.2806025D-09
23		0.6346253D-52	0.8129340D-39	0.6157056D-31	0.2154848D-20	0.4353658D-15	0.9846898D-10
24		0.3377200D-54	0.1601714D-40	0.2660705D-32	0.2653582D-21	0.9050365D-16	0.3455471D-10
25		0.1797199D-56	0.3155836D-42	0.1149795D-33	0.3267745D-22	0.1881386D-16	0.1212593D-10

N	S = 4.0	S = 5.0	S = 6.0	S = 7.0	S = 8.0	S = 9.0	S = 10.0
1	0.1695407D 01	0.2424513D 01	0.3191875D 01	0.3986729D 01	0.4802392D 01	0.5634416D 01	0.6479684D 01
2	0.7467645D 00	0.1239283D 01	0.1801101D 01	0.2414432D 01	0.3067417D 01	0.3751850D 01	0.4461843D 01
3	0.3382604D 00	0.6540908D 00	0.1051465D 01	0.1513875D 01	0.2028507D 01	0.2585668D 01	0.3178001D 01
4	0.1540201D 00	0.3479200D 00	0.6198317D 00	0.9598045D 00	0.1357678D 01	0.1804563D 01	0.2293078D 01
5	0.7020424D-01	0.1854565D 00	0.3665588D 00	0.6110533D 00	0.9131794D 00	0.1266402D 01	0.1664495D 01
6	0.3200695D-01	0.9891541D-01	0.2170158D 00	0.3896606D 00	0.6155275D 00	0.8910427D 00	0.1211821D 01
7	0.1459301D-01	0.5276664D-01	0.1285303D 00	0.2486452D 00	0.4152937D 00	0.6277270D 00	0.8836077D 00
8	0.6653495D-02	0.2814984D-01	0.7613390D-01	0.1587046D 00	0.2803183D 00	0.4424974D 00	0.6448058D 00
9	0.3033581D-02	0.1501752D-01	0.4509942D-01	0.1013086D 00	0.1892487D 00	0.3120204D 00	0.4707415D 00
10	0.1383125D-02	0.8011656D-02	0.2671598D-01	0.6467288D-01	0.1277772D 00	0.2200497D 00	0.3437428D 00
11	0.6306194D-03	0.4274121D-02	0.1582609D-01	0.4128629D-01	0.8627628D-01	0.1551998D 00	0.2510364D 00
12	0.2875234D-03	0.2280192D-02	0.9375125D-02	0.2635681D-01	0.5825559D-01	0.1094656D 00	0.1833443D 00
13	0.1310929D-03	0.1216455D-02	0.5553680D-02	0.1682600D-01	0.3933575D-01	0.7720980D-01	0.1339100D 00
14	0.5977025D-04	0.6489645D-03	0.3289915D-02	0.1074162D-01	0.2656067D-01	0.5445918D-01	0.9780618D-01
15	0.2725153D-04	0.3462148D-03	0.1948896D-02	0.6857387D-02	0.1793459D-01	0.3841243D-01	0.7143710D-01
16	0.1242501D-04	0.1847015D-03	0.1154496D-02	0.4377717D-02	0.1211000D-01	0.2709402D-01	0.5217755D-01
17	0.5665037D-05	0.9853605D-04	0.6839062D-03	0.2794710D-02	0.8177053D-02	0.1911065D-01	0.3811050D-01
18	0.2582906D-05	0.5256781D-04	0.4051357D-03	0.1784127D-02	0.5521407D-02	0.1347963D-01	0.2783597D-01
19	0.1177646D-05	0.2804430D-04	0.2399962D-03	0.1138977D-02	0.3728230D-02	0.9507808D-02	0.2033145D-01
20	0.5369335D-06	0.1496130D-04	0.1421701D-03	0.7271165D-03	0.2517420D-02	0.6706300D-02	0.1485014D-01
21	0.2448085D-06	0.7981675D-05	0.8421943D-04	0.4641872D-03	0.1699842D-02	0.4730266D-02	0.1084658D-01
22	0.1116175D-06	0.4258129D-05	0.4989031D-04	0.2963345D-03	0.1147788D-02	0.3336477D-02	0.7922367D-02
23	0.5089068D-07	0.2271661D-05	0.2955427D-04	0.1891783D-03	0.7750228D-03	0.2353373D-02	0.5786518D-02
24	0.2320300D-07	0.1211904D-05	0.1750750D-04	0.1207704D-03	0.5233201D-03	0.1659944D-02	0.4226488D-02
25	0.1057913D-07	0.6465364D-06	0.1037118D-04	0.7709913D-04	0.3533624D-03	0.1170836D-02	0.3087038D-02

ZEROS OF $M_{is}(X)$

N	S = 0.4	S = 0.6	S = 0.8	S = 1.0	S = 1.5	S = 2.0	S = 3.0
1	0.2347981D-01	0.9275073D-01	0.1930191D 00	0.3112246D 00	0.6502538D 00	0.1025212D 01	0.1832071D 01
2	0.9113854D-05	0.4927998D-03	0.3781559D-02	0.1328845D-01	0.7756731D-01	0.2026711D 00	0.5959240D 00
3	0.3538027D-08	0.2622466D-05	0.7450742D-04	0.5742333D-03	0.9547651D-02	0.4204848D-01	0.2074939D 00
4	0.1373473D-11	0.1395563D-07	0.1468010D-05	0.2481487D-04	0.1175735D-02	0.8740281D-02	0.7274501D-01
5	0.5331868D-15	0.7426577D-10	0.2892402D-07	0.1072348D-05	0.1447855D-03	0.1816919D-02	0.2552470D-01
6	0.2069848D-18	0.3952101D-12	0.5698862D-09	0.4634035D-07	0.1782957D-04	0.3777003D-03	0.8956996D-02
7	0.8035216D-22	0.2103137D-14	0.1122840D-10	0.2002548D-08	0.2195617D-05	0.7851618D-04	0.3143182D-02
8	0.3119297D-25	0.1119198D-16	0.2212316D-12	0.8653795D-10	0.2703786D-06	0.1632191D-04	0.1103004D-02
9	0.1210921D-28	0.5955884D-19	0.4358899D-14	0.3739644D-11	0.3329570D-07	0.3392992D-05	0.3870661D-03
10	0.4700834D-32	0.3169463D-21	0.8588283D-16	0.1616047D-12	0.4100189D-08	0.7053337D-06	0.1358292D-03
11	0.1824879D-35	0.1686650D-23	0.1692139D-17	0.6983571D-14	0.5049166D-09	0.1466245D-06	0.4766514D-04
12	0.7084237D-39	0.8975619D-26	0.3333999D-19	0.3017875D-15	0.6217781D-10	0.3048023D-07	0.1672664D-04
13	0.2750124D-42	0.4776434D-28	0.6568936D-21	0.1304142D-16	0.7656868D-11	0.6336218D-08	0.5869710D-05
14	0.1067607D-45	0.2541811D-30	0.1294269D-22	0.5635708D-18	0.9429028D-12	0.1317170D-08	0.2059798D-05
15	0.4144483D-49	0.1352641D-32	0.2550082D-24	0.2435410D-19	0.1161135D-12	0.2738128D-09	0.7228238D-06
16	0.1608902D-52	0.7198168D-35	0.5024394D-26	0.1052436D-20	0.1429876D-13	0.5692009D-10	0.2536532D-06
17	0.6245808D-56	0.3830552D-37	0.9899499D-28	0.4547989D-22	0.1760817D-14	0.1183252D-10	0.8901192D-07
18	0.2424642D-59	0.2038453D-39	0.1950486D-29	0.1965364D-23	0.2168353D-15	0.2459740D-11	0.3123605D-07
19	0.9412540D-63	0.1084776D-41	0.3843017D-31	0.8493109D-25	0.2670212D-16	0.5113298D-12	0.1096135D-07
20	0.3653978D-66	0.5772707D-44	0.7571848D-33	0.3670205D-26	0.3288225D-17	0.1062950D-12	0.3846554D-08
21	0.1418486D-69	0.3071984D-46	0.1491872D-34	0.1586040D-27	0.4049275D-18	0.2209656D-13	0.1349832D-08
22		0.1634776D-48	0.2939415D-36	0.6853898D-29	0.4986468D-19	0.4593424D-14	0.4736828D-09
23		0.8699568D-51	0.5791493D-38	0.2961838D-30	0.6140572D-20	0.9548790D-15	0.1662247D-09
24		0.4629532D-53	0.1141090D-39	0.1279926D-31	0.7561789D-21	0.1984998D-15	0.5833153D-10
25		0.2463635D-55	0.2248276D-41	0.5531063D-33	0.9311943D-22	0.4126406D-16	0.2046969D-10

N	S = 4.0	S = 5.0	S = 6.0	S = 7.0	S = 8.0	S = 9.0	S = 10.0
1	0.2681675D 01	0.3556499D 01	0.4448206D 01	0.5352124D 01	0.6265345D 01	0.7185927D 01	0.8112501D 01
2	0.1117311D 01	0.1720457D 01	0.2379586D 01	0.3079387D 01	0.3810113D 01	0.4565192D 01	0.5339985D 01
3	0.5019702D 00	0.8988126D 00	0.1373416D 01	0.1907690D 01	0.2488766D 01	0.3107383D 01	0.3756736D 01
4	0.2281947D 00	0.4768277D 00	0.8067827D 00	0.1204464D 01	0.1658040D 01	0.2157969D 01	0.2696709D 01
5	0.1039795D 00	0.2539835D 00	0.4765562D 00	0.7655920D 00	0.1113034D 01	0.1511036D 01	0.1952676D 01
6	0.4740227D-01	0.1354370D 00	0.2820231D 00	0.4878984D 00	0.7495959D 00	0.1062039D 01	0.1419868D 01
7	0.2161194D-01	0.7224491D-01	0.1670079D 00	0.3112517D 00	0.5055543D 00	0.7478052D 00	0.1034643D 01
8	0.9853652D-02	0.3854042D-01	0.9892084D-01	0.1986443D 00	0.3411836D 00	0.5270089D 00	0.7547679D 00
9	0.4492651D-02	0.2056064D-01	0.5859669D-01	0.1267986D 00	0.2303219D 00	0.3715656D 00	0.5509211D 00
10	0.2048370D-02	0.1096883D-01	0.3471127D-01	0.8094365D-01	0.1555034D 00	0.2620271D 00	0.4022530D 00
11	0.9339301D-03	0.5851733D-02	0.2056232D-01	0.5167297D-01	0.1049956D 00	0.1848005D 00	0.2937518D 00
12	0.4258143D-03	0.3121829D-02	0.1218079D-01	0.3298748D-01	0.7089472D-01	0.1303416D 00	0.2145357D 00
13	0.1941450D-03	0.1665459D-02	0.7215708D-02	0.2105895D-01	0.4786987D-01	0.9193363D-01	0.1566891D 00
14	0.8851810D-04	0.8885024D-03	0.4274475D-02	0.1344390D-01	0.3232311D-01	0.6484424D-01	0.1144429D 00
15	0.4035878D-04	0.4740054D-03	0.2532134D-02	0.8582507D-02	0.2182555D-01	0.4573738D-01	0.8358815D-01
16	0.1840111D-04	0.2528762D-03	0.1499998D-02	0.5479024D-02	0.1473729D-01	0.3226060D-01	0.6105251D-01
17	0.8389765D-05	0.1349065D-03	0.8885760D-03	0.3497778D-02	0.9951084D-02	0.2275487D-01	0.4459273D-01
18	0.3825214D-05	0.7197099D-04	0.5263789D-03	0.2232962D-02	0.6719288D-02	0.1605006D-01	0.3257057D-01
19	0.1744061D-05	0.3839567D-04	0.3118189D-03	0.1425510D-02	0.4537077D-02	0.1132085D-01	0.2378961D-01
20	0.7951838D-06	0.2048363D-04	0.1847168D-03	0.9100379D-03	0.3063579D-02	0.7985125D-02	0.1737598D-01
21	0.3625546D-06	0.1092777D-04	0.1094234D-03	0.5809631D-03	0.2068626D-02	0.5632281D-02	0.1269146D-01
22	0.1653025D-06	0.5829837D-05	0.6482078D-04	0.3708836D-03	0.1396803D-02	0.3972710D-02	0.9269874D-02
23	0.7536770D-07	0.3110149D-05	0.3839885D-04	0.2367700D-03	0.9431657D-03	0.2802138D-02	0.6770740D-02
24	0.3436301D-07	0.1659227D-05	0.2274690D-04	0.1511527D-03	0.6368556D-03	0.1976479D-02	0.4945367D-02
25	0.1566741D-07	0.8851780D-06	0.1347492D-04	0.9649503D-04	0.4300252D-03	0.1394103D-02	0.3612109D-02