IMPROVED APPROXIMATE FORMULAS FOR FLUX
FROM CYLINDRICAL AND RECTANGULAR SOURCES

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Improved Analytic Flux Formulas for
Cylindrical and Rectangular Sources

TABLE OF CONTENTS

	<u>Page</u>
I. Introduction.....	1
II. Background - The Approximation of Ono and Tsuro.....	2
A. An Exact Flux Formula for a Cylindrical Source.....	2
B. The Approximation of Ono and Tsuro.....	5
C. 1. The Functions of Ono and Tsuro.....	7
C. 2. A Sample Problem.....	8
D. Improved Accuracy for the Approximation of Ono and Tsuro....	9
III. Extensions of the Approximation of Ono and Tsuro - Approximate Formulas for the Flux at Detector Points Outside the Radial and Axial Extensions of a Cylindrical Source with a Slab Shield.....	9
A. Background.....	9
B. CASE I - Slab Shield Parallel to the Source Axis.....	10
C. CASE II - Slab Shield Perpendicular to the Source Axis.....	13
IV. Approximations of Rectangular Sources.....	16
A. Approximation of a Rectangular Volume Source by a Section of an Annulus.....	16
B. Approximation of Rectangular Source with Square Cross-Section by a Truncated Cone.....	17
C. Approximation of a Rectangular Surface Source.....	18
D. Rectangular Surface Source Sample Problems.....	20
1. Square Surface Source Problem.....	20
2. Rectangular Surface Source Problem.....	23
V. Figures.....	25
1 Division of a Cylindrical Source into Regions I and II.....	25
2 Detail of Division of a Cylindrical Source into Regions I and II.....	25

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
3 Cylindrical Source-Volume Approximation Using a Section of an Annulus with a Curved Top Surface.....	26
4 Bases of Cylinder and Annular Sector.....	27
5 Cylindrical Source Approximation with Detector Point Outside the Axial and Radial Extensions of the Source and with a Slab Shield Parallel to the Source Axis.....	28
6 Detail of the Midplane of a Cylindrical Source Approxi- mation with Detector Point Outside the Axial and Radial Extensions of the Source.....	28
7 Layout of Arbitrary Test Problem with Slab Shield Parallel to the Source Axis.....	29
8 Cylindrical Source with a Detector Point Outside the Radial and Axial Extensions of the Source and with a Slab Shield Perpendicular to the Source Axis.....	30
9 Section of an Annulus Used to Approximate a Cylindrical Source with a Detector Point Outside the Radial and Axial Extensions of the Source, and with a Slab Shield Perpendicular to the Source Axis.....	30
10 Layout of Arbitrary Test Problem with a Slab Shield Perpendicular to the Source Axis.....	31
11 Base of an Annular Sector which Preserves the Area of the Base of a Rectangular Source.....	32
12 Rectangular Volume Source Approximation Using a Section of an Annulus.....	33
13 Square Rectangular Source Approximation Using a Truncated Cone.....	34
14 Rectangular Surface Source with Center Opposite Detector Point.....	35

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
VI. Tables.....	36
1 <u>Approximate Flux</u> <u>Exact Flux</u> for a Cylindrical Source with a Lateral Detector Point and a Slab Shield Parallel to the Source Axis.....	37
1A Improved Ratios of <u>Approximate Flux</u> <u>Exact Flux</u> Using the Algorithm of Section II.D.....	37
2 <u>Approximate Flux</u> <u>Exact Flux</u> from a Cylindrical Source with Detector Points Outside the Radial and Axial Extensions of the Source with an Intervening Slab Shield Parallel to the Source Axis.....	38
3 Results from the Exact Flux Formula and from Equation (24) for the Problem of Figure 7.....	40
4 <u>Approximate Flux</u> <u>Exact Flux</u> from a Cylindrical Source at Detector Points Outside the Radial and Axial Extensions of the Source with an Intervening Slab Shield Perpendicular to the Source Axis.....	41
5 Results from the Exact Flux Formula and From Equation (30) for the Problem of Figure 10.....	43
6 The Function $L_0(\phi_0, b)$	44
7 The Function $G(\theta_0, b)$	45
8 The Smoothed Function $\bar{G}(\theta_0, b) = G(\theta_0, b)e^{b/\theta_0}$	45
9 The Smoothed Function $\bar{F}(\theta_0, b) = F(\theta_0, b)e^{b/\theta_0}$	46
10 The Function $F(\theta_0, b)$	46
11 The Smoothed Function $\bar{F}_2(\theta_0, b) = F_2(\theta_0, b)e^{b/\theta_0}$	47
12 The Function $F_2(\theta_0, b)$	47

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
13 The Smoothed Function $\bar{R}(\phi_0, x_2/a, b) = R(\phi_0, x_2/a, b) e^{b/\phi_0}$	48
14 The Function $R(\phi_0, x_2/a, b)$	53
15 The Function $E_1(b)$	58
16 The Smoothed Function $\bar{E}_1(b) = be^b E_1(b)$	58
17 The Function $E_2(b)$	58
18 The Smoothed Function $\bar{E}_2(b) = be^b E_2(b)$	58
VII. References.....	59

ABSTRACTIMPROVED APPROXIMATE FORMULAS FOR FLUX
FROM CYLINDRICAL AND RECTANGULAR SOURCES

This report provides two new approximate formulas for the flux at detector points outside the radial and axial extensions of a homogeneous cylindrical source and improved approximate formulas for the flux at points opposite rectangular surface sources. These formulas extend the range of geometries for which analytic approximations may be used by shield design engineers to make rapid scoping studies and check more extensive calculations for reasonableness. These formulas can be used to support skeptical, independent evaluations and are also valuable teaching tools for introducing shield designers to complex shield analyses.

Improved Analytic Flux Formulas for Cylindrical and Rectangular Sources

I. Introduction

Hand calculation methods involving analytic approximations of exact flux formulas and tables of special mathematical functions continue to be useful in shielding calculations since they enable shield design personnel to make quick estimates of dose rates, check calculations made by more exact and time-consuming methods, and rapidly determine the scope of problems before a detailed solution is attempted.

They are also a valuable teaching tool. Solving shielding problems by hand methods can give a shielding engineer a body of experience and a feel for such problems which is very valuable when the output from black-box type computer programs must be evaluated.

Knowledge of hand calculation methods of radiation fluxes and dose rates is also valuable and even essential in those situations where no computer, or no time to use a computer, is available, and a quick answer is needed.

Several collections of approximate analytic radiation flux formulas are available, as are tables of the required mathematical functions. A partial list of these documents is given in Section H of Reference (1). Reference (1) is itself a compilation of useful approximate analytic flux calculation formulas and function tables which were assembled expressly for the use of shielding personnel. Reference (2) contains a subset of the same material. Reference (1) gives approximate flux formulas for a variety of source geometries and contains tables of cross-section, spectrum, and build-up factor data as well as shielding function tables and considerable information about these functions. This report assumes that the reader is at least minimally familiar with the contents of Reference (1).

Extensive use of Reference (1) has shown that improved analytic approximate formulas are needed for finding the flux

- (a) at detector points located outside the radial and axial extent of a cylindrical source, and
- (b) at detector points opposite a rectangular source.

In all cases, the attenuation of a slab shield must be included.

In addition, more extensive information on the errors in results calculated using the cylindrical source approximation of Ono and Tsuru [References (1)-(4)] is needed, and improvement in this formula is desirable.

The material given in later sections of this report meets all these needs. Therefore this report supplements and extends the formulas and information given in Reference (1), and the two reports should be mutually familiar to the user. The use of this material should enable shielding engineers to make better estimates and quick scoping calculations in many situations and thereby save engineering and computer time.

In order that the reader may better understand the approximate flux formulas given in this report, Section II below starts with the exact formula for flux from a cylindrical source at a lateral detector point and then discusses the corresponding cylindrical source approximation of Ono and Tsuru [Reference (4)] in detail, ending with a refinement which improves its accuracy in some cases.

Section III then presents extensions of the cylindrical source approximate flux formula which apply to detector points located outside the radial and axial extent of a cylindrical source. Detailed error information is given for all approximate cylindrical source formulas.

Finally, Section IV discusses calculation of flux from rectangular sources and gives both an exact formula and a new approximation for a rectangular surface source.

All required mathematical function tables are given in Section VI.

II. Background - The Approximation of Ono and Tsuru

A. An Exact Flux Formula for a Cylindrical Source

Figures 1 and 2 show a cylindrical source with a lateral detector point. A slab shield of thickness t is assumed to be parallel to the source axis, perpendicular to the line OP , and to lie between the source and the detector point P .

The unscattered flux at the point detector P is given by (1)

$$\phi_p = \int_V \frac{S_v e^{[-\mu_s(r_2 - r_1) + \mu t]} \sec\phi \sec\theta}{4\pi r^2} dV_s$$

where

S_V = Source strength per unit volume per unit time

μ_S = Attenuation coefficient of the source material

μ = Attenuation coefficient of the shield material

t = Thickness of the shield

dV_S = Volume element of the source

$r_2 - r_1$ = Distance from the volume element to the cylindrical source surface in the direction of the detector, projected onto the base of the cylinder. See Figures 1 and 2.

ϕ = Angle subtended by the cylinder, as seen from the detector point. See Figures 1 and 2.

θ = Angle between the straight line connecting the volume element with the point detector and a straight line passing through the point detector and normal to the shield. θ is a function of the height of the cylinder. See Figures 1 and 2.

ρ = Distance from the volume element to the point detector.

The integral can be simplified by choosing the Ono and Tsuru method which regards the point detector as the origin of the coordinate system (See Reference (4)). Then from Figures 1 and 2 it can be ascertained that

$$\rho = r \sec \phi \sec \theta \quad (2a)$$

$$r_1 = (R+a)\cos^2\phi - \cos\phi \sqrt{R^2 - (R+a)^2\sin^2\phi} \quad (2b)$$

$$r_2 = (R+a)\cos^2\phi + \cos\phi \sqrt{R^2 - (R+a)^2\sin^2\phi} \quad (2c)$$

$$r_2 - r_1 = 2 \cos\phi \sqrt{R^2 - (R+a)^2\sin^2\phi} \quad (2d)$$

$$dV_S = dr \cdot d_\phi (r \tan\phi) \cdot dz$$

$$= dr \cdot d_\phi (r \tan\phi) \cdot d_\theta (r \sec\phi \tan\theta)$$

where subscripts indicate the variation in that direction.

$$\begin{aligned}
 \therefore dV_S &= dr \cdot \left(\frac{\partial}{\partial \phi} (r \tan \phi) \cdot d\phi \right) \cdot \left(\frac{\partial}{\partial \theta} (r \sec \phi \tan \theta) \cdot d\theta \right) \\
 &= dr \cdot (r \sec^2 \phi d\phi) \cdot (r \sec \phi \sec^2 \theta d\theta) \\
 dV_S &= r^2 \sec^3 \phi \sec^2 \theta dr d\phi d\theta
 \end{aligned} \tag{2e}$$

The angles are given by

$$\phi_0 = \sin^{-1} (R/(a+R)) \tag{2f}$$

$$\theta_3 = \tan^{-1} x/r_2 \sec \phi \tag{2g}$$

$$\theta_4 = \tan^{-1} x/r_1 \sec \phi \tag{2h}$$

as may be seen from Figures 1 and 2.

By combining equations (1), (2a) and (2e) we may write

$$\begin{aligned}
 \phi_p &= \frac{S_V}{4\pi\mu_S} \cdot 2 \int_0^{\phi_0} \sec \phi d\phi \int_{\mu_S r_1}^{\mu_S r_2} d(\mu_S r) \int_0^{\theta_0} \exp(-\mu t \sec \phi \sec \theta) \cdot \\
 &\quad \exp(-\mu_S (r-r_1) \sec \phi \sec \theta) \cdot d\theta
 \end{aligned}$$

The integration over r can easily be carried out with the result

$$\phi = \frac{S_V}{2\pi\mu_S} \int_0^{\phi_0} d\phi \int_0^{\theta_0} \cos \theta \cdot \exp(-b \sec \theta \sec \phi) \cdot [1 - \exp(-\mu_S (r_2 - r_1) \sec \theta \sec \phi)] d\theta$$

$$\text{where } b = \mu t. \tag{3}$$

$$\text{Let } G(\theta_0, \mu t) = \int_0^{\theta_0} \cos \theta \cdot \exp(-\mu t \sec \theta) d\theta \tag{4}$$

Then Equations (2d), (3) and (4) yield

$$\phi = \frac{1}{2\pi\mu_s} \int_0^{\phi_0} [G(\theta_0, \mu t \sec\phi) - G(\theta_0, (\mu t \sec\phi + 2\mu_s R \sqrt{1-(1+a/R)^2 \sin^2\phi})] d\phi \quad (5)$$

and

$$G\left(\frac{\pi}{2}, \mu t\right) = H(\mu t) = \int_0^{\frac{\pi}{2}} \cos\theta \exp(-\mu t \sec\theta) d\theta \quad (6)$$

B. The Approximation of Ono and Tsuru

Equation (1) must be solved by numeric integration or quadrature if it is to be solved at all. Ono and Tsuru were able to derive an ingenious and useful approximation to Equation (1) by substituting a section of an annulus for the cylinder, as shown in Figure 3. To quote from their paper:

"A cylindrical source is replaced by a columnar fragment of cylindrical shell with area of base equal to that of the original cylinder. (See Fig. 3). The cylindrical shell fragment has six surfaces, two plane side surfaces, a conical top surface, and a bottom surface. Consider a straight line L parallel to the axis of the source cylinder and passing the observation point P. The inner surface is part of a cylinder and passing the observation point P. The inner surface is part of a cylinder with axis coinciding with the line L and radius equal to a. The two side surfaces contain the line L and are in contact with the original cylinder on both sides. The upper surface is a part of a right circular cone with apex at P, its axis coinciding with the line L, and half apex angle, $\pi/2 - \theta_0$, such that the conical surface is in contact with the top edge of the cylinder. The bottom surface is on a common plane with the source cylinder. The outer surface is part of a cylinder with its axis on L and radius equal to $a + m_c R$, m_c being such that the bottom area of the cylindrical shell fragment is equal to that of the original cylinder."

where

$$\theta_0 = \tan^{-1} \frac{L}{a} \quad (7)$$

$$m_c = \sqrt{\left(\frac{a}{R}\right)^2 + \frac{\pi}{\phi_0}} - \frac{a}{R} \quad (9)$$

and equation (5) is approximated as

$$\phi_p \approx \frac{1}{2\pi\mu_s} \int_0^{\phi_0} [G(\phi_0, \mu t \sec\phi) - G(\phi_0, (\mu t \sec\phi + \mu_s R))] d\phi \quad (9)$$

The elevation angle as defined by Equation (8) is measured to the top of the front of the annulus, so that the curved top of the annular sector lies above the top of the cylindrical source which it replaces. Therefore, the source volume is not preserved by this approximation. This helps to make this a conservative approximation.

The volume of the annular sector is then

$$V_{an} = \frac{2}{3} \phi_0 \frac{R}{a} [(a+m_c R)^3 - a^3] \quad (10)$$

To be useful as a hand calculation tool, equation (9) must be expressed in terms of mathematical functions which may be tabulated in readily usable form.

Then

$$\text{Define } L_0(\phi_0, \mu t) = \frac{\int_0^{\phi_0} G(\phi_0, \mu t \sec\phi) d\phi}{\phi_0 G(\phi_0, \mu t)} \quad (11)$$

Then eq. (9) becomes the approximation of Ono and Tsuro:

$$\phi_p \approx \frac{\phi_0 S_v}{2\pi\mu_s} L_0(\phi_0, \mu t) \cdot (G(\theta_0, \mu t) - G(\theta_0, \mu t + \mu_s m_c R)) \quad (12)$$

1. The Functions of Ono and Tsuru

From Equations (4) and (11) these functions are

$$(a) \quad G(\theta_0, b) = \int_0^{\theta_0} \cos \theta \, e^{-b \sec \theta} d\theta \quad (13)$$

which is usually tabulated in the smoothed (easily interpolated) form

$$\bar{G}(\theta_0, b) = \frac{b}{\theta_0} G(\theta_0, b) \quad (14)$$

and

$$(b) \quad L_0(\phi_0, b) = \frac{\int_0^{\phi_0} \int_0^{\frac{\pi}{2}} \cos \theta \, e^{-b \sec \phi \sec \theta} d\phi d\theta}{\phi_0 \int_0^{\frac{\pi}{2}} \cos \theta \, e^{-b \sec \theta} d\theta} \quad (15)$$

which is inherently in smoothed form. $L_0(\phi_0, b)$ gives the ratio of the attenuation of a slab shield of thickness b to the attenuation of an annular shield of the same thickness curved around the detector point and concentric with the annular sector source. Figure 4 shows the relation of the slab shield and the annular shield which have just been described.

The definition of $L_0(\phi_0, b)$ includes a double integral. Numeric checks have shown that the value of this function is almost independent of the upper limit on θ in Equation (15) and is also largely independent of the source shape behind the shield, provided that the source strength is a constant. The limit $\theta = \frac{\pi}{2}$ is therefore valid, and the use of this function is not limited to the approximation of Ono and Tsuru.

Tabulations of these functions are given in Section VI of this report.

Any further refinement in source shape or attempt to approximate Equation (1) more closely results in mathematical functions which are dependent on at least four parameters. A table of such a function must be voluminous and detailed and is difficult to interpolate. Problems also arise because functions such as $G(\theta_0, b)$ and the Sievert Integral $F(\theta_0, b)$ are extremely weak functions of the upper limit when that limit is large (greater than 60 degrees). The plots in Chapter Nine of Reference (6) illustrate this.

In contrast to this, the $G(\theta_0, b)$ and $L_0(\phi_0, b)$ functions defined by Ono and Tsuro involve only two parameters or independent variables each and are easy to use. Anyone using this cylindrical source approximation therefore owes a debt of gratitude to Ono and Tsuro.

2. A Sample Problem

An illustrative sample problem will now be displayed in which the approximate flux formula given in Equation (12) is to be used to find the flux at a detector point 15 cm. from the base of a cylindrical source having a radius of 10 cm. and a height of 40 cm. The source attenuation coefficient is $\mu_s = 0.1$, the source strength S_v is 1.0, and the intervening slab shield is 1.0 mfp thick. Then

$$\theta_0 = \tan^{-1} \frac{40}{15} = \tan^{-1} 2.67 = 69^\circ = 1.2r$$

$$\phi_0 = \sin^{-1} \frac{10}{25} = \sin^{-1} .4 = 23.6^\circ = 0.41r$$

$$m_c = 1.65 \text{ and } b' = b + \mu_s m_c R = 2.6$$

$$\begin{aligned} \Phi &= \frac{1 \times .41}{2 \times 3.14 \times .1} L_0(.41, 1.) [G(1.2, 1) - G(1.2, 2.6)] \\ &= 0.656 \times .97 [.368 \times .606 \times 1.2 - .074 \times .48 \times 1.2] \\ &= 0.586 [.266 - .042] = 0.131 \end{aligned}$$

The flux found by a numeric calculation using the exact flux formula is 0.136, which is in good agreement with the approximate hand calculation.

D. Improved Accuracy for the Approximation of Ono and Tsuru

Table 1 gives the ratios, for a range of problem parameters, of the flux calculated by Equation (12) to the exact flux calculated by Equation (1). The tool for doing these calculations was a special version of the SPAR1 program, which is described in Reference (5). Some of these error ratios are larger than 3.

If the source height λ is replaced by a smaller number, according to the following algorithm, the two sets of ratios which are the worst in Table 1 are replaced by the two sets of the ratios which are designated as Table 1A. This gives an improved Ono and Tsuru cylindrical source approximation which is conservative by less than a factor of 2.15 for the range of problem parameters covered by Table 1.

The height of the front of the annular sector which will preserve volume is

$$\lambda' = \frac{3}{2} \frac{\pi}{\phi_0} \frac{R^2 \lambda a}{[(a + m_c R)^3 - a^3]} \quad (16)$$

Set $\lambda'' = \text{MIN}(2.0 * \lambda', \lambda)$ and

$$\lambda''' = 0.5 * (\lambda'' + \lambda)$$

Then if $\frac{a}{R} < 0.5$ and $\mu_s R < 5.0$, replace λ by λ''' in Equation (8),

and if $\frac{a}{R} < 0.5$ and $\mu_s R < 2.5$ replace λ by λ'' in Equation (8). The flux may then be found using Equation (12).

III. Extensions of the Approximation of Ono and Tsuru - Approximate Formulas for the Flux at Detector Points Outside the Radial and Axial Extensions of a Cylindrical Source with a Slab Shield Parallel to the Source Axis

A. Background

Exact flux formulas for this situation are given in References (3) and (5). Here, an analogue of the approximate formula of Equation (12) which applies to this situation will be derived and tested.

The approximation of Ono and Tsuro was derived for lateral detector points and it breaks down badly for detector points located beyond the axial and radial extensions of the source, as shown in Figures (5) and (6).

The reason for this is readily apparent. Equation (12) does not model either the top or bottom of the source properly when the geometry is that of Figure (5). However, by properly altering the heights h and $T = h + \lambda$ in Figure (5), the approximation of Ono and Tsuro may be made the basis for a simple and usable approximation using the superposition method. The flux from a source of height λ which is a distance h above a lateral detector point is assumed to be equal to the flux from a source of height $T = h + \lambda$ minus the flux from a source of height h . There are two cases to be considered: The case with an intervening slab shield parallel to the axis of the cylindrical source (Figure 5) and the case with a slab shield perpendicular to the axis (Figure 8).

These cases are treated in the next two sections of this report.

B. Case 1 - Slab Shield Parallel to the Source Axis

The approximate flux formula for this case is given by the following algorithms:

Step 1. See Figure 5.

The height of the superimposed cylinder, that is, the height of the cylinder of height λ combined with the cylinder of height h , is

$$T = h + \lambda \quad (17)$$

Find the height T' which will preserve the volume of this large cylinder when it is replaced by a section of an annulus defined to preserve the basal area. This height is given by

$$T' = \frac{3}{2} \frac{\pi}{\phi_0} \frac{R^2 T a}{[(a + m_C R)^3 - a^3]} \quad (18)$$

where ϕ_0 and m_C are defined by Equations (9) and (10), respectively.

Step 2. Let $T'' = \text{MIN} (2.0 * T', T)$ and

$$T''' = 0.5 * (T'' + T)$$

Step 3. Let $T_{use} = T$.

If $\frac{a}{R} < 0.5$ and $\mu_s R < 5.0$ and $\frac{g}{a} < 0.5$,

set $T_{use} = T'''$.

If $\frac{a}{R} < 0.5$ and $\mu_s R < 2.0$ and $\frac{g}{a} < 0.75$,

set $T_{use} = T''$. (19)

Step 4. The height of the lower cylinder in Figure 4 is h . Find the height to preserve this volume, which is

$$h' = h \frac{T'}{T}. \quad (20)$$

Step 5. Let $h'' = \text{MIN} (2.0 * h', h)$ and

$$h''' = 0.5 * (h'' + h)$$

Step 6. Let $h_{use} = h$

If $\frac{a}{R} < 0.5$ and $\mu_s R < 5.0$,

set $h_{use} = h'''$.

If $\frac{a}{R} < 0.5$ and $\mu_s R < 2.5$,

set $h_{use} = h''$. (21)

Step 7. Find

$$\theta_2 = \tan^{-1} \frac{h_{use}}{a} \quad \text{and} \quad (22)$$

$$\theta_3 = \tan^{-1} \frac{T_{use}}{a} \quad (23)$$

Step 8. The flux from the cylinder of height ℓ in Figures 5 and 6 is then given by

$$\begin{aligned} \phi_{P_1} = \frac{S_v \phi_0}{2\pi\mu_s} L_0(\phi_0, b) \{ & G(\theta_3, b) - G(\theta_3, b + \mu_s m_c R) \\ & - G(\theta_2, b) + G(\theta_2, b + \mu_s m_c R) \} . \end{aligned} \quad (24)$$

Step 9. Evaluate the accuracy of the result.

The use of this approximate formula is evaluated in Tables 2 and 3. In Table 2, $H' = (h+\ell)/\ell$, and μ_{us} is the macroscopic attenuation coefficient of the source, and is the same as μ_s in Equation (24).

Table 2 gives ratios of results calculated by Equation (24) to results calculated by the exact cylindrical source option of the SPAR1 program [Reference (5)] for a wide range of problem geometries and parameters. Table 3 gives the results for the sample problem of Figure 7 calculated by the same two methods.

The accuracy is good for many values of the parameters in Table 2 but this approximation gives low answers for certain combinations of the parametric values as H'/ℓ , ℓ/a and b increase. The maximum ratios given in this table are less than 3. The low or non-conservative ratios are marked off from the ratios in the range of 0.88 to 3.0.

These ratios may be used as approximate correction factors for calculations where the problem parameters lie in the range of the parameters used in generating this table. The information in this table is therefore very useful.

The behavior in which non-conservative or low answers are generated is also seen in Table 3.

The reason for this is easy to find: Equation (24) involves only L_0 and G functions, and as may be seen from Table 1, $G(\theta_0, b)$ becomes a very weak function of θ_0 as θ_0 and b increase. If both θ_2 and θ_3 [Equations (22) and (23)] are greater than 45° and b is not small, the parameter values and error ratios of Table 2 must be used as guidelines as to the geometric arrangements for which Equation (24) is trustworthy.

C. Case II - Slab Shield Perpendicular to the Source Axis

The geometry of this source and shield configuration is shown in Figure 8. The applicability of the approximation of Ono and Tsuru to this case is not obvious.

However, if an annular sector can be suitably defined which replaces the cylindrical source, the case of the shield perpendicular to the source axis can also be handled by a superposition method based on the approximation of Ono and Tsuru. This configuration is shown in Figure 9. A simple algorithm for defining and using such a sector is as follows:

Step 1. See Figures 8 and 9.

A usable annular sector for representing this source is defined to have height = $2R$ and thickness λ and the distance out to a detector point in the base plane would be h , while the distance the detector point lies below the source base is a .

Step 2. Find the volume of the annular sector, which is given by

$$V_{an} = \pi (2R) [(H + \lambda)^2 - h^2] \cdot \phi_0 / \pi = 2R\phi_0[(h + \lambda)^2 - h^2] \quad (25)$$

and the volume of the cylinder, which is $V_{cyl} = \pi R^2 \lambda$; and equate these volumes to determine the angle ϕ_0 :

$$\phi_0 = \frac{\pi}{2} \frac{R}{2h + \lambda} \cdot \quad (26)$$

Step 3. If $R \leq \frac{2}{3} (2h + \ell)$, (27)

proceed to Step 4. Otherwise, this approximation does not apply to the problem. See Step 7 below for an explanation of this criterion.

Step 4. Define $\theta_2 = \tan^{-1} \frac{a}{h + \ell}$ and (28)

$$\theta_3 = \tan^{-1} \frac{a + 2R}{h} . \quad (29)$$

Step 5. The flux from the cylinder of height ℓ at the point P_1 is then given by

$$\begin{aligned} \phi_{P_1} = \frac{S_v \phi_0}{2\pi\mu_s} L_0(\phi_0, b) \{ & G(\theta_3, b) - G(\theta_3, b + \mu_s \ell) \\ & - G(\theta_2, b) + G(\theta_2, b + \mu_s \ell) \} \end{aligned} \quad (30)$$

Step 6. Here again, cases in which θ_2 and θ_3 are both above 45° are likely to give low answers and the cautions given at the end of Section III.B for Equation (24) also apply to this approximation.

Step 7. Evaluate the accuracy of the result (see Table 4). This approximation is not applicable to any and all possible variations in the geometry of the source and detector points as noted in Step 3 above.

For practical problems, the angle ϕ_0 (see Figure 9) should not be greater than 60° or $\pi/3$ radians. The inequality (27) follows from Equation (26). With this added requirement, Equation (27) becomes

$$\frac{\pi}{3} = \frac{\pi}{2} \frac{R}{2h + \ell}$$

so that the maximum value of the ratio $R/(2h + \ell)$ allowed in the problem using this approximation is

$$\frac{R}{2h + \ell} = \frac{2}{3}$$

$$\text{or } R \leq \frac{2}{3} (2h + \ell).$$

The ratios of Table 4 were calculated for problem parameters which observe this restriction. In order to allow the use of all but one of the problem parameters of Table 2 in the generation of the ratios for Table 4, while observing this restriction, first rewrite Inequality (27) as an equation:

$$\frac{R}{\ell} = \frac{2}{3} \frac{(2h + \ell)}{\ell} ; \text{ then observe that} \quad (31)$$

$$\frac{R}{\ell} = \frac{1}{\left(\frac{\ell}{a}\right)\left(\frac{a}{R}\right)}, \text{ and } \frac{2h + \ell}{\ell} = 2\left(\frac{h + \ell}{\ell}\right) - 1$$

Substitution in Equation (31) then gives

$$\left(\frac{\ell}{a}\right) = \frac{3}{2} \frac{1}{\left(\frac{a}{R}\right)(2H' - 1)} \quad (32)$$

$$\text{where } H' = \frac{h + \ell}{\ell}.$$

The minimum values of H' and a/R used in compiling Table 2 are 1.1 and 0.2 respectively. These values, when substituted in Equation (32), will give the corresponding minimum value of ℓ/a which satisfies the constraint of Inequality (27):

$$\left(\frac{\ell}{a}\right)_{\min} = \frac{3}{2} \frac{1}{0.2[2.2 - 1]} = 6.25$$

The other three values of $\left(\frac{a}{R}\right)$ used in compiling Table 2 are 0.5, 1.0, and 2.5; these values, along with $H' = 1.1$, give the (ℓ/a) values 2.5, 1.25, and 0.5 respectively [from Equation (32)].

These values of (ℓ/a) are the basis for the parameter values used to generate the error ratios of Table 4, which clearly shows the geometrical arrangements for which this approximation is applicable. The restrictions on the problem geometry which apply here clearly affect these ratios.

Note that the maximum ratios are less than 3.0. The low or non-conservative ratios are marked off from the ratios in the range 0.88 to 3.0.

These ratios may be used as approximate correction factors for flux calculations using this approximate formula as long as the problem parameters lie within the range of the parameters used to generate this table. The information given in this table is therefore very useful.

Table 5 gives a comparison of exact and approximate results for the problem shown in Figure 10. The accuracy here is reasonably good. All the ratios except two are greater than 0.6.

IV. Approximations of Rectangular Sources

A. Approximation of a Rectangular Volume Source by a Section of an Annulus

Provided that a rectangular source is long with respect to its base dimensions and has a lateral detector point, either the approximation of Ono and Tsuru or the new approximations discussed in Section III of this report may be adapted to allow calculation of flux or dose rate from such a source.

The geometry of this situation is shown in Figures 11 and 12. The volume of the rectangular source is

$$V_r = \ell_1 \ell_2 \ell_3 \quad (33)$$

and M_R , the factor which preserves area of the the base is

$$M_R = \sqrt{\left(\frac{a}{\ell_3}\right)^2 + \frac{\ell_1}{\phi_0 \ell_3}} - \frac{a}{\ell_3} \quad (34)$$

where

$$\phi_0 = \tan^{-1} \frac{\ell_1}{2a} \quad (35)$$

For this approximation to work well, the rectangular source dimensions should be such that

$$l_2 \gg l_1 \text{ and } l_2 > l_3.$$

Then Equations (12), (24), and (30) may be used directly, with $M_R l_3$ substituted for $m_C R$ and ϕ_0 defined by Equation (35). The θ -limits are defined in the same way as in the discussions of Equations (24) and (30), again with $m_C R$ replaced by $M_R l_3$.

The accuracy of this approximation will be similar to that of the approximation of the corresponding cylindrical source case. The closer the shape of the annular sector approaches the shape of the true source, the better the results calculated by the approximate formulas.

Approximations of rectangular sources for which the above inequalities are not true are discussed below.

The height l' which will preserve volume in the situation of Figure 12 is

$$l' = \frac{3a l_1 l_2 l_3}{2\phi_0 [(a + M_R l_3)^3 - a^3]} \quad (36)$$

B. Approximation of Rectangular Source with Square Cross-Section by a Truncated Cone

As shown in Figure 13, the flux at a point located opposite the center of the square end of a square rectangular source may be found approximately by use of a truncated cone source.

To preserve the area of the square end of the source, the radius R of the near end of the truncated cone should be

$$R = \frac{l_1}{\sqrt{\pi}} \quad (37)$$

and the length of the truncated cone which will preserve source volume is then

$$l = [a^3 + 3a^2 l_3]^{1/3} - a \quad (38)$$

where $V = \ell_1^2 \ell_3$ is the rectangular source volume. See Figure 13 for definitions of a , ℓ_1 , etc.

The defining angle of the truncated cone is then

$$\theta_0 = \tan^{-1} \frac{\ell_1}{a\sqrt{\pi}} . \quad (39)$$

If $b = \mu t$ is the optical thickness of the slab shield, $\mu_s \ell$ is the optical thickness of the truncated cone, and

$$b' = b + \mu_s \ell . \quad (40)$$

then the flux at the detector point P_1 is given by

$$\phi_{p_1} = \frac{S_v}{2\pi\mu_s} [E_2(b) - E_2(b') + \cos\theta_0 E_2(b' \sec\theta_0) - \cos\theta_0 E_2(b \sec\theta_0)] \quad (41)$$

C. Approximation of a Rectangular Surface Source

A rectangular surface source such as that shown in Figure 14 may be approximated by using a disk source if $\ell_1 \approx \ell_2$ so that the source is close to being square. For a square surface source represented as a disk, the disk radius which preserves area is

$$r = \frac{\ell_1}{\sqrt{\pi}} \quad (42)$$

while use of the radius $r = \frac{\ell_1}{2} \sqrt{2} = \frac{\ell_1}{\sqrt{2}}$ will give a conservative answer.

In either case,

$$\theta_0 = \tan^{-1} \frac{r}{a}$$

and given an intervening slab shield of optical thickness b , the flux formula is

$$\phi_p = \frac{S_a}{2} [E_1(b) - E_1(b \sec\theta_0)] \quad (43)$$

while if $b = 0$, the flux formula is $\phi_p = \frac{S_a}{2} \log (\sec \theta_0)$. (44)

Now if an intervening slab shield is assumed in Figure 14, the exact equation for the flux at the point P is [from Reference (3)],

$$\phi_p = \frac{S_a}{\pi} \int_0^{\theta_0} \int_0^{\phi_0} \sec \phi e^{-b \sec \phi} \sec \theta d\phi d\theta \quad (45)$$

where

$$\phi_0 = \tan^{-1} \frac{\ell_1}{2a}, \quad \theta_0 = \tan^{-1} \frac{\ell_2}{2a \sec \phi} \quad (46)$$

and the maximum value of θ_0 is

$$\theta_m = \tan^{-1} \frac{\ell_2}{2a} \quad (47)$$

If $\ell_2 > \ell_1$, so that the disk approximation breaks down, a simplified approximation of Equation (45) may be written which uses the $L_0(\theta_0, b)$ function of Ono and Tsuru. This approximation is

$$\phi_p = \frac{S_a}{\pi} \theta_m L_0(\theta_0, b) \int_0^{\phi_0} \sec \phi e^{-b \sec \phi} d\phi \quad (48)$$

and is valid for $\theta_m > \phi_0$. Unless ϕ_0 is small with respect to θ_m , the actual source shape is unacceptably distorted.

Now the Sievert Integral of the Second Kind is defined to be

$$S_2(\phi_0, b) = b \int_0^{\phi_0} \sec \phi e^{-b \sec \phi} d\phi \quad (49)$$

Therefore, for use in Equation (48), define

$$F_2(\phi_0, b) = \frac{1}{b} S_2(\phi_0, b) = \int_0^{\phi_0} \sec \phi e^{-b \sec \phi} d\phi \quad (50)$$

Tabulations of this function are given in Section VI of this report. The smoothed form of this function is defined as

$$\bar{F}_2(\phi_0, b) = \frac{e^b}{\phi_0} F_2(\phi_0, b) \quad (51)$$

Equation (48) may now be written in the usable form

$$\phi_p = \frac{S_a \theta_m}{\pi} L_0(\theta_m, b) F_2(\phi_0, b) = \frac{S_a \theta_m}{\pi} L_0(\theta_m, b) \phi_0 e^{-b} \bar{F}_2(\phi_0, b) \quad (52)$$

The function

$$R(\phi_0, \ell_2/a, b) = \int_0^{\phi_0} \int_0^{\theta_0} \sec \phi e^{-b \sec \phi} \sec \theta d\phi d\theta \quad (53)$$

is also tabulated in Section VI. Substitution of this function into the exact rectangular surface source equation [Equation (45)] gives

$$\phi_p = \frac{S_a}{\pi} R(\phi_0, \ell/a, b) \quad (54)$$

If b is zero, Equation (48) reduces to

$$\phi_p = \frac{S_a}{\pi} \theta_m \log(\sec \phi_0 + \tan \phi_0) \quad (55)$$

where θ_m is the larger angle. Equation (55) is then similar in some ways to Equation (44).

D. Rectangular Surface Source Sample Problems

1. Square Surface Source Problem

Refer to Figure 14. Assuming an intervening slab shield of optical thickness b , the exact equation for the flux at the detector point is

$$\phi_p = \frac{S_a}{\pi} \int_0^{\phi_0} \int_0^{\tan^{-1} \frac{\ell_2}{2a \sec \phi}} \sec \phi e^{-b \sec \phi} \sec \theta d\phi d\theta$$

or from Equation (54)

$$\phi_p = \frac{S_a}{\pi} \phi_0 e^{-b} \bar{R}(\phi_0, \frac{\ell_2}{a}, b)$$

$$\text{since } \bar{R}(\phi_0, \frac{\ell_2}{a}, b) = \frac{e^b}{\phi_0} R(\phi_0, \ell_2/a, b)$$

where

$$\phi_0 = \tan^{-1} \frac{\ell_1}{2a}.$$

Here, let

$$S_a = 1.0,$$

$$a = 10.0,$$

$$b = 2.0 \text{ mfp, and}$$

$$\ell_1 = \ell_2 = 20$$

Then the flux, using the exact rectangular source function $R(\phi_0, \ell_2/a, b)$, is as follows:

$$\phi_0 = \tan^{-1} \frac{20}{2 \times 10} = \tan^{-1} 1 = 45^\circ = .7854 \text{r} = \frac{\pi}{4}$$

$$\frac{\ell_2}{a} = \frac{20}{10} = 2. \text{ Then } \bar{R}(.7854, 2., 2.) = .5234, \text{ and}$$

$$\phi_p = \frac{\pi/4}{\pi} \times \frac{1}{e^2} \times 0.5234 = 0.25 \times .1353 \times .5234 = \underline{0.0177}$$

If the same problem is solved using the approximation of a disk source with area preserved

$$r = \frac{\lambda_1}{\sqrt{\pi}} = \frac{20}{1.77} = 11.30 ,$$

$$\theta_m = \tan^{-1} \frac{r}{a} = \tan^{-1} \frac{11.3}{10} = 48.5^\circ = .846r$$

$$\sec 48.5^\circ = 1.51$$

and

$$\phi_p = \frac{S_a}{2} [E_1(b) - E_1(b \sec \theta_0)] = \frac{1}{2} [E_1(2) - E_1(3.02)]$$

$$\phi_p = \frac{1}{2} \left[\frac{e^{-2}}{2} \bar{E}_1(2) - \frac{e^{-3.02}}{3.02} \bar{E}_1(3.02) \right] = .5 [.0677 \times .723 - \frac{.05}{3.02} \times .786]$$

$$\phi_p = .5 [.0359] = \underline{.0179} .$$

If the disk source approximation is changed to be conservative, with $r = \lambda_1 \sqrt{2}$, the calculation of the flux is as follows:

$$r = \frac{20}{\sqrt{2}} = 14.1 \text{ and } \theta_m = \tan^{-1} \frac{14.1}{10} = 0.955r = 54.6^\circ$$

$$\sec \theta_m = \frac{1}{\cos 54.6} = \frac{1}{.579} = 1.73$$

$$\phi_p = \frac{S_a}{2} [E_1(b) - E_1(b \sec \theta_m)] = \frac{1}{2} \left[\frac{e^{-2}}{2} \bar{E}_1(2) - \frac{e^{-3.46}}{3.46} \bar{E}_1(3.46) \right]$$

$$= \frac{1}{2} [.0677 \times .723 - \frac{0.0314}{3.46} \times 0.8] = 0.5 \times 0.0417 = \underline{0.0208}$$

Finally, if the approximation of Equation (52) is used, even though, for a square surface source,

$$\theta_m = \phi_0 = \tan^{-1} \lambda_1 / 2a ,$$

the flux is given by

$$\begin{aligned}
\phi_p &= \frac{S_a \theta_m}{\pi} L_0(\theta_0, b) \phi_0 e^{-b} \bar{F}_2(\phi_0, b) \\
&= \frac{1 \times .7854}{\pi} L_0(.7854, 2) \times .7854 e^{-2} \bar{F}_2(.7854, 2) \\
&= .25 \times .7842 \times .7854 \times .1353 \times .8819 = \underline{.0185}
\end{aligned}$$

2. Rectangular Surface Source Problem

The convention is that ℓ_2 , the vertical dimension, is the longer side. A disk source approximation will not work in this case. The detector point is located as in Figure 14.

Let $\ell_2 = 20$ cm, $\ell_1 = 10$ cm, $b = 2$ mfp, $a = 10$ cm, and $S_a = 1.0$

Then

$$\theta_m = .7854r = 45^\circ$$

$$\phi_0 = \tan^{-1} \frac{\ell_1}{2a} = \tan^{-1} \frac{10}{2 \times 10} = \tan^{-1} .5 = 26.5^\circ = .463r$$

$$\ell_1/a = 10/10 = 1 .$$

The flux given by the exact formula [see Equations (45) and (54)] is

$$\phi_p = \frac{S_a}{\pi} \phi_0 e^{-b} \bar{R}(\phi_0, \ell_2/a, b)$$

$$\phi_p = \frac{1}{\pi} .463 \times .1353 \bar{R}(.463, 1., 2) = 0.147 \times .1353 \times .423$$

$$\phi_p = \underline{0.00841}$$

The flux from an approximation founded on integrating a line source over the arc $a\phi_0$ is

$$\phi_p = a\phi \left(\frac{4S}{4\pi a}\right) F(\theta_m, b) = \frac{S}{\pi} \phi_o e^{-b} \bar{F}(\theta_m, b)$$

$$= \frac{1 \times .463}{\pi} \times .1353 \times .7854 \bar{F}(.7854, 2)$$

$$= 0.463 \times .1353 \times .25 \times .8038 = \underline{.01262}$$

The flux given by the rectangular surface source approximation of Equation (52) is

$$\phi = S \frac{\theta_m}{a \pi} L_o(\theta_m, b) \phi_o e^{-b} \bar{F}(\phi_o, b)$$

$$= 1 \times \frac{.7854}{\pi} L_o(.7854, 2) \times .463 \times .1353 \times \bar{F}_2(.463, 2)$$

$$= .25 \times .7842 \times .463 \times .1353 \times .963 = \underline{.0119}$$

FIGURE 1

Division of a Cylindrical Source
into Regions I and II

FIGURE 2

Detail of Division of Cylindrical Source
into Regions I and II

FIGURE 3

Cylindrical Source-Volume Approximation
Using a Section of an Annulus with a
Curved Top Surface

FIGURE 4

Bases of Cylinder and Annular Sector

FIGURE 5

Cylindrical Source Approximation with Detector Point Outside the Axial and Radial Extensions of the Source, and with Slab Shield Parallel to the Source Axis

FIGURE 6

Detail of the Midplane of a Cylindrical Source Approximation with a Detector Point Outside the Axial and Radial Extensions of the Source

FIGURE 7

Layout of Arbitrary Test Problem with
Slab Shield Parallel to the Source Axis

FIGURE 8

Cylindrical Source with a Detector Point Outside the Radial and Axial Extensions of the Source and with a Slab Shield Perpendicular to the Source Axis

FIGURE 9

Section of an Annulus Used to Approximate a Cylindrical Source with a Detector Point Outside the Radial and Axial Extensions of the Source, and with a Slab Shield Perpendicular to the Source Axis

For the approximation let
 $H = a$,
 $A = h$, and

$$M_C = \frac{l}{R} \text{ so that } M_C R = l$$

Then set $L = 2R$, equate volumes, and solve for ϕ_0 :

$$\phi_0 = \frac{\pi R}{2(2h + l)}$$

FIGURE 10

Layout of Arbitrary Test Problem with a
Slab Shield Perpendicular to the Source Axis

FIGURE 11

Base of an Annular Sector which
Preserves the Area of the Base of a Rectangular Source

FIGURE 12

Rectangular Volume Source Approximation
Using a Section of an Annulus

FIGURE 14

Rectangular Surface Source with
Centered Opposite Detector Point

VI. Tables

TABLE 1
Approximate Flux for a
Exact Flux
 Cylindrical Source with a
 Lateral Detector Point and
 a Slab Shield Parallel to the
 Source Axis

B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.10	.20	L/A					25.00	.10	.50
.20	3.88	3.68	3.35	3.22				.20	1.75	1.71	1.61	1.55			
.50	3.58	3.33	2.81	2.50				.50	1.65	1.59	1.43	1.31			
1.00	2.93	2.83	1.99	1.68				1.00	1.44	1.36	1.17	1.08			
2.50	1.83	1.59	1.23	1.11				2.50	1.13	1.07	1.01	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.10	.50	L/A					25.00	.10	1.00
.20	2.50	2.43	2.25	2.13				.20	1.45	1.43	1.38	1.34			
.50	2.32	2.22	1.92	1.71				.50	1.38	1.35	1.26	1.18			
1.00	1.94	1.81	1.43	1.24				1.00	1.25	1.20	1.09	1.04			
2.50	1.34	1.22	1.05	.99				2.50	1.07	1.04	1.02	1.01			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.10	1.00	L/A					25.00	.10	2.50
.20	1.90	1.87	1.78	1.70				.20	1.22	1.22	1.20	1.19			
.50	1.78	1.73	1.56	1.41				.50	1.19	1.18	1.13	1.10			
1.00	1.53	1.46	1.23	1.10				1.00	1.12	1.10	1.05	1.03			
2.50	1.17	1.11	1.03	1.00				2.50	1.04	1.03	1.02	1.02			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.10	2.50	L/A					25.00	.50	.20
.20	1.45	1.44	1.41	1.37				.20	1.54	1.46	1.35	1.31			
.50	1.38	1.36	1.28	1.20				.50	1.46	1.38	1.23	1.16			
1.00	1.25	1.21	1.10	1.05				1.00	1.30	1.21	1.07	1.02			
2.50	1.08	1.06	1.04	1.03				2.50	1.07	1.03	1.00	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.50	.20	L/A					25.00	.50	.50
.20	1.91	1.82	1.69	1.63				.20	1.29	1.26	1.20	1.16			
.50	1.79	1.69	1.49	1.37				.50	1.25	1.21	1.13	1.08			
1.00	1.54	1.42	1.20	1.10				1.00	1.15	1.11	1.03	1.01			
2.50	1.16	1.08	1.01	1.00				2.50	1.03	1.01	1.00	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.50	.50	L/A					25.00	.50	1.00
.20	1.48	1.44	1.37	1.32				.20	1.18	1.17	1.14	1.11			
.50	1.40	1.36	1.24	1.17				.50	1.15	1.13	1.08	1.05			
1.00	1.26	1.20	1.08	1.03				1.00	1.09	1.07	1.02	1.00			
2.50	1.06	1.03	1.00	1.00				2.50	1.02	1.01	1.00	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.50	1.00	L/A					25.00	.50	2.50
.20	1.29	1.27	1.23	1.20				.20	1.09	1.09	1.08	1.07			
.50	1.24	1.22	1.15	1.10				.50	1.07	1.07	1.05	1.03			
1.00	1.15	1.12	1.04	1.01				1.00	1.04	1.03	1.01	1.00			
2.50	1.03	1.02	1.01	1.00				2.50	1.01	1.00	1.00	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					10.00	.50	2.50	L/A					25.00	.10	.20
.20	1.14	1.14	1.12	1.11				.20	1.09	1.09	1.08	1.07			
.50	1.11	1.11	1.08	1.05				.50	1.07	1.07	1.05	1.03			
1.00	1.07	1.06	1.02	1.01				1.00	1.04	1.03	1.01	1.00			
2.50	1.02	1.01	1.01	1.01				2.50	1.01	1.00	1.00	1.00			
B =	.20	1.00	5.00	10.00	R	MUS	A/R	B =	.20	1.00	5.00	10.00	R	MUS	A/R
L/A					25.00	.10	.20	L/A					25.00	.10	.20
.20	2.45	2.34	2.15	2.08				.20	2.45	2.34	2.15	2.08			
.50	2.28	2.14	1.86	1.69				.50	2.28	2.14	1.86	1.69			
1.00	1.91	1.75	1.41	1.26				1.00	1.91	1.75	1.41	1.26			
2.50	1.33	1.21	1.06	1.02				2.50	1.33	1.21	1.06	1.02			

TABLE 1A
Improved Ratios of
Approximate Flux
Exact Flux
Using the Algorithm of Section II.D

B = .20 1.00 5.00 10.00	R 10.00	MUS .10	A/R .20
L/A .20 1.07 1.02 .95 .93			
.50 1.08 1.03 .98 .99			
1.00 1.10 1.06 1.05 1.07			
2.50 1.14 1.12 1.07 1.03			
B = .20 1.00 5.00 10.00	R 10.00	MUS .10	A/R .50
L/A .20 2.11 2.05 1.90 1.81			
.50 1.99 1.91 1.87 1.49			
1.00 1.73 1.61 1.30 1.14			
2.50 1.28 1.17 1.02 .98			
B = .20 1.00 5.00 10.00	R 10.00	MUS .10	A/R 1.00
L/A .20 1.68 1.64 1.58 1.49			
.50 1.58 1.54 1.40 1.28			
1.00 1.42 1.35 1.16 1.06			
2.50 1.15 1.10 1.03 1.00			
B = .20 1.00 5.00 10.00	R 10.00	MUS .10	A/R 2.50
L/A .20 1.32 1.32 1.29 1.27			
.50 1.28 1.27 1.20 1.15			
1.00 1.20 1.17 1.09 1.04			
2.50 1.08 1.06 1.04 1.03			
B = .20 1.00 5.00 10.00	R 10.00	MUS .50	A/R .20
L/A .20 1.91 1.82 1.69 1.63			
.50 1.79 1.69 1.49 1.37			
1.00 1.54 1.42 1.20 1.10			
2.50 1.16 1.08 1.01 1.00			
B = .20 1.00 5.00 10.00	R 10.00	MUS .50	A/R .50
L/A .20 1.48 1.44 1.37 1.32			
.50 1.40 1.36 1.24 1.17			
1.00 1.28 1.20 1.08 1.03			
2.50 1.06 1.03 1.00 1.00			
B = .20 1.00 5.00 10.00	R 10.00	MUS .50	A/R 1.00
L/A .20 1.29 1.27 1.23 1.20			
.50 1.24 1.22 1.15 1.10			
1.00 1.15 1.12 1.04 1.01			
2.50 1.03 1.02 1.01 1.00			
B = .20 1.00 5.00 10.00	R 10.00	MUS .50	A/R 2.50
L/A .20 1.14 1.14 1.12 1.11			
.50 1.11 1.11 1.08 1.05			
1.00 1.07 1.06 1.02 1.01			
2.50 1.02 1.01 1.01 1.01			
B = .20 1.00 5.00 10.00	R 25.00	MUS .10	A/R .20
L/A .20 1.62 1.55 1.45 1.43			
.50 1.59 1.52 1.41 1.37			
1.00 1.50 1.42 1.28 1.21			
2.50 1.23 1.17 1.05 1.02			
B = .20 1.00 5.00 10.00	R 25.00	MUS .10	A/R .50
L/A .20 1.73 1.69 1.59 1.53			
.50 1.63 1.58 1.41 1.30			
1.00 1.43 1.35 1.16 1.07			
2.50 1.13 1.07 1.01 1.00			
B = .20 1.00 5.00 10.00	R 25.00	MUS .10	A/R 1.00
L/A .20 1.44 1.42 1.37 1.33			
.50 1.37 1.34 1.25 1.17			
1.00 1.24 1.20 1.09 1.03			
2.50 1.07 1.04 1.02 1.01			
B = .20 1.00 5.00 10.00	R 25.00	MUS .10	A/R 2.50
L/A .20 1.22 1.21 1.20 1.18			
.50 1.18 1.17 1.13 1.09			
1.00 1.12 1.10 1.05 1.03			
2.50 1.04 1.03 1.02 1.02			
B = .20 1.00 5.00 10.00	R 25.00	MUS .50	A/R .20
L/A .20 1.54 1.48 1.35 1.31			
.50 1.48 1.38 1.23 1.16			
1.00 1.30 1.21 1.07 1.02			
2.50 1.07 1.03 1.00 1.00			
B = .20 1.00 5.00 10.00	R 25.00	MUS .50	A/R .50
L/A .20 1.29 1.25 1.20 1.16			
.50 1.25 1.21 1.13 1.08			
1.00 1.15 1.11 1.03 1.01			
2.50 1.03 1.01 1.00 1.00			
B = .20 1.00 5.00 10.00	R 25.00	MUS .50	A/R 1.00
L/A .20 1.18 1.17 1.14 1.11			
.50 1.15 1.13 1.08 1.05			
1.00 1.09 1.07 1.02 1.00			
2.50 1.02 1.01 1.00 1.00			
B = .20 1.00 5.00 10.00	R 25.00	MUS .50	A/R 2.50
L/A .20 1.09 1.09 1.08 1.07			
.50 1.07 1.07 1.05 1.03			
1.00 1.04 1.03 1.01 1.00			
2.50 1.01 1.00 1.00 1.00			

TABLE 2
Approximate Flux
Exact Flux

from A Cylindrical Source at Detector Points Outside the Radial and
Axial Extensions of the Source with an Intervening Slab Shield
Parallel to the Source Axis

R= 10.00				Mus= .10				a/R= .20				Mus=R= 1.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.08	1.14	1.43	1.03	1.08	1.38	.95	1.00	1.29	.94	1.00	1.31			
.50	1.09	1.17	3.87	1.04	1.12	3.42	.99	1.08	2.48	1.00	1.11	2.03			
1.00	1.12	1.22	2.72	1.08	1.19	2.33	1.07	1.20	1.82	1.09	1.20	1.29			
2.50	1.16	1.63	1.63	1.14	1.43	1.37	1.09	1.12	.75	1.03	.97	.41			
R= 10.00				Mus= .10				a/R= .50				Mus=R= 1.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	2.18	2.42	2.98	2.12	2.34	2.82	1.95	2.10	2.41	1.85	1.94	2.10			
.50	2.04	2.15	2.31	1.94	2.02	2.11	1.87	1.84	1.55	1.48	1.39	1.24			
1.00	1.73	1.72	1.66	1.61	1.56	1.45	1.28	1.20	.97	1.12	1.04	.68			
2.50	1.27	1.22	.99	1.17	1.11	.78	1.02	.90	.24	.97	.71	.05			
R= 10.00				Mus= .10				a/R= 1.00				Mus=R= 1.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.70	1.84	2.08	1.67	1.80	2.02	1.59	1.68	1.79	1.52	1.57	1.58			
.50	1.60	1.68	1.68	1.56	1.59	1.54	1.40	1.38	1.18	1.28	1.18	.91			
1.00	1.41	1.38	1.23	1.34	1.28	1.07	1.14	1.05	.87	1.04	.94	.38			
2.50	1.14	1.05	.77	1.08	.97	.55	1.01	.74	.10	.97	.51	.01			
R= 10.00				Mus= .10				a/R= 2.50				Mus=R= 1.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.34	1.39	1.48	1.33	1.38	1.45	1.30	1.34	1.35	1.27	1.29	1.24			
.50	1.29	1.30	1.25	1.27	1.27	1.18	1.20	1.15	.94	1.13	1.08	.75			
1.00	1.19	1.15	1.00	1.18	1.10	.88	1.07	.98	.54	1.02	.88	.28			
2.50	1.06	.95	.71	1.04	.88	.50	1.01	.84	.08	.98	.41	.00			
R= 10.00				Mus= .50				a/R= .20				Mus=R= 5.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.93	1.98	2.08	1.83	1.85	1.94	1.68	1.65	1.66	1.62	1.58	1.50			
.50	1.78	1.72	1.82	1.67	1.59	1.48	1.45	1.32	1.15	1.33	1.18	1.01			
1.00	1.50	1.38	1.22	1.38	1.25	1.09	1.15	1.03	.85	1.07	.95	.72			
2.50	1.13	1.03	.87	1.05	.97	.78	.98	.84	.43	.98	.75	.23			
R= 10.00				Mus= .50				a/R= .50				Mus=R= 5.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.48	1.49	1.48	1.45	1.44	1.42	1.38	1.33	1.24	1.31	1.28	1.12			
.50	1.39	1.34	1.19	1.35	1.28	1.11	1.22	1.11	.88	1.13	1.00	.74			
1.00	1.23	1.13	.93	1.17	1.08	.84	1.04	.91	.59	.99	.83	.39			
2.50	1.03	.91	.65	1.00	.85	.49	.95	.68	.13	.92	.49	.02			
R= 10.00				Mus= .50				a/R= 1.00				Mus=R= 5.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.28	1.27	1.23	1.27	1.25	1.20	1.23	1.19	1.09	1.19	1.14	.99			
.50	1.23	1.17	1.02	1.20	1.14	.98	1.13	1.02	.78	1.07	.94	.81			
1.00	1.12	1.02	.81	1.09	.98	.71	1.01	.85	.42	.97	.78	.22			
2.50	1.00	.83	.57	.97	.78	.38	.93	.52	.05	.90	.32	.00			
R= 10.00				Mus= .50				a/R= 2.50				Mus=R= 5.00			
b= .20				b= 1.00				b= 5.00				b= 10.00			
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a															
.20	1.13	1.11	1.05	1.13	1.11	1.04	1.12	1.08	.98	1.10	1.08	.91			
.50	1.10	1.05	.91	1.09	1.03	.88	1.08	.97	.89	1.03	.91	.54			
1.00	1.05	.96	.78	1.03	.92	.68	.99	.81	.38	.97	.72	.18			
2.50	.98	.80	.59	.98	.72	.39	.93	.45	.04	.89	.25	.00			

TABLE 2 (Cont'd)

R= 25.00 Mus= .10 a/R= .20 Mus+R= 2.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.64	1.72	2.05	1.57	1.63	1.93	1.48	1.49	1.75	1.43	1.45	1.69
.50	1.60	1.64	2.32	1.52	1.55	2.07	1.40	1.40	1.57	1.38	1.32	1.33
1.00	1.49	1.74	1.85	1.41	1.56	1.45	1.28	1.21	1.09	1.18	1.08	.89
2.50	1.21	1.20	1.08	1.15	1.09	.92	1.03	.92	.52	.99	.82	.28

R= 25.00 Mus= .10 a/R= .50 Mus+R= 2.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.76	1.82	1.95	1.71	1.76	1.87	1.60	1.61	1.81	1.53	1.50	1.43
.50	1.64	1.61	1.52	1.57	1.53	1.40	1.39	1.29	1.28	1.27	1.13	.89
1.00	1.41	1.31	1.12	1.32	1.21	1.02	1.12	1.00	.89	1.04	.90	.47
2.50	1.10	.99	.72	1.05	.92	.58	.98	.74	.18	.95	.58	.03

R= 25.00 Mus= .10 a/R= 1.00 Mus+R= 2.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.45	1.48	1.50	1.43	1.45	1.48	1.37	1.37	1.31	1.33	1.30	1.17
.50	1.37	1.34	1.20	1.34	1.29	1.12	1.23	1.14	.87	1.15	1.02	.69
1.00	1.22	1.13	.91	1.18	1.07	.80	1.08	.91	.49	1.00	.82	.27
2.50	1.04	.89	.61	1.01	.82	.42	.97	.59	.06	.93	.38	.00

R= 25.00 Mus= .10 a/R= 2.50 Mus+R= 2.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.22	1.22	1.20	1.21	1.21	1.18	1.19	1.18	1.10	1.17	1.15	1.02
.50	1.18	1.14	.91	1.16	1.12	.96	1.11	.93	.77	1.07	.96	.61
1.00	1.10	1.02	.82	1.08	.88	.72	1.02	.87	.41	.99	.78	.20
2.50	1.01	.84	.62	.99	.77	.41	.98	.51	.05	.93	.30	.00

R= 25.00 Mus= .50 a/R= .20 Mus+R=12.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.54	1.53	1.50	1.48	1.45	1.41	1.34	1.30	1.22	1.29	1.24	1.13
.50	1.44	1.38	1.24	1.38	1.29	1.13	1.20	1.10	.94	1.13	1.02	.88
1.00	1.27	1.17	1.02	1.18	1.08	.93	1.04	.95	.77	1.00	.90	.66
2.50	1.05	.97	.80	1.00	.92	.71	.97	.81	.39	.95	.72	.20

R= 25.00 Mus= .50 a/R= .50 Mus+R=12.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.29	1.27	1.22	1.26	1.24	1.18	1.19	1.15	1.05	1.15	1.09	.98
.50	1.23	1.18	1.04	1.19	1.13	.98	1.10	1.01	.81	1.05	.94	.69
1.00	1.13	1.04	.88	1.09	.99	.78	1.00	.88	.54	.97	.81	.36
2.50	1.00	.87	.61	.98	.81	.48	.94	.83	.11	.91	.48	.02

R= 25.00 Mus= .50 a/R= 1.00 Mus+R=12.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.17	1.15	1.08	1.16	1.13	1.06	1.13	1.08	.97	1.10	1.04	.90
.50	1.14	1.07	.93	1.12	1.05	.88	1.06	.96	.71	1.02	.90	.56
1.00	1.07	.97	.76	1.04	.93	.67	.98	.82	.38	.96	.73	.19
2.50	.98	.80	.54	.96	.72	.35	.92	.48	.04	.88	.29	.00

R= 25.00 Mus= .50 a/R= 2.50 Mus+R=12.50												
	b= .20			b= 1.00			b= 5.00			b= 10.00		
H'/1=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
1/a												
.20	1.08	1.04	.97	1.08	1.04	.98	1.07	1.02	.91	1.06	1.00	.85
.50	1.06	1.00	.85	1.05	.99	.81	1.03	.93	.65	1.00	.88	.50
1.00	1.02	.92	.72	1.01	.89	.63	.98	.79	.33	.96	.69	.14
2.50	.97	.77	.57	.95	.68	.37	.91	.41	.04	.87	.22	.00

TABLE 3

Results From the Exact Flux Formula and
From Equation (24) for the Problem of Figure 7

$\mu_s = 0.1$		$S_v = 1.0$		$R = 10.$			
Distance of Detector Point From Source Edge	Distance of Detector Point Below Source	Slab Shield Thickness					
		$b = 0.0$		$b = 1.0$		$b = 5.0$	
		Flux		Flux		Flux	
		Exact	Approx	Exact	Approx	Exact	Approx
a	z						
5	0	0.93	1.0015	0.23	0.24	0.19E-2	0.20E-2
5	5	0.65	0.70	0.14	0.14	0.82E-3	0.80E-3
5	15	0.33	0.32	0.045	0.037	0.98E-4	0.40E-4
5	25	0.19	0.16	0.016	0.009	0.91E-5	0.10E-5
5	35	0.12	0.09	0.0061	0.0025	0.88E-6	0.20E-7
5	45	0.082	0.056	0.0025	0.0008	0.81E-7	0.50E-9
15	0	0.47	0.53	0.14	0.15	0.14E-2	0.15E-2
15	5	0.39	0.43	0.10	0.11	0.88E-3	0.88E-3
15	15	0.25	0.26	0.053	0.05	0.29E-3	0.19E-3
15	25	0.16	0.16	0.026	0.022	0.50E-4	0.25E-4
15	35	0.11	0.10	0.013	0.009	0.96E-5	0.27E-5
15	45	0.08	0.07	0.0061	0.004	0.18E-5	0.27E-6

TABLE 4

APPROXIMATE FLUX

EXACT FLUX

from A Cylindrical Source at Detector Points Outside the Radial and Axial Extensions of the Source with an Intervening Slab Shield Perpendicular to the Source Axis

R= 10.00 Mus= .10 a/R= .20 Mus*R= 1.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
6.25	1.31	1.11	1.10	1.46	1.15	1.08	1.56	1.24	1.07	1.64	1.34	1.08
15.63	.70	.88	1.01	.83	.88	1.01	.99	.88	1.00	1.15	.92	.99
31.25	.45	.78	.92	.49	.78	.92	.57	.75	.92	.68	.75	.91
78.13	.31	.64	.83	.31	.64	.83	.32	.64	.83	.34	.64	.83
R= 10.00 Mus= .10 a/R= .50 Mus*R= 1.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
2.50	1.61	1.24	1.14	1.90	1.34	1.13	2.16	1.54	1.14	2.48	1.78	1.17
6.25	.83	.92	1.04	1.01	.93	1.04	1.23	.96	1.03	1.44	1.03	1.02
12.50	.51	.79	.94	.58	.79	.94	.69	.79	.94	.83	.79	.94
31.25	.33	.67	.85	.34	.67	.85	.36	.68	.85	.40	.68	.85
R= 10.00 Mus= .10 a/R= 1.00 Mus*R= 1.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
1.25	1.92	1.42	1.22	2.41	1.64	1.22	2.97	2.05	1.26	3.72	2.60	1.38
3.13	1.02	.99	1.08	1.27	1.01	1.07	1.57	1.08	1.07	1.89	1.23	1.06
6.25	.81	.82	.96	.72	.82	.96	.88	.82	.96	1.05	.84	.96
15.63	.37	.69	.86	.38	.69	.86	.43	.69	.86	.49	.69	.86
R= 10.00 Mus= .50 a/R= .20 Mus*R= 5.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
.50	2.10	1.62	1.37	2.88	2.12	1.44	3.94	3.01	1.65	5.62	4.32	2.10
1.25	1.37	1.13	1.14	1.79	1.24	1.14	2.31	1.47	1.15	2.98	1.83	1.18
2.50	.85	.88	1.00	1.05	.90	1.00	1.29	.94	1.00	1.56	1.03	.99
6.25	.47	.72	.88	.53	.72	.88	.63	.72	.88	.75	.73	.88
R= 10.00 Mus= .50 a/R= .50 Mus*R= 5.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
6.25	1.18	.94	.92	1.32	1.03	.93	1.36	1.16	.95	1.35	1.26	.99
15.63	.97	.68	.83	.71	.68	.83	.89	.72	.83	1.05	.79	.84
31.25	.34	.59	.80	.40	.59	.80	.50	.60	.80	.62	.61	.80
78.13	.23	.55	.78	.24	.55	.78	.26	.55	.78	.29	.55	.78
R= 10.00 Mus= .50 a/R= 1.00 Mus*R= 5.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
2.50	1.34	1.03	.95	1.52	1.18	.96	1.58	1.33	1.00	1.62	1.46	1.06
6.25	.68	.70	.85	.87	.73	.85	1.07	.79	.85	1.24	.89	.86
12.50	.41	.62	.82	.49	.62	.82	.62	.63	.82	.77	.66	.82
31.25	.25	.57	.80	.27	.57	.80	.30	.57	.80	.36	.58	.80
R= 10.00 Mus= .50 a/R= 2.50 Mus*R= 5.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
1.25	1.45	1.12	.98	1.67	1.30	1.01	1.81	1.52	1.07	1.96	1.73	1.18
3.13	.82	.78	.87	1.04	.80	.87	1.26	.90	.87	1.48	1.04	.88
6.25	.50	.65	.83	.62	.68	.83	.78	.68	.83	.95	.72	.83
15.63	.29	.59	.81	.32	.59	.81	.37	.60	.81	.48	.60	.81
R= 10.00 Mus= .50 a/R= 5.00 Mus*R= 5.00												
b= .25			b= 1.00			b= 2.50			b= 5.00			
H'/L=	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50
L/a												
.50	1.43	1.15	1.02	1.70	1.42	1.08	1.83	1.74	1.22	2.26	2.11	1.45
1.25	1.04	.88	.88	1.31	.96	.89	1.58	1.12	.91	1.84	1.32	.94
2.50	.70	.71	.84	.88	.73	.84	1.08	.79	.84	1.28	.89	.85
6.25	.39	.62	.81	.46	.62	.81	.57	.63	.81	.70	.65	.81

TABLE 4 (Cont'd)

R = 25.00													Mus = .10			a/R = .20			Mus*R = 2.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
6.25	1.23	1.00	.99	1.38	1.08	.99	1.44	1.19	1.00	1.46	1.30	1.03	1.46	1.30	1.03						
15.63	.60	.72	.89	.73	.73	.89	.90	.78	.88	1.07	.82	.88	1.07	.82	.88						
31.25	.37	.63	.83	.42	.63	.83	.51	.64	.83	.63	.65	.83	.63	.65	.83						
78.13	.25	.57	.79	.28	.57	.79	.27	.57	.79	.30	.57	.79	.30	.57	.79						
R = 25.00													Mus = .10			a/R = .50			Mus*R = 2.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
2.50	1.44	1.10	1.03	1.66	1.23	1.03	1.79	1.41	1.05	1.93	1.59	1.11	1.93	1.59	1.11						
6.25	.71	.76	.91	.89	.78	.90	1.09	.83	.90	1.28	.92	.90	1.28	.92	.90						
12.50	.43	.68	.85	.51	.68	.85	.63	.67	.85	.78	.69	.85	.78	.69	.85						
31.25	.27	.60	.81	.29	.60	.81	.31	.60	.81	.36	.60	.81	.36	.60	.81						
R = 25.00													Mus = .10			a/R = 1.00			Mus*R = 2.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
1.25	1.60	1.21	1.07	1.92	1.42	1.09	2.20	1.72	1.14	2.55	2.05	1.28	2.55	2.05	1.28						
3.13	.86	.81	.92	1.08	.85	.92	1.32	.94	.92	1.55	1.08	.93	1.55	1.08	.93						
6.25	.52	.69	.88	.63	.70	.88	.79	.71	.88	.98	.75	.88	.98	.75	.88						
15.63	.31	.62	.82	.33	.62	.82	.38	.62	.82	.46	.62	.82	.46	.62	.82						
R = 25.00													Mus = .10			a/R = 2.50			Mus*R = 2.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
.50	1.59	1.27	1.13	2.01	1.62	1.20	2.48	2.12	1.37	3.19	2.77	1.68	3.19	2.77	1.68						
1.25	1.10	.91	.95	1.41	1.01	.95	1.74	1.19	.95	2.11	1.44	1.00	2.11	1.44	1.00						
2.50	.72	.74	.88	.90	.77	.88	1.11	.82	.88	1.33	.92	.88	1.33	.92	.88						
6.25	.41	.65	.83	.47	.65	.83	.58	.65	.83	.71	.67	.83	.71	.67	.83						
R = 25.00													Mus = .50			a/R = .20			Mus*R = 12.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
6.25	1.16	.91	.87	1.29	1.01	.88	1.32	1.14	.91	1.30	1.23	.96	1.30	1.23	.96						
15.63	.56	.63	.80	.71	.65	.80	.88	.69	.80	1.04	.77	.81	1.04	.77	.81						
31.25	.33	.56	.78	.39	.57	.78	.49	.57	.78	.62	.59	.78	.62	.59	.78						
78.13	.22	.54	.77	.23	.54	.77	.25	.54	.77	.29	.54	.77	.29	.54	.77						
R = 25.00													Mus = .50			a/R = .50			Mus*R = 12.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
2.50	1.30	.99	.90	1.44	1.12	.92	1.46	1.28	.96	1.44	1.38	1.03	1.44	1.38	1.03						
6.25	.68	.67	.82	.88	.71	.82	1.08	.77	.82	1.23	.88	.83	1.23	.88	.83						
12.50	.40	.59	.80	.49	.60	.80	.62	.61	.80	.77	.64	.80	.77	.64	.80						
31.25	.24	.56	.79	.26	.56	.79	.30	.56	.79	.35	.56	.79	.35	.56	.79						
R = 25.00													Mus = .50			a/R = 1.00			Mus*R = 12.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
1.25	1.38	1.07	.93	1.54	1.23	.96	1.58	1.41	1.02	1.60	1.54	1.13	1.60	1.54	1.13						
3.13	.81	.73	.83	1.03	.78	.84	1.24	.88	.84	1.42	1.02	.88	1.42	1.02	.88						
6.25	.49	.62	.81	.61	.63	.81	.78	.66	.81	.94	.71	.81	.94	.71	.81						
15.63	.28	.58	.80	.31	.58	.80	.37	.58	.80	.45	.59	.80	.45	.59	.80						
R = 25.00													Mus = .50			a/R = 2.50			Mus*R = 12.50		
b = .25													b = 1.00			b = 2.50			b = 5.00		
H'/L =	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50	1.10	1.50	2.50						
L/a																					
.50	1.35	1.09	.96	1.52	1.31	1.02	1.60	1.52	1.14	1.71	1.72	1.31	1.71	1.72	1.31						
1.25	1.01	.83	.85	1.27	.93	.86	1.49	1.09	.88	1.69	1.26	.92	1.69	1.26	.92						
2.50	.69	.69	.82	.87	.72	.82	1.07	.78	.82	1.25	.88	.83	1.25	.88	.83						
6.25	.39	.61	.80	.46	.61	.80	.57	.62	.80	.70	.64	.80	.70	.64	.80						

TABLE 5

Results From the Exact Flux Formula and
From Equation (30) for the Problem of Figure 10

$\mu_s = 0.1$		$S_v = 1.0$		$R = 10.$			
Distance of Detector Point From Source Edge	Distance of Detector Point Below Source	Slab Shield Thickness					
		$b = 0.0$		$b = 1.0$		$b = 5.0$	
		Flux		Flux		Flux	
a	z	Exact	Approx	Exact	Approx	Exact	Approx
5	0	0.93	NA	0.23	NA	0.20E-2	NA
5	5	0.65	0.43	0.14	0.11	0.95E-3	1.1E-3
5	15	0.33	0.27	0.098	0.08	0.92E-3	0.86E-3
5	25	0.19	0.17	0.062	0.056	0.76E-3	0.70E-3
5	35	0.12	0.12	0.041	0.039	0.58E-3	0.55E-3
5	45	0.08	0.08	0.029	0.029	0.44E-3	0.43E-3
15	0	0.47	NA	0.14	NA	0.14E-2	NA
15	5	0.39	0.33	0.066	0.077	0.31E-3	0.55E-3
15	15	0.25	0.23	0.062	0.061	0.39E-3	0.51E-3
15	25	0.16	0.16	0.048	0.048	0.42E-3	0.46E-3
15	35	0.11	0.11	0.036	0.036	0.39E-3	0.41E-3
15	45	0.08	0.08	0.027	0.027	0.33E-3	0.35E-3

TABLE 6
The Function $L_0(\phi_0, b)$

TABLE OF THE SMOOTHED FUNCTION $L_0(\phi, b)$													
b (MFP) = (RAD)	.01	.05	.10	.20	.40	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00
0.1745	1.00000	1.00000	.99999	.99999	.99997	.99996	.99995	.99994	.99993	.99991	.99990	.99988	.99983
0.4363	1.00000	.99998	.99995	.99991	.99984	.99976	.99969	.99962	.99953	.99945	.99936	.99928	.99911
0.6727	.99998	.99991	.99982	.99965	.99934	.99905	.99876	.99848	.99813	.99779	.99745	.99712	.99680
1.0090	.99996	.99979	.99959	.99922	.99852	.99785	.99720	.99657	.99579	.99503	.99427	.99352	.99204
1.7453	.99992	.99962	.99927	.99881	.99736	.99617	.99502	.99390	.99252	.99118	.98983	.98850	.98589
2.1817	.99988	.99941	.99886	.99782	.99586	.99409	.99221	.99046	.98831	.98620	.98412	.98208	.97802
2.6180	.99982	.99915	.99835	.99684	.99402	.99134	.98876	.98624	.98318	.98014	.97716	.97423	.96847
3.4897	.99968	.99846	.99703	.99432	.99027	.98451	.97992	.97547	.97004	.96474	.95955	.95445	.94450
4.3633	.99949	.99755	.99528	.99100	.98305	.97558	.96844	.96153	.95316	.94503	.93712	.92939	.91443
5.2360	.99925	.99640	.99367	.98881	.97525	.96447	.95421	.94438	.93251	.92109	.91005	.89935	.87885
6.1087	.99895	.99498	.99033	.98166	.96574	.95102	.93713	.92390	.90811	.89305	.87862	.86475	.83553
6.9813	.99858	.99324	.98701	.97542	.95435	.93508	.91708	.90009	.88004	.86112	.84319	.82615	.79441
7.8540	.99813	.99112	.98298	.96794	.94088	.91645	.89381	.87289	.84839	.82559	.80427	.78425	.74464
8.7266	.99758	.98856	.97813	.95901	.92506	.89491	.86751	.84232	.81341	.78693	.76253	.73997	.69553
1.04720	.99607	.98158	.96511	.93553	.88498	.84208	.80488	.77158	.73507	.70295	.67445	.64895	.60524
1.22173	.99383	.97058	.94510	.90108	.83049	.77487	.72932	.69111	.65106	.61746	.58878	.56393	.52281
1.39626	.99188	.95051	.91072	.84743	.75778	.69521	.64797	.61046	.57268	.54189	.51606	.49393	.45781
1.57080	.98454	.92881	.83771	.76513	.67638	.61874	.57621	.54271	.50907	.48168	.45872	.43905	.40677
b (MFP) = (RAD)	3.50	4.00	5.00	6.00	8.00	10.00	12.00	15.00	20.00	25.00	35.00	50.00	60.00
0.1745	.99981	.99978	.99973	.99968	.99957	.99947	.99937	.99922	.99896	.99871	.99820	.99744	.99694
0.4363	.99879	.99862	.99830	.99798	.99734	.99670	.99607	.99512	.99355	.99198	.98885	.98420	.98113
0.6727	.99515	.99451	.99322	.99195	.98942	.98691	.98442	.98071	.97459	.96855	.95687	.93936	.92814
1.0090	.98913	.98769	.98483	.98201	.97642	.97092	.96548	.95744	.94432	.93155	.90696	.87232	.85081
1.7453	.98076	.97823	.97324	.96831	.95865	.94919	.93982	.92635	.90456	.88374	.84477	.79230	.76084
2.1817	.97010	.96622	.95859	.95169	.93649	.92235	.90864	.88800	.85757	.82844	.77575	.70853	.67023
2.6180	.95726	.95178	.94107	.93062	.91046	.89117	.87269	.84835	.80584	.76909	.70518	.62835	.58687
3.4897	.92539	.91618	.89836	.88127	.84906	.81918	.79141	.75325	.69767	.65040	.57492	.49432	.45481
4.3633	.88610	.87279	.84729	.82334	.77951	.74041	.70535	.65917	.59590	.54583	.47139	.39902	.36551
5.2360	.84095	.82334	.79044	.76031	.70708	.66161	.62245	.57310	.50938	.46159	.39487	.33286	.30470
6.1087	.79123	.76978	.73081	.69573	.63645	.58812	.54810	.49967	.44002	.39704	.33870	.28533	.26117
6.9813	.73880	.71427	.67058	.63287	.57124	.52317	.48473	.43961	.38569	.34761	.29838	.24968	.22852
7.8540	.68553	.65897	.61288	.57432	.51357	.46792	.43230	.39127	.34293	.30900	.26345	.22192	.20313
8.7266	.63332	.60590	.55952	.52180	.46412	.42167	.38936	.35222	.30865	.27810	.23710	.19973	.18282
1.04720	.58559	.51251	.47004	.43674	.38727	.35170	.32451	.29352	.25721	.23175	.19759	.16644	.15235
1.22173	.46281	.43992	.40309	.37441	.33195	.30146	.27815	.25159	.22046	.19865	.16938	.14268	.13059
1.39626	.40497	.38494	.35270	.32761	.29046	.26378	.24338	.22014	.19290	.17382	.14819	.12483	.11426
1.57080	.35998	.34217	.31351	.29121	.25818	.23447	.21634	.19568	.17147	.15450	.13172	.11095	.10157

TABLE 7
The Function $G(\theta_0, b)$

TABLE OF THE FUNCTION		G(θ, B)															
B (MFP)	θ (RAD)	.01	.05	.10	.20	.40	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00		
.01745	1728-01	1680-01	1579-01	1429-01	1170-01	9578-02	7842-02	6420-02	5000-02	3894-02	3033-02	2362-02	1432-02	8688-03			
.04383	4319-01	4149-01	3947-01	3571-01	2924-01	2393-01	1959-01	1604-01	1249-01	9728-02	7578-02	5899-02	3578-02	2170-02			
.08727	8829-01	8290-01	7885-01	7134-01	5839-01	4780-01	3912-01	3202-01	2493-01	1841-01	1511-01	1177-01	7132-02	4323-02			
.13090	1292+00	1241+00	1181+00	1088+00	8739-01	7151-01	5852-01	4788-01	3728-01	2800-01	2257-01	1758-01	1084-01	6443-02			
.17453	1719+00	1651+00	1570+00	1426+00	1182+00	9591-01	7771-01	6355-01	4944-01	3845-01	2991-01	2326-01	1407-01	8515-02			
.21817	2143+00	2058+00	1957+00	1789+00	1446+00	1182+00	9684-01	7899-01	6140-01	4772-01	3709-01	2883-01	1742-01	1052-01			
.26180	2582+00	2481+00	2339+00	2114+00	1727+00	1411+00	1152+00	9413-01	7310-01	5877-01	4409-01	3424-01	2085-01	1245-01			
.34907	3385+00	3250+00	3088+00	2789+00	2274+00	1854+00	1512+00	1233+00	9553-01	7402-01	5736-01	4445-01	2669-01	1603-01			
.43633	4183+00	4014+00	3812+00	3438+00	2797+00	2275+00	1851+00	1506+00	1184+00	8991-01	6948-01	5370-01	3208-01	1917-01			
.52360	4848+00	4745+00	4563+00	4053+00	3289+00	2688+00	2185+00	1789+00	1353+00	1042+00	8024-01	6181-01	3670+00	2179-01			
.61087	5675+00	5438+00	5156+00	4636+00	3747+00	3030+00	2450+00	1981+00	1520+00	1166+00	8948-01	6886-01	4049+00	2389-01			
.69813	6358+00	6088+00	5787+00	5174+00	4185+00	3354+00	2702+00	2177+00	1683+00	1270+00	9710-01	7425-01	4348+00	2547-01			
.78540	6993+00	6688+00	6328+00	5684+00	4539+00	3639+00	2919+00	2343+00	1781+00	1355+00	1031+00	7852-01	4583+00	2858-01			
.87266	7574+00	7237+00	6836+00	6102+00	4885+00	3882+00	3100+00	2477+00	1874+00	1419+00	1075+00	8158-01	4709+00	2728-01			
1.04720	8556+00	8153+00	7676+00	6808+00	5363+00	4234+00	3348+00	2653+00	1988+00	1493+00	1123+00	8472-01	4843+00	2784-01			
1.22173	9276+00	8807+00	8258+00	7287+00	5850+00	4414+00	3482+00	2724+00	2028+00	1515+00	1136+00	8545-01	4888-01	2792-01			
1.39626	9716+00	9179+00	8565+00	7477+00	6150+00	4482+00	3485+00	2738+00	2033+00	1518+00	1137+00	8549-01	4887-01	2792-01			
1.57080	9848+00	9272+00	8625+00	7505+00	6157+00	4484+00	3488+00	2738+00	2033+00	1518+00	1137+00	8549-01	4887-01	2792-01			

B (MFP)	θ (RAD)	3.50	4.00	5.00	6.00	8.00	10.00	12.00	15.00	20.00	25.00	35.00	50.00	80.00	75.00
.01745	5269-03	3196-03	1178-03	4325-04	5852-05	7919-06	1072-06	5335-08	3594-10	2421-12	1698-16	3358-23	1524-27	4657-34	
.04383	1318-02	7979-03	2834-03	1078-03	1480-04	1974-05	2876-06	1328-07	8934-10	6010-12	2720-16	8281-23	3748-27	1141-33	
.08727	2620-02	1588-02	5835-03	2144-03	2884-04	3907-05	5275-06	2618-07	1752-09	1173-11	5280-16	1580-22	7088-27	2130-33	
.13090	4234-02	2346-02	8181-03	3181-03	4274-04	5761-05	7753-06	3828-07	2544-09	1691-11	7475-16	2199-22	9737-27	2871-33	
.17453	6152-02	3117-02	1141-02	1178-03	5588-04	7500-05	1005-06	4933-07	3248-09	2147-11	2688-16	1345-22	2688-27	3820-33	
.21817	6356-02	3841-02	1402-02	8119-03	6823-04	9098-05	1213-05	5908-07	3842-09	2501-11	1064-15	2973-22	1277-26	3818-33	
.26180	7612-02	4531-02	1649-02	5999-03	7945-04	1053-04	1396-05	8741-07	4326-09	2783-11	1159-15	3161-22	1341-26	3745-33	
.34907	9830-02	5785-02	2088-02	7539-03	9838-04	1285-04	1681-05	7873-07	4980-09	3131-11	1258-15	3313-22	1385-26	3814-33	
.43633	1145-01	6846-02	2448-02	8758-03	1124-03	1448-04	1887-05	8886-07	5306-09	3278-11	1288-15	3342-22	1391-26	3820-33	
.52360	1295-01	7898-02	2724-02	9853-03	1218-03	1545-04	1971-05	9953-07	5435-09	3325-11	1295-15	3345-22	1391-26	3820-33	
.61087	1411-01	8346-02	2820-02	1025-02	1274-03	1588-04	2021-05	9197-07	5475-09	3336-11	1295-15	3345-22	1391-26	3820-33	
.69813	1495-01	8789-02	3048-02	1082-02	1304-03	1622-04	2049-05	9242-07	5483-09	3338-11	1295-15	3345-22	1391-26	3820-33	
.78540	1551-01	9074-02	3121-02	1081-02	1316-03	1631-04	2046-05	9252-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	
.87266	1585-01	9234-02	3156-02	1089-02	1321-03	1633-04	2047-05	9254-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	
1.04720	1609-01	9338-02	3177-02	1093-02	1322-03	1634-04	2047-05	9254-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	
1.22173	1612-01	9347-02	3178-02	1093-02	1322-03	1634-04	2047-05	9254-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	
1.39626	1612-01	9347-02	3178-02	1093-02	1322-03	1634-04	2047-05	9254-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	
1.57080	1612-01	9347-02	3178-02	1093-02	1322-03	1634-04	2047-05	9254-07	5485-09	3338-11	1295-15	3345-22	1391-26	3820-33	

TABLE 8
The Smoothed Function $\bar{G}(\theta_0, b) = G(\theta_0, b)e^{b/\theta_0}$

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot G(B, \theta) / \theta$																
B (MFP) θ (RAD)	.01	.05	.10	.20	.40	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00		
.01745	.99995	.99995	.99994	.99994	.99993	.99992	.99991	.99990	.99989	.99987	.99986	.99985	.99982	.99980		
.04383	.99988	.99987	.99985	.99982	.99980	.99978	.99976	.99974	.99972	.99970	.99968	.99966	.99963	.99960		
.08727	.99972	.99967	.99960	.99958	.99954	.99950	.99946	.99942	.99938	.99934	.99930	.99926	.99921	.99916		
.13090	.99957	.99950	.99948	.99944	.99940	.99936	.99932	.99928	.99924	.99920	.99916	.99912	.99907	.99902		
.17453	.99948	.99940	.99938	.99934	.99930	.99926	.99922	.99918	.99914	.99910	.99906	.99902	.99897	.99892		
.21817	.99930	.99919	.99918	.99913	.99905	.99893	.99873	.99859	.99843	.99828	.99814	.99794	.99768	.99725		
.26180	.99850	.99805	.99748	.99740	.99734	.99728	.99720	.99705	.99689	.99673	.99657	.99641	.99625	.99609		
.34907	.99781	.99758	.99730	.99700	.99670	.99640	.99610	.99580	.99551	.99521	.99493	.99465	.99438	.99410		
.43633	.99708	.99684	.99656	.99626	.99596	.99566	.99536	.99506	.99477	.99447	.99418	.99389	.99360	.99331		
.52360	.99648	.99628	.99604	.99574	.99544	.99514	.99484	.99454	.99424	.99394	.99364	.99334	.99304	.99274		
.61087	.99608	.99591	.99569	.99539	.99509	.99479	.99449	.99419	.99389	.99359	.99329	.99299	.99269	.99239		
.69813	.99593	.99578	.99556	.99526	.99496	.99466	.99436	.99406	.99376	.99346	.99316	.99286	.99256	.99226		
.78540	.99582	.99567	.99545	.99515	.99485	.99455	.99425	.99395	.99365	.99335	.99305	.99275	.99245	.99215		
.87266	.99576	.99561	.99539	.99509	.99479	.99449	.99419	.99389	.99359	.99329	.99299	.99269	.99239	.99209		
1.04720	.99570	.99555	.99533	.99503	.99473	.99443	.99413	.99383	.99353	.99323	.99293	.99263	.99233	.99203		
1.22173	.99564	.99549	.99527	.99497	.99467	.99437	.99407	.99377	.99347	.99317	.99287	.99257	.99227	.99197		
1.39626	.99558	.99543	.99521	.99491	.99461	.99431	.99401	.99371	.99341	.99311	.99281	.99251	.99221	.99191		
1.57080	.99552	.99537	.99515	.99485	.99455	.99425	.99395	.99365	.99335	.99305	.99275	.99245	.99215	.99185		

B (MFP) θ (RAD)	3.50	4.00	5.00	6.00	8.00	10.00	12.00	15.00	20.00	25.00	35.00	50.00	80.00	75.00
.01745	.99977	.99975	.99970	.99964	.99954	.99944	.99934	.99919	.99893	.99868	.99818	.99742	.99691	.99615
.04383	.99957	.99942	.99910	.99878	.99846	.99814	.99782	.99750	.99718	.99686	.99646	.99596	.99546	.99496
.08727	.99937	.99922	.99890	.99858	.99826	.99794	.99762	.99730	.99698	.99658	.99618	.99568	.99518	.99468
.13090	.99917	.99902	.99870	.99838	.99806	.99774	.99742	.99710	.99678	.99638	.99598	.99548	.99498	.99448
.17453	.99897	.99882	.99850	.99818	.99786	.99754	.99722	.99690	.99658	.99618	.99578	.99528	.99478	.99428
.21817	.99877	.99862	.99830	.99798	.99766	.99734	.99702	.99670	.99638	.99598	.99558	.99508	.99458	.99408
.26180	.99857	.99842	.99810	.99778	.99746	.99714	.99682	.99650	.99618	.99578	.99538	.99488	.99438	.99388
.34907	.99837	.99822	.99790	.99758	.99726	.99694	.99662	.99630	.99598	.99558	.99518	.99468	.99418	.99368
.43633	.99817	.99802	.99770	.99738	.99706	.99674	.99642	.99610	.99578	.99538	.99498	.99448	.99398	.99348
.52360	.99797	.99782	.99750	.99718	.99686	.99654	.99622	.99590	.99558	.99518	.99478	.99428	.99378	.99328
.61087	.99777	.99762	.99730	.99698	.99666	.99634	.99602	.99570	.99538	.99506	.99466	.99416	.99366	.99316
.69813	.99757	.99742	.99710	.99678	.99646	.99614	.99582	.99550	.99518	.99486	.99446	.99396	.99346	.99296
.78540	.99737	.99722	.99690	.99658	.99626	.99594	.99562	.99530	.99498	.99466	.99426	.99376	.99326	.99276
.87266	.99717	.99702	.99670	.99638	.99606	.99574	.99542	.99510	.99478	.99446	.99406	.99356	.99306	.99256
1.04720	.99697	.99682	.99650	.99618	.99586	.99554	.99522	.99490	.99458	.99426	.99386	.99336	.99286	.99236
1.22173	.99677	.99662	.99630	.99598	.99566	.99534	.99502	.99470	.99438	.99406	.99366	.99316	.99266	.99216
1.39626	.99657	.99642	.99610	.99578	.99546	.99514	.99482	.99450	.99418	.99386	.99346	.99296	.99246	.99196
1.57080	.99637	.99622	.99590	.99558	.99526	.99494	.99462	.99430	.99398	.99366	.99326	.99276	.99226	.99176

TABLE 9

The Smoothed Function $\bar{F}(\theta_0, b) = F(\theta_0, b)e^{b/\theta_0}$

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot F(\theta, B) / \theta$															
θ (MFP)	θ (RAD)	.01	.05	.10	.20	.40	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00
.01745	1.00000	1.00000	.99999	.99999	.99999	.99998	.99997	.99996	.99994	.99992	.99991	.99990	.99987	.99985	.99985
.04383	1.00000	.99998	.99997	.99996	.99994	.99991	.99988	.99984	.99980	.99975	.99969	.99962	.99953	.99942	.99929
.08727	.99999	.99994	.99987	.99975	.99958	.99924	.99883	.99824	.99748	.99656	.99548	.99424	.99284	.99128	.98957
.13090	.99997	.99985	.99967	.99931	.99871	.99786	.99675	.99538	.99374	.99183	.98964	.98717	.98442	.98138	.97805
.17453	.99995	.99974	.99940	.99869	.99760	.99612	.99434	.99225	.98984	.98711	.98406	.98070	.97704	.97308	.96881
.21817	.99992	.99960	.99880	.99760	.99600	.99400	.99160	.98880	.98550	.98170	.97740	.97260	.96730	.96150	.95520
.26180	.99988	.99942	.99854	.99700	.99500	.99250	.98950	.98600	.98200	.97750	.97250	.96700	.96100	.95450	.94750
.30543	.99979	.99905	.99791	.99630	.99420	.99160	.98850	.98480	.98050	.97560	.97010	.96400	.95740	.95030	.94270
.34907	.99967	.99864	.99710	.99500	.99230	.98900	.98500	.98030	.97500	.96910	.96260	.95550	.94790	.93980	.93120
.39270	.99951	.99815	.99610	.99370	.99070	.98700	.98250	.97720	.97120	.96450	.95720	.94940	.94110	.93230	.92300
.43633	.99931	.99755	.99510	.99230	.98880	.98450	.97930	.97380	.96768	.95988	.95222	.94466	.93722	.92987	.92267
.47996	.99907	.99755	.99511	.99227	.98871	.98433	.97911	.97308	.96621	.95848	.95111	.94298	.93496	.92694	.91892
.52359	.99879	.99680	.99380	.98980	.98480	.97910	.97280	.96580	.95800	.94950	.94040	.93030	.91950	.90800	.89570
.56722	.99847	.99610	.99250	.98750	.98150	.97450	.96660	.95780	.94820	.93780	.92660	.91470	.90210	.88880	.87480
.61085	.99811	.99558	.99170	.98640	.97980	.97220	.96330	.95340	.94250	.93000	.91660	.89640	.87540	.85300	.82930
.65448	.99770	.99480	.98930	.98220	.97490	.96630	.95630	.94530	.93330	.91980	.89960	.87760	.85480	.83110	.80640
.69811	.99724	.99400	.98790	.98020	.97120	.96140	.95050	.93850	.92550	.91160	.89080	.86810	.84380	.81810	.79100
.74174	.99673	.99320	.98660	.97830	.96880	.95840	.94690	.93450	.92090	.90660	.88560	.86210	.83630	.80910	.78050
.78537	.99617	.99230	.98520	.97640	.96650	.95550	.94340	.93040	.91640	.89140	.86940	.84570	.81950	.79180	.76270
.82899	.99557	.99140	.98380	.97450	.96410	.95250	.93980	.92620	.91160	.88600	.86210	.83630	.80910	.78050	.75020
.87262	.99492	.99040	.98230	.97250	.96160	.94950	.93640	.92220	.90700	.88080	.85540	.82860	.79970	.76920	.73700
.91625	.99422	.98940	.98090	.97050	.95900	.94660	.93290	.91820	.89250	.86580	.83810	.80940	.77870	.74610	.71170
.95988	.99347	.98830	.97940	.96840	.95630	.94340	.92920	.91400	.88780	.86050	.83180	.79960	.76590	.73140	.69520
1.00351	.99267	.98720	.97790	.96640	.95380	.94040	.92570	.91000	.88320	.85500	.82530	.79210	.75660	.72030	.68270
1.04714	.99182	.98610	.97640	.96450	.95130	.93740	.92220	.90590	.87860	.84980	.81960	.78510	.74770	.70940	.67010
1.09077	.99092	.98490	.97480	.96250	.94890	.93450	.91870	.90190	.87420	.84490	.81380	.77840	.73910	.69880	.65750
1.13440	.98997	.98370	.97320	.96050	.94640	.93130	.91500	.89760	.86940	.83960	.80790	.77160	.72970	.68840	.64610
1.17803	.98897	.98240	.97150	.95840	.94380	.92800	.91120	.89320	.86460	.83440	.79970	.75710	.71360	.67130	.62800
1.22166	.98792	.98100	.96980	.95630	.94120	.92480	.90750	.88920	.85980	.82860	.79290	.74840	.70310	.66080	.61750
1.26529	.98682	.97950	.96800	.95400	.93840	.92150	.90370	.88480	.85480	.82300	.78630	.74080	.69450	.65120	.60690
1.30892	.98567	.97810	.96620	.95180	.93570	.91810	.89920	.87960	.84860	.81540	.77760	.73010	.68280	.63850	.59320
1.35255	.98447	.97660	.96430	.94950	.93290	.91470	.89530	.87520	.84360	.80980	.77100	.72250	.67420	.62890	.58260
1.39618	.98322	.97510	.96240	.94720	.93020	.91150	.89160	.87100	.83880	.80440	.76480	.71530	.66600	.62070	.57340
1.43981	.98192	.97350	.96040	.94480	.92730	.90810	.88760	.86640	.83360	.79780	.75730	.70680	.65750	.61120	.56290
1.48344	.98057	.97190	.95840	.94230	.92430	.90450	.88340	.86160	.82820	.79180	.75030	.69880	.64850	.60120	.55190
1.52707	.97917	.97020	.95630	.93970	.92130	.90090	.87910	.85660	.82260	.78560	.74310	.69060	.63930	.59100	.54070

θ (MFP)	θ (RAD)	3.50	4.00	5.00	6.00	8.00	10.00	12.00	15.00	20.00	25.00	35.00	50.00	60.00	75.00
.01745	.99982	.99980	.99975	.99970	.99969	.99968	.99967	.99966	.99965	.99964	.99963	.99962	.99961	.99960	.99959
.04383	.99988	.99983	.99978	.99973	.99971	.99969	.99967	.99965	.99963	.99961	.99959	.99957	.99955	.99953	.99951
.08727	.99995	.99989	.99983	.99977	.99972	.99969	.99966	.99963	.99960	.99957	.99954	.99951	.99948	.99944	.99941
.13090	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.17453	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.21817	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.26180	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.30543	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.34907	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.39270	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.43633	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.47996	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.52359	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.56722	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.61085	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.65448	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.69811	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.74174	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.78537	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.82899	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.87262	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.91625	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
.95988	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.00351	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.04714	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.09077	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.13440	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.17803	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.22166	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.26529	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.30892	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.35255	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.39618	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932
1.43981	.99999	.99994	.99988	.99981	.99975	.99970	.99966	.99962	.99958	.99954	.99950	.99946	.99941	.99937	.99932

TABLE 11

The Smoothed Function $\bar{F}_2(\theta_c, b) = F_2(\theta_0, b)e^{b/\theta_0}$

TABLE OF THE SMOOTHED FUNCTION $\text{EXP}(B) \cdot F_2(0, B)/B$																
B (MFP) ° (RAD)	.01	.05	.10	.20	.40	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00		
.01745	1.00005	1.00005	1.00005	1.00004	1.00003	1.00002	1.00001	1.00000	.99999	.99997	.99995	.99995	.99992	.99990		
.04363	1.00031	1.00030	1.00029	1.00025	1.00018	1.00013	1.00006	1.00000	.99992	.99984	.99978	.99968	.99952	.99937		
.08727	1.00120	1.00121	1.00114	1.00102	1.00078	1.00051	1.00025	1.00000	.99958	.99936	.99905	.99873	.99809	.99746		
.13090	1.00284	1.00272	1.00258	1.00229	1.00172	1.00114	1.00057	.99989	.99928	.99858	.99785	.99713	.99571	.99429		
.17453	1.00506	1.00486	1.00460	1.00408	1.00305	1.00203	1.00100	.99998	.99870	.99742	.99615	.99488	.99228	.98984		
.21817	1.00795	1.00762	1.00721	1.00640	1.00478	1.00316	1.00155	.99994	.99794	.99594	.99395	.99197	.98803	.98412		
.26180	1.01150	1.01103	1.01044	1.00925	1.00690	1.00455	1.00221	.99988	.99698	.99410	.99123	.98836	.98272	.97712		
.30547	1.02073	1.01988	1.01878	1.01682	1.01332	1.00905	1.00381	.99861	.99444	.98925	.98414	.97907	.97199	.96300		
.34933	1.03298	1.03150	1.02980	1.02630	1.02130	1.01500	1.00772	.99903	.99078	.98265	.97465	.96676	.95135	.93638		
.39300	1.04856	1.04643	1.04377	1.03948	1.03268	1.02383	1.01783	.99979	.99384	.98584	.97740	.96740	.95235	.93644		
.43667	1.06793	1.06484	1.06100	1.05540	1.04740	1.03660	1.02360	.99981	.99280	.98430	.97430	.96280	.94980	.93530		
.48033	1.09170	1.08736	1.08197	1.07436	1.06366	1.05000	1.03448	.99989	.99188	.98188	.97038	.95738	.94288	.92688		
.52400	1.12069	1.11489	1.10728	1.09727	1.08484	1.06939	1.05138	.99984	.99084	.97984	.96784	.95484	.93984	.92284		
.56767	1.15509	1.14787	1.13875	1.12798	1.11484	1.09883	1.07950	.99979	.99079	.97979	.96779	.95479	.93979	.92279		
.61133	1.20429	1.19587	1.18510	1.17278	1.15802	1.14033	1.11978	.99972	.99072	.97972	.96772	.95472	.93972	.92272		
.65500	1.27173	1.26122	1.24816	1.23262	1.21485	1.19420	1.17000	.99963	.99063	.97963	.96763	.95463	.93963	.92263		
.69867	1.36626	1.35397	1.33932	1.32236	1.29591	1.26800	1.23800	.99954	.99054	.97954	.96754	.95454	.93954	.92254		
.74233	1.49180	1.47683	1.45937	1.43936	1.40800	1.37500	1.34000	.99945	.99045	.97945	.96745	.95445	.93945	.92245		
.78600	1.65180	1.63373	1.61288	1.58936	1.55300	1.51500	1.47500	.99936	.99036	.97936	.96736	.95436	.93936	.92236		
.82967	1.85180	1.82983	1.80437	1.77536	1.73300	1.68000	1.62500	.99927	.99027	.97927	.96727	.95427	.93927	.92227		
.87333	2.09180	2.06583	2.03537	2.00036	1.95000	1.88500	1.81500	.99918	.99018	.97918	.96718	.95418	.93918	.92218		
.91700	2.38180	2.35183	2.31637	2.27136	2.21000	2.13500	2.05500	.99909	.99009	.97909	.96709	.95409	.93909	.92209		
.96067	2.73180	2.69683	2.65637	2.60136	2.53000	2.44500	2.35500	.99900	.99000	.97900	.96700	.95400	.93900	.92200		
1.00433	3.14180	3.09683	3.04137	2.97636	2.89000	2.79000	2.68500	.99891	.99000	.97900	.96700	.95400	.93900	.92200		
1.04800	3.61180	3.55683	3.49137	3.41636	3.32000	3.21000	3.09500	.99882	.99000	.97900	.96700	.95400	.93900	.92200		
1.09167	4.14180	4.07683	4.00137	3.91636	3.81000	3.68500	3.56000	.99873	.99000	.97900	.96700	.95400	.93900	.92200		
1.13533	4.74180	4.66683	4.58137	4.48636	4.37000	4.24000	4.10500	.99864	.99000	.97900	.96700	.95400	.93900	.92200		
1.17900	5.41180	5.32683	5.23137	5.12636	5.00000	4.86000	4.71500	.99855	.99000	.97900	.96700	.95400	.93900	.92200		
1.22267	6.16180	6.06683	5.96137	5.84636	5.71000	5.56000	5.40500	.99846	.99000	.97900	.96700	.95400	.93900	.92200		
1.26633	7.01180	6.90683	6.79137	6.66636	6.52000	6.36000	6.19500	.99837	.99000	.97900	.96700	.95400	.93900	.92200		
1.31000	7.96180	7.84683	7.72137	7.58636	7.43000	7.26000	7.08500	.99828	.99000	.97900	.96700	.95400	.93900	.92200		
1.35367	9.01180	8.88683	8.75137	8.60636	8.44000	8.26000	8.07500	.99819	.99000	.97900	.96700	.95400	.93900	.92200		
1.39733	1.01618	1.00368	9.87137	9.71636	9.54000	9.35000	9.15500	.99810	.99000	.97900	.96700	.95400	.93900	.92200		
1.44100	1.13118	1.11868	1.10513	1.09013	1.07300	1.05400	1.03400	.99801	.99000	.97900	.96700	.95400	.93900	.92200		
1.48467	1.25818	1.24568	1.23113	1.21513	1.19700	1.17700	1.15600	.99792	.99000	.97900	.96700	.95400	.93900	.92200		
1.52833	1.40018	1.38768	1.37213	1.35513	1.33600	1.31600	1.29500	.99783	.99000	.97900	.96700	.95400	.93900	.92200		
1.57200	1.56018	1.54768	1.53013	1.51113	1.49100	1.46900	1.44600	.99774	.99000	.97900	.96700	.95400	.93900	.92200		

TABLE 12

The Function $F_2(\theta_0, b)$

TABLE OF THE FUNCTION $F_2(\theta, B)$																
B (MFP)	.01	.05	.10	.20	.40	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	3.00		
θ (RAD)																
.01745	1726-01	1660-01	1570-01	1429-01	1170-01	9578-02	7842-02	6421-02	5000-02	3894-02	3033-02	2382-02	1433-02	8689-03		
.04363	4321-01	4152-01	3949-01	3573-01	2825-01	2395-01	1981-01	1605-01	1250-01	9734-02	7581-02	5903-02	3580-02	2171-02		
.08727	8651-01	8311-01	7905-01	7152-01	5854-01	4792-01	3822-01	3210-01	2499-01	1948-01	1515-01	1180-01	7150-02	4334-02		
.13090	1300+00	1249+00	1187+00	1074+00	8780-00	7192-00	5885-00	4815-00	3748-00	2817-00	2276-00	1768-00	1070-01	6480-02		
.17453	1737+00	1686+00	1587+00	1435+00	1174+00	9568-00	7850-00	6421-01	4984-01	3884-01	3021-01	2250-01	1422-01	8801-02		
.21817	2177+00	2091+00	1968+00	1788+00	1489+00	1201+00	9818-00	8125-00	6238-00	4848-00	3768-00	2829-00	1769-01	1069-01		
.26180	2622+00	2518+00	2394+00	2163+00	1787+00	1443+00	1179+00	9830-00	7478-00	5807-00	4510-00	3502-00	2112-01	1274-01		
.30547	3052+00	2928+00	2728+00	2405+00	2069+00	1631+00	1574+00	1284+00	9945-01	7705-01	5970-01	4625-01	2777-01	1687-01		
.34933	3482+00	3338+00	3088+00	2681+00	2245+00	1672+00	1604+00	1239+00	9587-01	7390-01	5700-01	4307-01	2634-01	1634-01		
.39300	3938+00	3768+00	3485+00	3038+00	2525+00	2071+00	1622+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.43667	4400+00	4208+00	3895+00	3311+00	2740+00	2220+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.48033	4868+00	4658+00	4311+00	3688+00	3078+00	2510+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.52400	5340+00	5112+00	4738+00	4078+00	3420+00	2800+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.56767	5816+00	5568+00	5158+00	4458+00	3750+00	3070+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.61133	6292+00	6024+00	5588+00	4848+00	4090+00	3350+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.65500	6768+00	6480+00	6024+00	5244+00	4430+00	3640+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.69867	7244+00	6936+00	6458+00	5636+00	4780+00	3930+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.74233	7720+00	7392+00	6892+00	6036+00	5140+00	4250+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.78600	8196+00	7848+00	7328+00	6440+00	5500+00	4570+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.82967	8672+00	8304+00	7768+00	6840+00	5860+00	4890+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.87333	9148+00	8760+00	8208+00	7240+00	6220+00	5210+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.91700	9624+00	9216+00	8648+00	7640+00	6580+00	5530+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
.96067	1.01000	9.672+00	9.092+00	8.040+00	6.940+00	5.850+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
1.00433	1.05960	1.01520	9.568+00	8.480+00	7.340+00	6.210+00	1633+00	1249+00	9678+00	7430+00	5700-00	4307-00	2634-01	1634-01		
1.04720																
1.22172	1708+01	1604+01	1484+01	1272+01	9428+00	7050+00	5333+00	4060+00	2918+00	2113+00	1543+00	1134+00	8228-01	3472-01		
1.39626	2380+01	2173+01	1947+01	1586+01	1082+01	770+00	5835+00	4205+00	2975+00	2138+00	1554+00	1139+00	8235-01	3474-01		
1.57896	4898+01	3113+01	2427+01	1753+01	1118+01	777+00	5683+00	4210+00	2976+00	2138+00	1554+00	1139+00	8235-01	3474-01		
B (MFP)	3.50	4.00	5.00	6.00	8.00	8.00	10.00	12.00	15.00	20.00	25.00	35.00	50.00	60.00	75.00	
θ (RAD)																
.01745	5270-03	3195-03	1178-03	4325-04	5853-05	7820-05	1072-06	1335-06	3594-06	2421-12	1098-16	3358-23	1524-27	4658-34	9442-39	
.04363	1317-02	7984-03	2939-03	1053-04	1466-04	1978-05	2672-06	3329-07	8946-08	6061-14	2721-20	822-22	3750-27	1142-33	3750-39	
.08727	2827-02	1592-02	5550-03	2189-03	255-04	417-05	517-06	617-07	1750-08	76-11	5523-13	1584-22	7105-27	2135-33	3370-39	
.13090	6337-02	3373-02	1199-03	4305-04	5793-05	7798-06	10449-07	13849-08	25558-09	1700-11	7515-16	2211-22	9786-27	2885-33	3370-39	
.17453	5204-02	3148-02	1152-02	4218-03	5652-04	7573-05	10165-05	1980-07	3276-09	2157-11	9357-16	2883-22	1170-26	3370-33	3370-39	
.21817	6458-02	3801-02	1424-02	5198-03	8927-04	9233-05	1231-05	1594-07	3886-09	2535-11	1077-15	3007-22	1291-26	3854-33	3370-39	
.26180	7681-02	4632-02	1885-02	6131-03	8117-04	1079-04	1425-06	1876-07	4409-09	2834-11	1178-16	3208-22	1558-26	3788-33	3370-39	
.30547	1001-01	6011-02	2188-02	7824-03	1020-03	1391-04	1739-05	2230-07	5127-09	3215-11	1284-16	3408-22	1413-26	3788-33	3370-39	
.34933	1215-01	7255-02	2589-02	9281-03	1218-03	1333-03	1844-04	2087-05	5528-07	5870-09	3464-11	1330-16	3410-22	1414-26	3870-33	
.39300	1439-01	8244-02	2891-02	1051-03	1333-03	1844-04	2087-05	5528-07	5870-09	3464-11	1330-16	3410-22	1414-26	3870-33	3870-39	
.43667	1568-01	9238-02	3215-02	1123-02	1382-03	1718-04	2157-05	5726-07	5725-09	3481-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.48033	1701-01	9948-02	3417-02	1180-02	1420-03	1756-04	2187-05	5797-07	5739-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.52400	1804-01	1047-01	3552-02	1215-02	1451-03	1772-04	2198-05	5816-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.56767	1877-01	1082-01	3632-02	1233-02	1461-03	1777-04	2200-05	5819-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.61133	1947-01	1112-01	3686-02	1243-02	1465-03	1778-04	2201-05	5820-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.65500	1980-01	1116-01	3691-02	1244-02	1465-03	1778-04	2201-05	5820-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
.70000	1980-01	1116-01	3691-02	1244-02	1465-03	1778-04	2201-05	5820-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	
1.52780	1860-01	1116-01	3691-02	1244-02	1465-03	1778-04	2201-05	5820-07	5741-09	3464-11	1331-15	3410-22	1414-26	3870-33	3870-39	

TABLE 13

The Smoothed Function $\bar{R}(\phi_0, \ell_2/a, b) = R(\phi_0, \ell_2/a, b)e^b/\phi_0$

TABLE OF THE SMOOTHED FUNCTION $\text{EXP}(B) \cdot R(\phi_0, \ell_2/a, b)/\phi_0$

L2/A	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
ϕ (RAD)														
.01745	5000-02	4998-01	1244+00	2450+00	3587+00	4635+00	8948+00	1188+01	1303+01	1364+01	1458+01	1488+01	1500+01	1508+01
.04383	5003-02	4998-01	1244+00	2451+00	3588+00	4637+00	8950+00	1188+01	1304+01	1365+01	1457+01	1488+01	1500+01	1508+01
.08727	5013-02	5008-01	1247+00	2456+00	3598+00	4646+00	8963+00	1188+01	1305+01	1366+01	1458+01	1488+01	1502+01	1510+01
.13090	5029-02	5024-01	1251+00	2463+00	3607+00	4659+00	8985+00	1190+01	1307+01	1368+01	1460+01	1490+01	1504+01	1512+01
.17453	5051-02	5047-01	1256+00	2474+00	3622+00	4679+00	9018+00	1193+01	1311+01	1372+01	1464+01	1493+01	1508+01	1516+01
.26180	5117-02	5112-01	1272+00	2506+00	3687+00	4735+00	9105+00	1203+01	1321+01	1382+01	1474+01	1503+01	1517+01	1525+01
.34907	5212-02	5208-01	1298+00	2551+00	3732+00	4817+00	9234+00	1217+01	1335+01	1396+01	1488+01	1517+01	1531+01	1539+01
.43633	5342-02	5337-01	1328+00	2613+00	3820+00	4927+00	9405+00	1236+01	1354+01	1415+01	1507+01	1536+01	1550+01	1558+01
.52360	5519-02	5515-01	1370+00	2684+00	3935+00	5069+00	9624+00	1260+01	1378+01	1439+01	1530+01	1560+01	1574+01	1581+01
.61087	5727-02	5721-01	1423+00	2797+00	4081+00	5251+00	9899+00	1289+01	1408+01	1469+01	1560+01	1589+01	1603+01	1611+01
.78540	6357-02	6350-01	1578+00	3094+00	4489+00	5766+00	1066+01	1370+01	1489+01	1550+01	1640+01	1669+01	1682+01	1690+01
.87288	6814-02	6808-01	1691+00	3308+00	4797+00	6129+00	1117+01	1424+01	1543+01	1604+01	1694+01	1722+01	1736+01	1743+01
1.04720	8238-02	8225-01	2039+00	3860+00	5689+00	7198+00	1261+01	1574+01	1692+01	1752+01	1841+01	1869+01	1881+01	1888+01
1.57080	2598+00	1235+01	1851+01	2374+01	2688+01	2909+01	3514+01	3801+01	3903+01	3953+01	4024+01	4045+01	4054+01	4059+01

L2/A	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
ϕ (RAD)														
.01745	5000-02	4998-01	1244+00	2449+00	3584+00	4628+00	8888+00	1188+01	1275+01	1329+01	1401+01	1420+01	1427+01	1431+01
.04383	5003-02	4998-01	1244+00	2450+00	3585+00	4630+00	8890+00	1188+01	1276+01	1329+01	1401+01	1420+01	1428+01	1431+01
.08727	5012-02	5008-01	1246+00	2453+00	3586+00	4632+00	8892+00	1188+01	1277+01	1330+01	1403+01	1422+01	1430+01	1432+01
.13090	5029-02	5024-01	1250+00	2462+00	3603+00	4652+00	8923+00	1172+01	1279+01	1332+01	1405+01	1424+01	1431+01	1435+01
.17453	5050-02	5046-01	1258+00	2473+00	3618+00	4671+00	8952+00	1175+01	1282+01	1336+01	1408+01	1427+01	1434+01	1437+01
.26180	5114-02	5110-01	1272+00	2503+00	3682+00	4728+00	9038+00	1184+01	1291+01	1344+01	1416+01	1435+01	1442+01	1446+01
.34907	5208-02	5203-01	1295+00	2548+00	3726+00	4805+00	9160+00	1197+01	1304+01	1357+01	1429+01	1447+01	1454+01	1458+01
.43633	5334-02	5329-01	1326+00	2608+00	3811+00	4912+00	9324+00	1215+01	1321+01	1374+01	1445+01	1463+01	1470+01	1473+01
.52360	5499-02	5493-01	1367+00	2687+00	3922+00	5055+00	9532+00	1230+01	1337+01	1390+01	1460+01	1478+01	1485+01	1488+01
.61087	5627-02	5623-01	1385+00	2684+00	3925+00	5058+00	9535+00	1230+01	1337+01	1390+01	1460+01	1478+01	1485+01	1488+01
.78540	6319-02	6312-01	1569+00	3074+00	4487+00	5719+00	1050+01	1338+01	1441+01	1492+01	1559+01	1575+01	1581+01	1584+01
.87288	6780-02	6751-01	1677+00	3279+00	4751+00	6085+00	1097+01	1385+01	1489+01	1538+01	1603+01	1619+01	1625+01	1627+01
1.04720	8115-02	8101-01	2007+00	3897+00	5593+00	7087+00	1227+01	1513+01	1614+01	1661+01	1722+01	1738+01	1741+01	1743+01
1.57080	6551-01	4881+00	8829+00	1269+01	1518+01	1696+01	2197+01	2427+01	2502+01	2536+01	2578+01	2588+01	2591+01	2593+01

L2/A	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
ϕ (RAD)														
.01745	5000-02	4998-01	1243+00	2448+00	3580+00	4619+00	8812+00	1147+01	1243+01	1288+01	1342+01	1353+01	1358+01	1357+01
.04383	5003-02	4998-01	1244+00	2449+00	3582+00	4622+00	8815+00	1147+01	1243+01	1288+01	1342+01	1353+01	1358+01	1357+01
.08727	5012-02	5008-01	1246+00	2453+00	3586+00	4626+00	8827+00	1148+01	1244+01	1289+01	1343+01	1354+01	1357+01	1358+01
.13090	5029-02	5024-01	1250+00	2460+00	3595+00	4642+00	8847+00	1150+01	1246+01	1291+01	1345+01	1356+01	1359+01	1360+01
.17453	5049-02	5044-01	1255+00	2471+00	3613+00	4660+00	8875+00	1153+01	1248+01	1294+01	1347+01	1358+01	1361+01	1363+01
.26180	5111-02	5107-01	1271+00	2501+00	3656+00	4714+00	8955+00	1161+01	1257+01	1302+01	1355+01	1365+01	1368+01	1370+01
.34907	5202-02	5197-01	1293+00	2544+00	3717+00	4790+00	9071+00	1173+01	1268+01	1313+01	1365+01	1376+01	1379+01	1380+01
.43633	5325-02	5320-01	1323+00	2602+00	3800+00	4893+00	9224+00	1189+01	1284+01	1327+01	1378+01	1389+01	1392+01	1393+01
.52360	5484-02	5479-01	1363+00	2678+00	3907+00	5026+00	9418+00	1208+01	1302+01	1346+01	1399+01	1408+01	1409+01	1410+01
.61087	5658-02	5652-01	1413+00	2774+00	4045+00	5193+00	9658+00	1233+01	1326+01	1369+01	1417+01	1427+01	1428+01	1429+01
.78540	6273-02	6265-01	1557+00	3049+00	4427+00	5662+00	1031+01	1297+01	1387+01	1427+01	1473+01	1482+01	1484+01	1485+01
.87288	6893-02	6884-01	1680+00	3244+00	4696+00	5988+00	1074+01	1338+01	1426+01	1466+01	1508+01	1517+01	1519+01	1520+01
1.04720	7985-02	7951-01	1970+00	3821+00	5478+00	6908+00	1187+01	1445+01	1528+01	1564+01	1602+01	1609+01	1611+01	1611+01
1.57080	3454-01	2989+00	5902+00	9040+00	1115+01	1270+01	1708+01	1899+01	1957+01	1982+01	2008+01	2013+01	2014+01	2014+01

TABLE OF THE SMOOTHED FUNCTION $\text{EXP}(B) \cdot R(\phi_0, \ell_2/a, b)/\phi_0$

L2/A	=	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	=	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20	.20
ϕ (RAD)															
.01745	5000-02	4998-01	1243+00	2445+00	3572+00	4602+00	8868+00	1108+01	1184+01	1215+01	1246+01	1250+01	1250+01	1250+01	1250+01
.04383	5003-02	4998-01	1244+00	2446+00	3574+00	4604+00	8871+00	1107+01	1184+01	1216+01	1246+01	1250+01	1250+01	1251+01	1251+01
.08727	5011-02	5007-01	1246+00	2450+00	3580+00	4611+00	8881+00	1108+01	1185+01	1217+01	1247+01	1251+01	1251+01	1251+01	1251+01
.13090	5020-02	5021-01	1249+00	2457+00	3588+00	4623+00	8899+00	1109+01	1188+01	1218+01	1248+01	1252+01	1252+01	1253+01	1253+01
.17453	5048-02	5042-01	1254+00	2467+00	3603+00	4640+00	8923+00	1112+01	1188+01	1220+01	1250+01	1254+01	1254+01	1254+01	1254+01
.26180	5105-02	5101-01	1269+00	2495+00	3643+00	4690+00	8978+00	1118+01	1195+01	1226+01	1256+01	1259+01	1260+01	1260+01	1260+01
.34907	5191-02	5186-01	1290+00	2554+00	3726+00	4781+00	9095+00	1129+01	1204+01	1234+01	1261+01	1265+01	1267+01	1267+01	1267+01
.43633	5308-02	5301-01	1318+00	2590+00	3777+00	4856+00	9208+00	1140+01	1215+01	1245+01	1273+01	1278+01	1277+01	1277+01	1277+01
.52360	5458-02	5450-01	1355+00	2681+00	3877+00	4978+00	9197+00	1156+01	1229+01	1259+01	1286+01	1289+01	1289+01	1289+01	1289+01
.61087	5645-02	5639-01	1402+00	2750+00	4001+00	5130+00	9403+00	1175+01	1247+01	1275+01	1301+01	1304+01	1304+01	1304+01	1304+01
.78540	6183-02	6175-01	1534+00	3001+00	4349+00	5551+00	9942+00	1223+01	1291+01	1317+01	1340+01	1342+01	1342+01	1342+01	1342+01
.87288	6582-02	6553-01	1627+00	3175+00	4588+00	5835+00	1029+01	1253+01	1318+01	1343+01	1364+01	1368+01	1368+01	1368+01	1368+01
1.04720	7878-02	7885-01	1898+00	3675+00	5255+00	6809+00	1114+01	1325+01	1383+01	1405+01	1423+01	1424+01	1425+01	1425+01	1425+01
1.57080	1855-01	1738+00	3771+00	6177+00	7882+00	9158+00	1277+01	1426+01	1465+01	1480+01	1492+01	1493+01	1493+01	1493+01	1493+01

L2/A	=	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	=	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
ϕ (RAD)															
.01745	5000-02	4995-01	1242+00	2440+00	3556+00	4588+00	8393+00	1035+01	1085+01	1101+01	1111+01	1112+01	1112+01	1112+01	1112+01
.04383	5002-02	4998-01	1243+00	2441+00	3558+00	4589+00	8398+00	1035+01	1085+01	1101+01	1111+01	1112+01	1112+01	1112+01	1112+01
.08727	5010-02	5005-01	1245+00	2445+00	3563+00	4575+00	8404+00	1036+01	1086+01	1102+01	1112+01	1112+01	1112+01	1112+01	1112+01
.13090	5023-02	5018-01	1248+00	2451+00	3567+00	4586+00	8407+00	1037+01	1087+01	1103+01	1113+01	1113+01	1113+01	1113+01	1113+01
.17453	5041-02	5036-01	1252+00	2453+00	3569+00	4590+00	8435+00	1038+01	1088+01	1104+01	1114+01	1114+01	1114+01	1114+01	1114+01
.26180	5093-02	5088-01	1265+00	2484+00	3618+00	4643+00	8489+00	1043+01	1091+01	1107+01	1116+01	1117+01	1117+01	1117+01	1117+01
.34907	5169-02	5163-01	1284+00	2519+00	3667+00	4703+00	8584+00	1048+01	1096+01	1111+01	1120+01	1121+01	1121+01	1121+01	1121+01
.43633	5269-02	5264-01	1309+00	2567+00	3733+00	4783+00	8681+00	1056+01	1102+01	1117+01	1125+01	1126+01	1126+01	1126+01	1126+01
.52360	5398-02	5392-01	1340+00	2627+00	3817+00	4883+00	8781+00	1065+01	1110+01	1124+01	1132+01	1132+01	1132+01	1132+01	1132+01
.61087	5569-02	5554-01	1360+00	2702+00	3921+00	5008+00	8924+00	1075+01	1118+01	1131+01	1139+01	1139+01	1139+01	1139+01	1139+01
.78540	6048-02	6040-01	1468+00	2908+00	4210+00	5338+00	9277+00	1130+01	1148+01	1156+01	1158+01	1158+01	1158+01	1158+01	1158+01
.87288	6313-02	6303-01	1584+00	3045+00	4383+00	5550+00	9476+00	1113+01	1149+01	1159+01	1165+01	1165+01	1165+01	1165+01	1165+01
1.04720	7156-02	7142-01	1678+00	3411+00	4855+00	6074+00	9960+00	1138+01	1169+01	1177+01	1182+01	1182+01	1182+01	1182+01	1182+01
1.57080	1037-01	1012+00	2543+00	4083+00	5387+00	6385+00	8178+00	1018+01	1039+01	1045+01	1048+01	1048+01	1048+01	1048+01	1048+01

L2/A	=	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	=	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60
ϕ (RAD)															
.01745	5000-02	4995-01	1242+00	2435+00	3541+00	4534+00	8138+00	8741+00	1007+01	1015+01	1018+01	1018+01	1018+01	1018+01	1018+01
.04383	5002-02	4997-01	1242+00	2438+00	3542+00	4535+00	8138+00	8742+00	1007+01	1015+01	1018+01	1018+01	1018+01	1018+01	1018+01
.08727	5009-02	5003-01	1244+00	2439+00	3546+00	4540+00	8143+00	8745+00	1007+01	1015+01	1019+01	1019+01	1019+01	1019+01	1019+01
.13090	5028-02	5015-01	1247+00	2444+00	3554+00	4549+00	8153+00	8750+00	1007+01	1015+01	1019+01	1019+01	1019+01	1019+01	1019+01
.17453	5036-02	5031-01	1250+00	2452+00	3564+00	4561+00	8166+00	8758+00	1008+01	1016+01	1019+01	1019+01	1019+01	1019+01	1019+01
.26180	5081-02	5076-01	1262+00	2473+00	3593+00	4598+00	8234+00	8779+00	1009+01	1017+01	1020+01	1020+01	1020+01	1020+01	1020+01
.34907	5146-02	5141-01	1278+00	2503+00	3635+00	4646+00	8253+00	8807+00	1011+01	1018+01	1022+01	1022+01	1022+01	1022+01	1022+01
.43633	5233-02	5227-01	1299+00	2543+00	3689+00	4711+00	8319+00	8842+00	1013+01	1020+01	1023+01	1023+01	1023+01	1023+01	1023+01
.52360	5343-02	5338-01	1326+00	2594+00	3758+00	4792+00	8397+00	8881+00	1016+01	1022+01	1025+01	1025+01	1025+01	1025+01	1025+01
.61087	5478-02	5471-01	1359+00	2656+00	3842+00	4890+00	8485+00	8921+00	1018+01	1024+01	1028+01	1028+01	1028+01	1028+01	1028+01
.78540	5642-02	5634-01	1447+00	2819+00	4059+00	5138+00	8678+00	8981+00	1022+01	1027+01	1028+01	1028+01	1028+01	1028+01	1028+01
.87288	6061-02	6076-01	1523+00	2923+00	4194+00	5267+00	8716+00	9021+00	1024+01	1028+01	1030+01	1030+01	1030+01	1030+01	1030+01
1.04720	6693-02	6679-01	1651+00	3178+00	4505+00	5610+00	8893+00	8972+00	1015+01	1018+01	1020+01	1020+01	1020+01	1020+01	1020+01
1.57080	7555-02	7452-01	1778+00	3178+00	4262+00	5102+00	7405+00	8129+00	8244+00	8270+00	8279+00	8279+00	8279+00	8279+00	8279+00

TABLE 13 (Cont'd)

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot R(\beta, L2/A, B)/\beta$															
$L2/A$	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00	
B (MFP)	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	
β (RAD)															
.01745	5000-02 4994-01	1241+00	2430+00	3525+00	4500+00	7895+00	9215+00	9427+00	9489+00	9482+00	9482+00	9482+00	9482+00	9482+00	
.04383	5002-02 4998-01	1241+00	2431+00	3526+00	4501+00	7896+00	9216+00	9427+00	9489+00	9482+00	9482+00	9482+00	9482+00	9482+00	
.08727	5008-02 5000-01	1243+00	2434+00	3530+00	4505+00	7899+00	9218+00	9427+00	9489+00	9481+00	9481+00	9481+00	9481+00	9481+00	
.13090	5017-02 5011-01	1245+00	2438+00	3536+00	4512+00	7905+00	9217+00	9427+00	9488+00	9480+00	9480+00	9480+00	9480+00	9480+00	
.17453	5031-02 5025-01	1248+00	2444+00	3544+00	4522+00	7913+00	9219+00	9426+00	9487+00	9479+00	9479+00	9479+00	9479+00	9479+00	
.21810	5069-02 5063-01	1258+00	2482+00	3598+00	4550+00	7935+00	9223+00	9424+00	9483+00	9474+00	9474+00	9474+00	9474+00	9474+00	
.26180	5124-02 5118-01	1271+00	2487+00	3602+00	4559+00	7955+00	9226+00	9419+00	9458+00	9467+00	9467+00	9467+00	9467+00	9467+00	
.34907	5197-02 5190-01	1289+00	2520+00	3647+00	4614+00	8001+00	9228+00	9411+00	9445+00	9455+00	9455+00	9455+00	9455+00	9455+00	
.43633	5288-02 5281-01	1311+00	2561+00	3701+00	4703+00	8041+00	9228+00	9397+00	9428+00	9437+00	9437+00	9437+00	9437+00	9437+00	
.52360	5398-02 5391-01	1338+00	2611+00	3786+00	4776+00	8082+00	9218+00	9375+00	9403+00	9411+00	9411+00	9411+00	9411+00	9411+00	
.61087	5685-02 5678-01	1407+00	2738+00	3928+00	4950+00	8145+00	9158+00	9290+00	9313+00	9318+00	9318+00	9318+00	9318+00	9318+00	
.78540	5882-02 5882-01	1450+00	2810+00	4018+00	5044+00	8152+00	9085+00	9217+00	9238+00	9243+00	9243+00	9243+00	9243+00	9243+00	
.87268	6262-02 6268-01	1548+00	2973+00	4199+00	5297+00	8069+00	8887+00	8969+00	8987+00	8991+00	8991+00	8991+00	8991+00	8991+00	
1.04720	8104-02 8047-01	1454+00	2654+00	3597+00	4330+00	8290+00	8836+00	8898+00	8909+00	8912+00	8912+00	8912+00	8912+00	8912+00	
1.57080															

$L2/A$	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
β (RAD)														
.01745	5000-02 4994-01	1240+00	2425+00	3510+00	4487+00	7888+00	9158+00	8887+00	8919+00	8924+00	8924+00	8924+00	8924+00	8924+00
.04383	5002-02 4995-01	1241+00	2426+00	3511+00	4488+00	7889+00	9159+00	8887+00	8919+00	8924+00	8924+00	8924+00	8924+00	8924+00
.08727	5008-02 5000-01	1242+00	2428+00	3514+00	4471+00	7870+00	9158+00	8884+00	8918+00	8921+00	8921+00	8921+00	8921+00	8921+00
.13090	5014-02 5008-01	1244+00	2432+00	3518+00	4476+00	7873+00	9159+00	8889+00	8912+00	8916+00	8916+00	8916+00	8916+00	8916+00
.17453	5025-02 5019-01	1247+00	2437+00	3525+00	4484+00	7878+00	9159+00	8885+00	8906+00	8911+00	8911+00	8911+00	8911+00	8911+00
.21810	5057-02 5051-01	1254+00	2451+00	3544+00	4505+00	7885+00	9140+00	8870+00	8889+00	8894+00	8894+00	8894+00	8894+00	8894+00
.26180	5103-02 5098-01	1265+00	2471+00	3570+00	4538+00	7895+00	9122+00	8848+00	8865+00	8868+00	8868+00	8868+00	8868+00	8868+00
.34907	5181-02 5154-01	1280+00	2497+00	3604+00	4572+00	7905+00	9097+00	8813+00	8830+00	8834+00	8834+00	8834+00	8834+00	8834+00
.43633	5234-02 5227-01	1297+00	2528+00	3645+00	4618+00	7911+00	9061+00	8789+00	8784+00	8787+00	8787+00	8787+00	8787+00	8787+00
.52360	5320-02 5313-01	1318+00	2587+00	3693+00	4666+00	7911+00	8811+00	8710+00	8723+00	8726+00	8726+00	8726+00	8726+00	8726+00
.61087	5421-02 5411-01	1338+00	2658+00	3760+00	4733+00	7865+00	8452+00	8533+00	8544+00	8546+00	8546+00	8546+00	8546+00	8546+00
.78540	5534-02 5525-01	1369+00	2658+00	3800+00	4773+00	7665+00	8452+00	8533+00	8544+00	8546+00	8546+00	8546+00	8546+00	8546+00
.87268	5658-02 5648-01	1398+00	2705+00	3854+00	4819+00	7605+00	8332+00	8406+00	8415+00	8417+00	8417+00	8417+00	8417+00	8417+00
1.04720	5918-02 5901-01	1458+00	2791+00	3929+00	4854+00	7380+00	7978+00	8037+00	8045+00	8047+00	8047+00	8047+00	8047+00	8047+00
1.57080	8208-02 8170-01	1252+00	2309+00	3149+00	3803+00	5505+00	5918+00	5957+00	5962+00	5963+00	5963+00	5963+00	5963+00	5963+00

$L2/A$	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
B (MFP)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
β (RAD)														
.01745	5000-02 4993-01	1240+00	2419+00	3491+00	4426+00	7404+00	8266+00	8348+00	8357+00	8359+00	8359+00	8359+00	8359+00	8359+00
.04383	5001-02 4994-01	1240+00	2420+00	3491+00	4427+00	7404+00	8265+00	8347+00	8358+00	8358+00	8358+00	8358+00	8358+00	8358+00
.08727	5005-02 4998-01	1241+00	2421+00	3493+00	4429+00	7403+00	8261+00	8342+00	8352+00	8353+00	8353+00	8353+00	8353+00	8353+00
.13090	5011-02 5004-01	1242+00	2424+00	3497+00	4432+00	7402+00	8255+00	8335+00	8346+00	8346+00	8346+00	8346+00	8346+00	8346+00
.17453	5018-02 5012-01	1244+00	2427+00	3501+00	4437+00	7399+00	8248+00	8325+00	8334+00	8335+00	8335+00	8335+00	8335+00	8335+00
.21810	5043-02 5036-01	1250+00	2437+00	3514+00	4450+00	7393+00	8219+00	8295+00	8304+00	8305+00	8305+00	8305+00	8305+00	8305+00
.26180	5078-02 5068-01	1258+00	2452+00	3531+00	4487+00	7381+00	8180+00	8252+00	8260+00	8261+00	8261+00	8261+00	8261+00	8261+00
.34907	5118-02 5110-01	1268+00	2489+00	3553+00	4488+00	7381+00	8127+00	8193+00	8200+00	8201+00	8201+00	8201+00	8201+00	8201+00
.43633	5188-02 5180-01	1280+00	2490+00	3577+00	4511+00	7332+00	8057+00	8118+00	8124+00	8125+00	8125+00	8125+00	8125+00	8125+00
.52360	5268-02 5218-01	1294+00	2513+00	3604+00	4534+00	7287+00	7987+00	8022+00	8026+00	8028+00	8028+00	8028+00	8028+00	8028+00
.61087	5356-02 5347-01	1324+00	2562+00	3652+00	4585+00	7300+00	7713+00	7757+00	7761+00	7762+00	7762+00	7762+00	7762+00	7762+00
.78540	5421-02 5411-01	1338+00	2582+00	3688+00	4582+00	7005+00	7539+00	7579+00	7583+00	7584+00	7584+00	7584+00	7584+00	7584+00
.87268	5512-02 5487-01	1358+00	2591+00	3635+00	4471+00	6828+00	7077+00	7110+00	7114+00	7114+00	7114+00	7114+00	7114+00	7114+00
1.04720	5918-02 5901-01	1458+00	2791+00	3929+00	4854+00	7380+00	7978+00	8037+00	8045+00	8047+00	8047+00	8047+00	8047+00	8047+00
1.57080	8467-02 8442-01	1681+00	2010+00	2755+00	3334+00	4786+00	5086+00	5108+00	5110+00	5110+00	5110+00	5110+00	5110+00	5110+00

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot R(\beta, L2/A, B)/\beta$															
$L2/A$	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00	
B (MFP)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
β (RAD)															
.01745	5000-02 4993-01	1239+00	2413+00	3472+00	4388+00	7159+00	7843+00	7892+00	7897+00	7897+00	7897+00	7897+00	7897+00	7897+00	
.04383	5000-02 4994-01	1239+00	2413+00	3472+00	4387+00	7158+00	7842+00	7891+00	7895+00	7895+00	7895+00	7895+00	7895+00	7895+00	
.08727	5003-02 4998-01	1239+00	2413+00	3472+00	4387+00	7155+00	7836+00	7885+00	7889+00	7889+00	7889+00	7889+00	7889+00	7889+00	
.13090	5007-02 5000-01	1240+00	2416+00	3475+00	4389+00	7140+00	7826+00	7874+00	7878+00	7878+00	7878+00	7878+00	7878+00	7878+00	
.17453	5013-02 5005-01	1242+00	2418+00	3477+00	4391+00	7143+00	7813+00	7860+00	7864+00	7864+00	7864+00	7864+00	7864+00	7864+00	
.21810	5028-02 5020-01	1245+00	2424+00	3484+00	4396+00	7123+00	7773+00	7818+00	7822+00	7822+00	7822+00	7822+00	7822+00	7822+00	
.26180	5049-02 5041-01	1250+00	2432+00	3492+00	4402+00	7091+00	7716+00	7758+00	7761+00	7762+00	7762+00	7762+00	7762+00	7762+00	
.34907	5074-02 5067-01	1256+00	2442+00	3502+00	4407+00	7048+00	7640+00	7678+00	7681+00	7681+00	7681+00	7681+00	7681+00	7681+00	
.43633	5104-02 5095-01	1263+00	2452+00	3511+00	4416+00	6984+00	7542+00	7577+00	7579+00	7579+00	7579+00	7579+00	7579+00	7579+00	
.52360	5135-02 5098-01	1263+00	2452+00	3518+00	4408+00	6902+00	7420+00	7451+00	7453+00	7454+00	7454+00	7454+00	7454+00	7454+00	
.61087	5189-02 5179-01	1281+00	2474+00	3513+00	4373+00	6857+00	7093+00	7117+00	7119+00	7119+00	7119+00	7119+00	7119+00	7119+00	
.78540	5189-02 5179-01	1281+00	2474+00	3513+00	4373+00	6857+00	7093+00	7117+00	7119+00	7119+00	7119+00	7119+00	7119+00	7119+00	
.87268	5203-02 5191-01	1283+00	2470+00	3493+00	4327+00	6840+00	6881+00	6946+00	6946+00	6946+00	6946+00	6946+00	6946+00	6946+00	
1.04720	5159-02 5145-01	1268+00	2418+00	3381+00	4143+00	6020+00	6393+00	6372+00	6373+00	6373+00	6373+00	6373+00	6373+00	6373+00	
1.57080	3957-02 3937-01	1933-01	1796+00	2468+00	2989+00	4247+00	4466+00	4482+00	4482+00	4483+00	4483+00	4483+00	4483+00	4483+00	
$L2/A$	.01	.10	.25	.50	.75	1.00	2.51	5.00	7.50	10.00	20.00	30.00	40.00	50.00	
B (MFP)	1.75	1.75	1.75	1.75	1.75	1.75	1.73	1.75	1.75	1.75	1.75	1.75	1.75	1.75	
β (RAD)															
.01745	5000-02 4992-01	1238+00	2407+00	3453+00	4347+00	6932+00	7477+00	7507+00	7509+00	7509+00	7509+00	7509+00	7509+00	7509+00	
.04383	5000-02 4993-01	1238+00	2407+00	3453+00	4347+00	6936+00	7475+00	7515+00	7507+00	7507+00	7507+00	7507+00	7507+00	7507+00	
.08727	5001-02 4994-01	1238+00	2407+00	3454+00	4347+00	6925+00	7488+00	7497+00	7499+00	7499+00	7499+00	7499+00	7499+00	7499+00	
.13090	5003-02 4998-01	1239+00	2408+00	3454+00	4348+00	6917+00	7455+00	7484+00	7488+00	7488+00	7488+00	7488+00	7488+00	7488+00	
.17453	5006-02 4998-01	1239+00	2408+00	3454+00	4345+00	6908+00	7438+00	7468+00	7468+00	7468+00	7468+00	7468+00	7468+00	7468+00	
.21810	5013-02 5005-01	1240+00	2413+00	3454+00	4337+00	6887+00	7387+00	7440+00	7415+00	7415+00	7415+00	7415+00	7415+00	7415+00	
.26180	5028-02 5020-01	1243+00	2413+00	3454+00	4337+00	6887+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	
.34907	5022-02 5014-01	1243+00	2413+00	3454+00	4337+00	6887+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	7339+00	
.43633	5032-02 5024-01	1245+00	2418+00	3452+00	4328+00	6755+00	7218+00	7240+00	7242+00	7242+00	7242+00	7242+00	7242+00	7242+00	
.52360	5041-02 5032-01	1246+00	2415+00	3447+00	4312+00	6668+00	7097+00	7117+00	7118+00	7118+00	7118+00	7118+00	7118+00	7118+00	
.61087	5046-02 5037-01	1247+00	2412+00	3436+00	4287+00	6552+00	6949+00	6967+00	6968+00	6968+00	6968+00	6968+00	6968+00	6968+00	
.78540	5031-02 5021-01	1241+00	2391+00	3383+00	4193+00	6235+00	6585+00	6579+00	6580+00	6580+00	6580+00	6580+00	6580+00	6580+00	
.87268	5006-02 4998-01	1239+00	2408+00	3454+00	4345+00	6908+00	7438+00	7468+00	7468+00	7468+00	7468+00	7468+00	7468+00	7468+00	
1.04720	4850-02 4836-01	1191+00	2267+00	3180+00	3860+00	5827+00	6328+00	6339+00	6340+00	6340+00	6340+00	6340+00	6340+00	6340+00	
1.57080	3588-02 3565-01	8719-01	1834+00	2249+00	2722+00	3824+00	3993+00	3998+00	3998+00	3998+00	3998+00	3998+00	3998+00	3998+00	

TABLE 13 (Cont'd)

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot R(\beta, L/2A, B)/\beta$																												
$L/2A$	= .01		.10		.25		.50		.75		1.00		2.50		5.00		7.50		10.00		20.00		30.00		40.00		50.00	
B (MFP)	= 2.50		3.50		4.50		5.50		6.50		7.50		8.50		9.50		10.50		11.50		12.50		13.50		14.50		15.50	
β (RAD)																												
.01745	5000-02	4001-01	1238+00	2388+00	3388+00	4233+00	5338+00	6023+00	6829+00	7629+00	8429+00	9229+00	10029+00	10829+00	11629+00	12429+00	13229+00	14029+00	14829+00	15629+00	16429+00	17229+00	18029+00	18829+00	19629+00	20429+00	21229+00	22029+00
.04303	4000-02	4000-01	1235+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.08727	4000-02	4000-01	1235+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.13086	4000-02	4000-01	1234+00	2384+00	3384+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.17453	4000-02	4000-01	1232+00	2381+00	3381+00	4231+00	5336+00	6021+00	6827+00	7627+00	8427+00	9227+00	10027+00	10827+00	11627+00	12427+00	13227+00	14027+00	14827+00	15627+00	16427+00	17227+00	18027+00	18827+00	19627+00	20427+00	21227+00	22027+00
.20180	4000-02	4000-01	1229+00	2378+00	3378+00	4229+00	5335+00	6020+00	6826+00	7626+00	8426+00	9226+00	10026+00	10826+00	11626+00	12426+00	13226+00	14026+00	14826+00	15626+00	16426+00	17226+00	18026+00	18826+00	19626+00	20426+00	21226+00	22026+00
.24907	4000-02	4000-01	1221+00	2387+00	3387+00	4230+00	5334+00	6019+00	6825+00	7625+00	8425+00	9225+00	10025+00	10825+00	11625+00	12425+00	13225+00	14025+00	14825+00	15625+00	16425+00	17225+00	18025+00	18825+00	19625+00	20425+00	21225+00	22025+00
.30333	4000-02	4000-01	1212+00	2386+00	3386+00	4229+00	5333+00	6018+00	6824+00	7624+00	8424+00	9224+00	10024+00	10824+00	11624+00	12424+00	13224+00	14024+00	14824+00	15624+00	16424+00	17224+00	18024+00	18824+00	19624+00	20424+00	21224+00	22024+00
.35200	4000-02	4000-01	1198+00	2389+00	3389+00	4230+00	5333+00	6018+00	6824+00	7624+00	8424+00	9224+00	10024+00	10824+00	11624+00	12424+00	13224+00	14024+00	14824+00	15624+00	16424+00	17224+00	18024+00	18824+00	19624+00	20424+00	21224+00	22024+00
.41087	4000-02	4000-01	1183+00	2393+00	3393+00	4231+00	5334+00	6019+00	6825+00	7625+00	8425+00	9225+00	10025+00	10825+00	11625+00	12425+00	13225+00	14025+00	14825+00	15625+00	16425+00	17225+00	18025+00	18825+00	19625+00	20425+00	21225+00	22025+00
.47844	4000-02	4000-01	1168+00	2403+00	3403+00	4232+00	5335+00	6020+00	6826+00	7626+00	8426+00	9226+00	10026+00	10826+00	11626+00	12426+00	13226+00	14026+00	14826+00	15626+00	16426+00	17226+00	18026+00	18826+00	19626+00	20426+00	21226+00	22026+00
.54720	4000-02	4000-01	1151+00	2418+00	3418+00	4233+00	5336+00	6021+00	6827+00	7627+00	8427+00	9227+00	10027+00	10827+00	11627+00	12427+00	13227+00	14027+00	14827+00	15627+00	16427+00	17227+00	18027+00	18827+00	19627+00	20427+00	21227+00	22027+00
1.04720	4124-02	4111-01	1011+00	1911+00	1913+00	2647+00	3295+00	4367+00	4480+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00	4482+00
1.57080	2805-02	2854-01	6007-01	1318+00	1810+00	2183+00	2956+00	3034+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00	3035+00

$L/2A$	= .01		.10		.25		.50		.75		1.00		2.50		5.00		7.50		10.00		20.00		30.00		40.00		50.00	
B (MFP)	= 3.50		4.50		5.50		6.50		7.50		8.50		9.50		10.50		11.50		12.50		13.50		14.50		15.50		16.50	
β (RAD)																												
.01745	5000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.04303	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.08727	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.13086	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.17453	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.20180	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.24907	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.30333	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.35200	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.41087	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.47844	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
.54720	4000-02	4000-01	1232+00	2385+00	3385+00	4232+00	5337+00	6022+00	6828+00	7628+00	8428+00	9228+00	10028+00	10828+00	11628+00	12428+00	13228+00	14028+00	14828+00	15628+00	16428+00	17228+00	18028+00	18828+00	19628+00	20428+00	21228+00	22028+00
1.04720	3478-02	3458-01	8488-01	1597+00	2199+00	2624+00	3462+00	3446+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00	3445+00
1.57080	2344-02	2335-01	5726-01	1075+00	1471+00	1781+00	2279+00	2306+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00	2308+00

TABLE OF THE SMOOTHED FUNCTION $\exp(B) \cdot \sin(L/2A, B) / \pi$																
L/2A B (MFP) B (RAD)	.01 4.00	.10 5.00	.25 5.00	.50 4.00	.75 4.00	1.00 4.00	2.50 4.00	5.00 4.00	7.50 4.00	10.00 4.00	20.00 4.00	30.00 4.00	40.00 4.00	50.00 4.00		
.01745	4999	02	4987	-01	1231	+00	2354	+00	3293	+00	4021	+00	5455	+00		
.04363	4987	02	4984	-01	1230	+00	2352	+00	3291	+00	4018	+00	5451	+00		
.06727	4987	02	4975	-01	1228	+00	2347	+00	3284	+00	4009	+00	5434	+00		
.13098	4971	02	4959	-01	1212	+00	2325	+00	3275	+00	3995	+00	5405	+00		
.20188	4957	02	4927	-01	1210	+00	2328	+00	3295	+00	3979	+00	5380	+00		
.26188	4845	02	4872	-01	1202	+00	2286	+00	3260	+00	3960	+00	5355	+00		
.30697	4795	02	4782	-01	1170	+00	2256	+00	3138	+00	3818	+00	5161	+00		
.43633	4078	02	4085	-01	1150	+00	2191	+00	3049	+00	3701	+00	4910	+00		
.52306	4534	02	4521	-01	1114	+00	2119	+00	2842	+00	3581	+00	4684	+00		
.61087	4383	02	4351	-01	1071	+00	2033	+00	2615	+00	3398	+00	4430	+00		
.78544	3951	02	3936	-01	9681	-01	1079	+00	2816	+00	3618	+00	4477	+00		
.87108	3718	02	3744	-01	9057	-01	1714	+00	2351	+00	2812	+00	3587	+00		
1.04726	3236	02	3218	-01	7802	-01	1481	+00	2422	+00	2416	+00	3959	+00		
1.57986	2169	02	2181	-01	6297	-01	8024	-01	1354	+00	1613	+00	2048	+00		
.01745	4999	02	4985	-01	1227	+00	2321	+00	3227	+00	3981	+00	5026	+00		
.04363	4985	02	4981	-01	1226	+00	2320	+00	3224	+00	3988	+00	5014	+00		
.06727	4981	02	4980	-01	1223	+00	2322	+00	3213	+00	3974	+00	4993	+00		
.13098	4957	02	4943	-01	1217	+00	2316	+00	3180	+00	3882	+00	4959	+00		
.17453	4924	02	4918	-01	1209	+00	2293	+00	3172	+00	3822	+00	4911	+00		
.20188	4839	02	4815	-01	1185	+00	2247	+00	3184	+00	3735	+00	4778	+00		
.30697	4098	02	4088	-01	1153	+00	2183	+00	3018	+00	3619	+00	4598	+00		
.43633	4925	02	4521	-01	1112	+00	2102	+00	2862	+00	3485	+00	4377	+00		
.52306	4339	02	4325	-01	1083	+00	2048	+00	2618	+00	3404	+00	4433	+00		
.61087	4110	02	4112	-01	1007	+00	1977	+00	2587	+00	3084	+00	4112	+00		
.78544	3613	02	3606	-01	8826	-01	1055	+00	2252	+00	2689	+00	3851	+00		
.87208	3582	02	3530	-01	8183	-01	1531	+00	2078	+00	2457	+00	3013	+00		
1.04726	2859	02	2847	-01	6971	-01	1361	+00	1761	+00	2679	+00	2842	+00		
1.57986	1911	02	1902	-01	4658	-01	8085	-01	1178	+00	1387	+00	1698	+00		
.01745	4999	02	4982	-01	1224	+00	2308	+00	3182	+00	3779	+00	4667	+00		
.04363	4992	02	4977	-01	1223	+00	2305	+00	3159	+00	3765	+00	4601	+00		
.06727	4975	02	4958	-01	1218	+00	2286	+00	3148	+00	3748	+00	4637	+00		
.13098	4943	02	4927	-01	1210	+00	2281	+00	3123	+00	3721	+00	4598	+00		
.17453	4899	02	4883	-01	1206	+00	2280	+00	3083	+00	3682	+00	4515	+00		
.20188	4779	02	4762	-01	1198	+00	2269	+00	3063	+00	3662	+00	4477	+00		
.30697	4058	02	4052	-01	1127	+00	2118	+00	2899	+00	3439	+00	4181	+00		
.43633	4406	02	4384	-01	1078	+00	2018	+00	2747	+00	3252	+00	3956	+00		
.52306	4160	02	4144	-01	1016	+00	1903	+00	2584	+00	3059	+00	3681	+00		
.61087	3895	02	3880	-01	9598	-01	1777	+00	2405	+00	2832	+00	3397	+00		
.78544	3336	02	3322	-01	8128	-01	1513	+00	2037	+00	2368	+00	2848	+00		
.87208	3054	02	3051	-01	7482	-01	1388	+00	1815	+00	2151	+00	2512	+00		
1.04726	2589	02	2586	-01	6160	-01	1160	+00	1587	+00	1872	+00	2173	+00		
1.57986	1928	02	1918	-01	4198	-01	7787	-01	1045	+00	1222	+00	1459	+00		
.01745	4999	02	4982	-01	1224	+00	2308	+00	3182	+00	3779	+00	4667	+00		
.04363	4992	02	4977	-01	1223	+00	2305	+00	3159	+00	3765	+00	4601	+00		
.06727	4975	02	4958	-01	1218	+00	2286	+00	3148	+00	3748	+00	4637	+00		
.13098	4943	02	4927	-01	1210	+00	2281	+00	3123	+00	3721	+00	4598	+00		
.17453	4899	02	4883	-01	1206	+00	2280	+00	3083	+00	3682	+00	4515	+00		
.20188	4779	02	4762	-01	1198	+00	2269	+00	3063	+00	3662	+00	4477	+00		
.30697	4058	02	4052	-01	1127	+00	2118	+00	2899	+00	3439	+00	4181	+00		
.43633	4406	02	4384	-01	1078	+00	2018	+00	2747	+00	3252	+00	3956	+00		
.52306	4160	02	4144	-01	1016	+00	1903	+00	2584	+00	3059	+00	3681	+00		
.61087	3895	02	3880	-01	9598	-01	1777	+00	2405	+00	2832	+00	3397	+00		
.78544	3336	02	3322	-01	8128	-01	1513	+00	2037	+00	2368	+00	2848	+00		
.87208	3054	02	3051	-01	7482	-01	1388	+00	1815	+00	2151	+00	2512	+00		
1.04726	2589	02	2586	-01	6160	-01	1160	+00	1587	+00	1872	+00	2173	+00		
1.57986	1928	02	1918	-01	4198	-01	7787	-01	1045	+00	1222	+00	1459	+00		

TABLE 13 (Cont'd)

[illegible]

TABLE 13 (Cont'd)

TABLE OF THE SMOOTHED FUNCTION $\text{EXP}(B) \cdot R(0, L2/A, B) / \theta$																
L2/A	01	10	25	50	75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00		
B (MFP)	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00		
θ (RAD)																
0.1745	4901-02	4810-01	1138+00	1797+00	2624+00	2671+00	2107+00	2679+00	2679+00	2679+00	2679+00	2679+00	2679+00	2679+00	2679+00	2679+00
0.4383	4847-02	4873-01	1128+00	1781+00	2695+00	2652+00	2106+00	2669+00	2669+00	2669+00	2669+00	2669+00	2669+00	2669+00	2669+00	2669+00
0.8727	4797-02	4725-01	1093+00	1726+00	1842+00	1868+00	1104+00	1994+00	1994+00	1994+00	1994+00	1994+00	1994+00	1994+00	1994+00	1994+00
1.3080	4584-02	4495-01	1040+00	1846+00	1844+00	1887+00	1183+00	1893+00	1893+00	1893+00	1893+00	1893+00	1893+00	1893+00	1893+00	1893+00
1.7453	4278-02	4284-01	8721-01	1832+00	1722+00	1781+00	1787+00	1787+00	1787+00	1787+00	1787+00	1787+00	1787+00	1787+00	1787+00	1787+00
2.6188	3598-02	3543-01	8184-01	1287+00	1444+00	1476+00	1486+00	1486+00	1486+00	1486+00	1486+00	1486+00	1486+00	1486+00	1486+00	1486+00
3.4887	2956-02	2910-01	8717-01	1854+00	1181+00	1267+00	1211+00	1211+00	1211+00	1211+00	1211+00	1211+00	1211+00	1211+00	1211+00	1211+00
4.3633	2434-02	2390-01	8528-01	8887-01	9793-01	9812-01	9841-01	9841-01	9841-01	9841-01	9841-01	9841-01	9841-01	9841-01	9841-01	9841-01
5.2386	2042-02	2018-01	4638-01	7286-01	8133-01	8367-01	8332-01	8332-01	8332-01	8332-01	8332-01	8332-01	8332-01	8332-01	8332-01	8332-01
6.1087	1752-02	1724-01	3978-01	6233-01	6877-01	7126-01	7148-01	7148-01	7148-01	7148-01	7148-01	7148-01	7148-01	7148-01	7148-01	7148-01
7.8546	1363-02	1341-01	3094-01	4849-01	5427-01	5543-01	5560-01	5560-01	5560-01	5560-01	5560-01	5560-01	5560-01	5560-01	5560-01	5560-01
8.7288	1228-02	1207-01	2785-01	4364-01	4884-01	4889-01	5004-01	5004-01	5004-01	5004-01	5004-01	5004-01	5004-01	5004-01	5004-01	5004-01
1.04726	1022-02	1008-01	2321-01	3636-01	4078-01	4157-01	4170-01	4170-01	4170-01	4170-01	4170-01	4170-01	4170-01	4170-01	4170-01	4170-01
1.57688	8814-03	8707-02	1847-01	2424-01	2714-01	2772-01	2780-01	2780-01	2780-01	2780-01	2780-01	2780-01	2780-01	2780-01	2780-01	2780-01

L2/A	01	10	25	50	75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00		
B (MFP)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00		
θ (RAD)																
0.1745	4887-02	4882-01	1097+00	1614+00	1732+00	1748+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00
0.4383	4824-02	4820-01	1083+00	1593+00	1710+00	1723+00	1724+00	1724+00	1724+00	1724+00	1724+00	1724+00	1724+00	1724+00	1724+00	1724+00
0.8727	4710-02	4810-01	1036+00	1523+00	1633+00	1646+00	1647+00	1647+00	1647+00	1647+00	1647+00	1647+00	1647+00	1647+00	1647+00	1647+00
1.3080	4388-02	4295-01	9848-01	1417+00	1510+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00	1531+00
1.7453	4062-02	3918-01	8791-01	1298+00	1382+00	1392+00	1393+00	1393+00	1393+00	1393+00	1393+00	1393+00	1393+00	1393+00	1393+00	1393+00
2.6188	3187-02	3129-01	7016-01	1027+00	1098+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00	1108+00
3.4887	2527-02	2472-01	9541-01	8183-01	8886-01	8728-01	8732-01	8732-01	8732-01	8732-01	8732-01	8732-01	8732-01	8732-01	8732-01	8732-01
4.3633	2042-02	1998-01	4478-01	6548-01	7090-01	7059-01	7053-01	7053-01	7053-01	7053-01	7053-01	7053-01	7053-01	7053-01	7053-01	7053-01
5.2386	1785-02	1808-01	3737-01	5462-01	5848-01	5882-01	5884-01	5884-01	5884-01	5884-01	5884-01	5884-01	5884-01	5884-01	5884-01	5884-01
6.1087	1481-02	1436-01	3263-01	4662-01	5086-01	5042-01	5044-01	5044-01	5044-01	5044-01	5044-01	5044-01	5044-01	5044-01	5044-01	5044-01
7.8546	1137-02	1112-01	2481-01	3641-01	3894-01	3921-01	3923-01	3923-01	3923-01	3923-01	3923-01	3923-01	3923-01	3923-01	3923-01	3923-01
8.7288	1022-02	1001-01	2242-01	3277-01	3504-01	3529-01	3531-01	3531-01	3531-01	3531-01	3531-01	3531-01	3531-01	3531-01	3531-01	3531-01
1.04726	8524-03	8339-02	1888-01	2731-01	2926-01	2941-01	2942-01	2942-01	2942-01	2942-01	2942-01	2942-01	2942-01	2942-01	2942-01	2942-01
1.57688	5683-03	5568-02	1248-01	1621-01	1947-01	1981-01	1982-01	1982-01	1982-01	1982-01	1982-01	1982-01	1982-01	1982-01	1982-01	1982-01

L2/A	01	10	25	50	75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00		
B (MFP)	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00		
θ (RAD)																
0.1745	4888-02	4888-01	1072+00	1510+00	1591+00	1597+00	1507+00	1597+00	1597+00	1597+00	1597+00	1597+00	1597+00	1597+00	1597+00	1597+00
0.4383	4806-02	4785-01	1055+00	1438+00	1506+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00	1572+00
0.8727	4653-02	4537-01	1009+00	1411+00	1483+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00	1488+00
1.3080	4278-02	4471-01	9189-01	1286+00	1381+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00	1368+00
1.7453	3841-02	3746-01	8246-01	1181+00	1219+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00	1233+00
2.6188	2982-02	2986-01	8393-01	8987-01	9428-01	9459-01	9460-01	9460-01	9460-01	9460-01	9460-01	9460-01	9460-01	9460-01	9460-01	9460-01
3.4887	2318-02	2259-01	4987-01	6876-01	7314-01	7339-01	7346-01	7346-01	7346-01	7346-01	7346-01	7346-01	7346-01	7346-01	7346-01	7346-01
4.3633	1884-02	1817-01	3894-01	5668-01	5888-01	5906-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01
5.2386	1556-02	1514-01	3330-01	4675-01	4902-01	4918-01	4919-01	4919-01	4919-01	4919-01	4919-01	4919-01	4919-01	4919-01	4919-01	4919-01
6.1087	1332-02	1298-01	2856-01	4088-01	4282-01	4218-01	4217-01	4217-01	4217-01	4217-01	4217-01	4217-01	4217-01	4217-01	4217-01	4217-01
7.8546	1036-02	1018-01	2220-01	3117-01	3266-01	3279-01	3280-01	3280-01	3280-01	3280-01	3280-01	3280-01	3280-01	3280-01	3280-01	3280-01
8.7288	9281-02	9045-01	1881-01	2618-01	2813-01	2815-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01
1.04726	7771-03	7572-02	1885-01	2338-01	2511-01	2459-01	2460-01	2460-01	2460-01	2460-01	2460-01	2460-01	2460-01	2460-01	2460-01	2460-01
1.57688	5181-03	5048-02	1110-01	1529-01	1634-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01	1640-01

TABLE OF THE SMOOTHED FUNCTION $\text{EXP}(B) \cdot R(0, L2/A, B) / \theta$																
L2/A	01	10	25	50	75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00		
B (MFP)	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00		
θ (RAD)																
0.1745	4888-02	4828-01	1035+00	1387+00	1428+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00	1430+00
0.4383	4885-02	4734-01	1015+00	1386+00	1488+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00	1482+00
0.8727	4571-02	4429-01	9497-01	1271+00	1389+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00	1310+00
1.3080	4123-02	3995-01	8501-01	1145+00	1178+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00	1180+00
1.7453	3823-02	3510-01	7519-01	1004+00	1033+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00	1035+00
2.6188	2718-02	2630-01	5828-01	7588-01	7723-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01	7732-01
3.4887	2078-02	2013-01	4367-01	5741-01	5894-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01	5911-01
4.3633	1688-02	1616-01	3452-01	4881-01	4732-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01	4737-01
5.2386	1388-02	1349-01	2877-01	3834-01	3943-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01	3948-01
6.1087	1100-02	1153-01	2406-01	3287-01	3386-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01	3384-01
7.8546	8258-03	8085-02	1918-01	2556-01	2829-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01	2832-01
8.728																

TABLE 14
The Function $R(\phi_0, \phi_2/a, b)$

TABLE OF THE FUNCTION																
L_2/A	b (MFP)	ϕ (RAD)	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
.01745	.04303	.06727	.13090	.17453	.20180	.34007	.43033	.52300	.61007	.70540	.87200	1.04720	1.57000			
8041-04	2101-03	4331-03	0517-03	0720-03	1230-02	1001-02	2300-02	2000-02	3400-02	4043-02	5000-02	0501-02	0430-00			
8033-03	2100-02	4327-02	0511-02	0721-02	1230-01	1000-01	2300-01	2000-01	3400-01	4043-01	5000-01	0527-01	1020-01			
2140-02	5345-02	1077-01	1021-01	2171-01	3200-01	4279-01	6199-02	8099-02	1940-01	2040-01	2252-01	2357-01	2510-01	2507-01	2502-01	2000-01
4233-02	1059-01	2122-01	3102-01	4275-01	6094-01	8085-01	1550-00	2002-00	3110-00	3423-00	3582-00	3820-00	3890-00	3033-00	2954-00	
6100-02	1559-01	3107-01	4074-01	6250-01	9005-01	1227-00	2300-00	3100-00	4107-00	4013-00	4020-00	4142-00	4244-00	5202-00	5320-00	
8099-02	2040-01	2040-01	2252-01	2357-01	2510-01	2507-01	2502-01	2000-01	2000-01	2000-01	2000-01	2000-01	2000-01	2000-01	2000-01	2000-01
1940-01	3124-01	5031-01	5895-01	6222-01	6426-01	6421-01	6421-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01
2040-01	5124-01	5895-01	6222-01	6426-01	6421-01	6421-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01	6810-01
2252-01	6312-01	7142-01	7400-01	7934-00	8000-00	8157-00	8100-00	8100-00	8100-00	8100-00	8100-00	8100-00	8100-00	8100-00	8100-00	8100-00
2357-01	8112-00	8800-00	8820-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00
2510-01	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00
2507-01	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00
2502-01	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00
2000-01	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00	8800-00

TABLE 14 (Cont'd)

TABLE OF THE FUNCTION																	R(β, L2/A, B)									
L2/A	B	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00											
β (MFP)	(RAD)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00										
.01745	3921-04	3917-03	8733-03	1800-02	2765-02	3529-02	6191-02	7227-02	7393-02	7426-02	7430-02	7436-02	7436-02	7436-02	7436-02	7436-02										
.04363	8808-04	8795-03	2434-02	4700-02	6914-02	8825-02	1548-01	1807-01	1840-01	1858-01	1859-01	1859-01	1859-01	1859-01	1859-01	1859-01										
.08727	1904-03	1891-02	4873-02	9542-02	1384-01	1787-01	3097-01	3814-01	3698-01	3713-01	3718-01	3718-01	3718-01	3718-01	3718-01	3718-01										
.13090	2951-03	2948-02	7324-02	1434-01	2089-01	2854-01	4640-01	5421-01	5544-01	5560-01	5570-01	5578-01	5578-01	5578-01	5578-01	5578-01										
.17453	3945-03	3941-02	8701-02	1817-01	2779-01	3548-01	6246-01	7230-01	7392-01	7424-01	7434-01	7434-01	7434-01	7434-01	7434-01	7434-01										
.20180	5903-03	5898-02	1480-01	2890-01	4198-01	5353-01	9335-01	1085+00	1109+00	1113+00	1115+00	1115+00	1115+00	1115+00	1115+00	1115+00										
.34907	8937-03	8928-02	1994-01	3961-01	5890-01	7199-01	1249+00	1447+00	1477+00	1483+00	1485+00	1485+00	1485+00	1485+00	1485+00	1485+00										
.43633	1410-02	1410-01	2527-01	4941-01	7149-01	9098-01	1599+00	1809+00	1845+00	1852+00	1854+00	1854+00	1854+00	1854+00	1854+00	1854+00										
.52300	1244-02	1242-01	3985-01	8625-01	1279-01	1707-01	3092+00	3539+00	3614+00	3622+00	3624+00	3624+00	3624+00	3624+00	3624+00	3624+00										
.61087	1482-02	1480-01	3873-01	7105-01	1034+00	1311+00	2218+00	2539+00	2573+00	2581+00	2583+00	2583+00	2583+00	2583+00	2583+00	2583+00										
.78540	2990-02	2983-01	4980-01	9654-01	1388+00	1747+00	2874+00	3231+00	3278+00	3287+00	3289+00	3289+00	3289+00	3289+00	3289+00	3289+00										
.87206	2299-02	2295-01	3885-01	7142+00	1075+00	1378+00	2390+00	2566+00	2614+00	2622+00	2624+00	2624+00	2624+00	2624+00	2624+00	2624+00										
1.04720	2958-02	2949-01	7284-01	1390+00	1870+00	2458+00	3793+00	4172+00	4226+00	4229+00	4231+00	4231+00	4231+00	4231+00	4231+00	4231+00										
1.57080	4398-02	4268-01	1826+00	1873+00	2539+00	3056+00	4440+00	4821+00	4888+00	4877+00	4879+00	4879+00	4879+00	4879+00	4879+00	4879+00										

TABLE OF THE FUNCTION																	R(β, L2/A, B)									
L2/A	B	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00											
β (MFP)	(RAD)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00										
.01745	3210-04	3207-03	7904-03	1557-02	2254-02	2988-02	4024-02	5023-02	5713-02	5727-02	5730-02	5730-02	5730-02	5730-02	5730-02	5730-02										
.04363	8028-04	8018-03	1992-02	3894-02	5635-02	7172-02	1231-01	1400-01	1428-01	1432-01	1432-01	1432-01	1432-01	1432-01	1432-01	1432-01										
.08727	1807-03	1805-02	3987-02	7795-02	1128-01	1435-01	2402-01	2811-01	2855-01	2880-01	2884-01	2884-01	2884-01	2884-01	2884-01	2884-01										
.13090	2415-03	2412-02	5990-02	1171-01	1694-01	2150-01	3695-01	4210-01	4281-01	4292-01	4294-01	4294-01	4294-01	4294-01	4294-01	4294-01										
.17453	3227-03	3223-02	8004-02	1584-01	2203-01	2879-01	4928-01	5918-01	5745-01	5718-01	5721-01	5721-01	5721-01	5721-01	5721-01	5721-01										
.20180	4871-03	4865-02	1208-01	2391-01	3413-01	4336-01	7461-01	8981-01	1124+00	1136+00	1138+00	1139+00	1139+00	1139+00	1139+00	1139+00										
.34907	8953-03	8944-02	1625-01	3173-01	4585-01	5823-01	9821-01	1124+00	1136+00	1138+00	1139+00	1139+00	1139+00	1139+00	1139+00	1139+00										
.43633	8285-03	8274-02	2054-01	4009-01	5766-01	7339-01	1237+00	1398+00	1415+00	1417+00	1418+00	1418+00	1418+00	1418+00	1418+00	1418+00										
.52300	1608-02	1607-01	2499-01	4872-01	7021-01	8892-01	1485+00	1688+00	1689+00	1692+00	1693+00	1693+00	1693+00	1693+00	1693+00	1693+00										
.61087	1190-02	1194-01	2982-01	5768-01	8298-01	1049+00	1733+00	1935+00	1957+00	1980+00	1981+00	1981+00	1981+00	1981+00	1981+00	1981+00										
.78540	1599-02	1598-01	3950-01	7674-01	1098+00	1379+00	2215+00	2442+00	2488+00	2488+00	2489+00	2489+00	2489+00	2489+00	2489+00	2489+00										
.87206	1617-02	1613-01	4489-01	8883-01	1237+00	1547+00	2441+00	2675+00	2688+00	2702+00	2702+00	2702+00	2702+00	2702+00	2702+00	2702+00										
1.04720	2270-02	2273-01	4689-01	9175+00	1514+00	1768+00	2835+00	3073+00	3096+00	3098+00	3100+00	3100+00	3100+00	3100+00	3100+00	3100+00										
1.57080	3909-02	2988-01	7235-01	1334+00	1820+00	2198+00	3181+00	3410+00	3442+00	3445+00	3446+00	3446+00	3446+00	3446+00	3446+00	3446+00										

TABLE OF THE FUNCTION																	R(β, L2/A, B)									
L2/A	B	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00											
β (MFP)	(RAD)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00										
.01745	2900-04	2497-03	8198-03	1210-02	1748-02	2213-02	3702-02	4133-02	4174-02	4179-02	4180-02	4180-02	4180-02	4180-02	4180-02	4180-02										
.04363	8252-04	8244-03	1550-02	3028-02	4385-02	5534-02	9250-02	1033-01	1043-01	1045-01	1045-01	1045-01	1045-01	1045-01	1045-01	1045-01										
.08727	1251-03	1259-02	3182-02	6853-02	8734-02	1147-01	1851-01	2085-01	2088-01	2088-01	2088-01	2088-01	2088-01	2088-01	2088-01	2088-01										
.13090	1870-03	1877-02	4058-02	9890-02	1311-01	1662-01	2776-01	3099-01	3126-01	3129-01	3130-01	3130-01	3130-01	3130-01	3130-01	3130-01										
.17453	2516-03	2506-02	6221-02	1214-01	1751-01	2210-01	3760-01	4123-01	4163-01	4167-01	4168-01	4168-01	4168-01	4168-01	4168-01	4168-01										
.20180	3782-03	3777-02	9375-02	1828-01	2636-01	3338-01	5545-01	6105-01	6222-01	6228-01	6229-01	6229-01	6229-01	6229-01	6229-01	6229-01										
.34907	8070-03	8077-02	1259-01	2452-01	3531-01	4480-01	7381-01	8181-01	8253-01	8260-01	8262-01	8262-01	8262-01	8262-01	8262-01	8262-01										
.43633	8380-03	8388-02	1585-01	3087-01	4441-01	5811-01	9233-01	1010+00	1024+00	1025+00	1025+00	1025+00	1025+00	1025+00	1025+00	1025+00										
.52300	7752-03	7741-02	1920-01	3730-01	5368-01	6768-01	1109+00	1289+00	1289+00	1289+00	1289+00	1289+00	1289+00	1289+00	1289+00	1289+00										
.61087	9148-03	9132-02	2264-01	4399-01	6137-01	7930-01	1275+00	1394+00	1404+00	1405+00	1405+00	1405+00	1405+00	1405+00	1405+00	1405+00										
.78540	1245-02	1243-01	2970-01	5785-01	8217-01	1027+00	1644+00	1738+00	1745+00	1746+00	1747+00	1747+00	1747+00	1747+00	1747+00	1747+00										
.87206	1355-02	1353-01	3340-01	6450-01	9105-01	1141+00	1751+00	1885+00	1890+00	1890+00	1890+00	1890+00	1890+00	1890+00	1890+00	1890+00										
1.04720	1654-02	1640-01	4060-01	7774-01	1091+00	1342+00	1989+00	2123+00	2133+00	2134+00	2134+00	2134+00	2134+00	2134+00	2134+00	2134+00										
1.57080	2011-02	1999-01	4866-01	9045-01	1240+00	1506+00	2154+00	2289+00	2299+00	2300+00	2300+00	2300+00	2300+00	2300+00	2300+00	2300+00										

TABLE OF THE FUNCTION																	R(β, L2/A, B)									
L2/A	B	.01	.10	.25	.50	.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00											
β (MFP)	(RAD)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00										
.01745	1847-04	1844-03	4824-03	8387-03	1352-02	1798-02	2788-02	3054-02	3074-02	3475-02	3675-02	3675-02	3675-02	3675-02	3675-02	3675-02										
.04363	4809-04	4828-03	1200-02	2356-02	3381-02	4271-02	6989-02	7635-02	7682-02	7686-02	7687-02	7687-02	7687-02	7687-02	7687-02	7687-02										
.08727	9742-04	9728-03	2414-02	4701-02	6763-02	8543-02	1393-01	1520-01	1535-01	1536-01	1536-01	1536-01	1536-01	1536-01	1536-01	1536-01										
.13090	1402-03	1400-02	3623-02	7050-02	1015-01	1282-01	2088-01	2286-01	2300-01	2301-01	2301-01	2301-01	2301-01	2301-01	2301-01	2301-01										
.17453	1852-03	1849-02	4830-02	9417-02	1354-01	1710-01	2782-01	3043-01	3081-01	3082-01	3083-01	3083-01	3083-01	3083-01	3083-01	3083-01										
.20180	2937-03	2933-02	7275-02	1410-01	2035-01	2598-01	4101-01	4541-01	4587-01	4589-01	4589-01	4589-01	4589-01													

TABLE 14 (Cont'd)

TABLE OF THE FUNCTION		R(β, L2/A, B)															
L2/A	B (MFP)	0.01	0.10	0.25	0.50	0.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00	60.00	70.00
β (RAD)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1745	2920-07	2914-00	7131-00	1328-05	1781-05	2077-05	2420-05	2422-05	2422-05	2422-05	2422-05	2422-05	2422-05	2422-05	2422-05	2422-05	2422-05
0.4303	7304-07	7274-00	1780-05	3308-05	4444-05	5184-05	6038-05	6044-05	6044-05	6044-05	6044-05	6044-05	6044-05	6044-05	6044-05	6044-05	6044-05
0.6727	1453-00	1447-05	3530-05	0577-05	0833-05	1030-04	1190-04	1260-04	1260-04	1260-04	1260-04	1260-04	1260-04	1260-04	1260-04	1260-04	1260-04
1.3090	2150-00	2149-05	5250-05	0708-05	1311-04	1520-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04	1770-04
1.7453	2840-00	2820-05	0817-05	1285-04	1723-04	2008-04	2332-04	2334-04	2334-04	2334-04	2334-04	2334-04	2334-04	2334-04	2334-04	2334-04	2334-04
2.0180	4102-00	4085-05	0980-05	1853-04	2482-04	2887-04	3341-04	3344-04	3344-04	3344-04	3344-04	3344-04	3344-04	3344-04	3344-04	3344-04	3344-04
3.4067	5102-00	5179-05	1283-04	2349-04	3128-04	3631-04	4183-04	4186-04	4186-04	4186-04	4186-04	4186-04	4186-04	4186-04	4186-04	4186-04	4186-04
4.3033	6070-00	6052-05	1476-04	2732-04	3043-04	3210-04	3838-04	4042-04	4042-04	4042-04	4042-04	4042-04	4042-04	4042-04	4042-04	4042-04	4042-04
5.2300	6751-00	6729-05	1040-04	3020-04	4024-04	4048-04	5300-04	5310-04	5310-04	5310-04	5310-04	5310-04	5310-04	5310-04	5310-04	5310-04	5310-04
6.1007	7210-00	7184-05	1752-04	3220-04	4270-04	4932-04	5600-04	5613-04	5613-04	5613-04	5613-04	5613-04	5613-04	5613-04	5613-04	5613-04	5613-04
7.8540	7607-00	7620-05	1850-04	3411-04	4500-04	5180-04	5807-04	5871-04	5871-04	5871-04	5871-04	5871-04	5871-04	5871-04	5871-04	5871-04	5871-04
8.7200	7737-00	7690-05	1075-04	3438-04	4530-04	5213-04	5901-04	5804-04	5804-04	5804-04	5804-04	5804-04	5804-04	5804-04	5804-04	5804-04	5804-04
1.04720	7707-00	7720-05	1002-04	3448-04	4551-04	5225-04	5913-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04
1.57000	7700-00	7720-05	1002-04	3448-04	4551-04	5225-04	5913-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04	5810-04

TABLE OF THE FUNCTION		R(β, L2/A, B)															
L2/A	B (MFP)	0.01	0.10	0.25	0.50	0.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00	60.00	70.00
β (RAD)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1745	3900-00	3941-07	0001-07	1700-00	2321-00	2050-00	2907-00	2900-00	2900-00	2900-00	2900-00	2900-00	2900-00	2900-00	2900-00	2900-00	2900-00
0.4303	0070-00	0030-07	2305-00	4301-00	5700-00	6025-00	7400-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00
0.6727	1001-07	1051-00	4753-00	0712-00	1400-05	1314-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05	1407-05
1.3090	2000-00	2000-00	7040-00	1200-05	1000-05	1000-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05	2100-05
1.7453	3005-07	3700-00	0221-00	1000-05	2220-05	2541-05	2831-05	2832-05	2832-05	2832-05	2832-05	2832-05	2832-05	2832-05	2832-05	2832-05	2832-05
2.0180	5432-07	5405-00	1310-05	2400-05	3103-05	3000-05	4000-05	4010-05	4010-05	4010-05	4010-05	4010-05	4010-05	4010-05	4010-05	4010-05	4010-05
3.4067	0771-07	0730-00	1030-05	2902-05	3924-05	4400-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05	4040-05
4.3033	7700-07	7740-00	1000-05	3433-05	4400-05	5101-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05	5020-05
5.2300	0400-07	0450-00	2052-05	3735-05	4071-05	5522-05	0073-05	0074-05	0074-05	0074-05	0074-05	0074-05	0074-05	0074-05	0074-05	0074-05	0074-05
6.1007	0030-07	0004-00	2157-05	3915-05	5007-05	5700-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05	0331-05
7.8540	0275-07	0225-00	2230-05	4001-05	5201-05	5942-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05	0000-05
8.7200	0310-07	0250-00	2240-05	4000-05	5277-05	5950-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05
1.04720	0324-07	0270-00	2240-05	4000-05	5280-05	5962-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05
1.57000	0324-07	0270-00	2240-05	4000-05	5280-05	5962-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05	0520-05

TABLE OF THE FUNCTION		R(β, L2/A, B)															
L2/A	B (MFP)	0.01	0.10	0.25	0.50	0.75	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00	60.00	70.00
β (RAD)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1745	5300-00	5320-00	1203-07	2330-07	3020-07	3400-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07	3000-07
0.4303	1300-00	1320-00	0723-07	0820-07	0751-07	0407-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07	0217-07
0.6727	2047-00	0032-07	0304-07	1154-00	1400-00	1002-00	1023-00	1024-00	1024-00	1024-00	1024-00	1024-00	1024-00	1024-00	1024-00	1024-00	1024-00
1.3090	3000-00	3000-07	0420-07	1704-00	2205-00	2400-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00	2007-00
1.7453	5000-00	5070-07	1220-00	2221-00	2073-00	3220-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00	3404-00
2.0180	7107-00	7154-07	1734-00	3120-00	4030-00	4530-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00	4002-00
3.4067	0040-07	0070-07	2120-00	3033-00	4030-00	5527-00	0052-00	0053-00	0053-00	0053-00	0053-00	0053-00	0053-00	0053-00	0053-00	0053-00	0053-00
4.3033	1001-07	0001-07	2400-00	4320-00	5500-00	0212-00	0073-00	0074-00	0074-00	0074-00	0074-00	0074-00	0074-00	0074-00	0074-00	0074-00	0074-00
5.2300	1070-07	1000-00	2000-00	4030-00	5042-00	0027-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00	7105-00
6.1007	1117-07	1100-00	2002-00	4002-00	0145-00	0043-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00	7327-00
7.8540	1143-07	1135-00	2744-00	4003-00	0204-00	0000-00	7453-00	7454-00	7454-00	7454-00	7454-00	7454-00	7454-00	7454-00	7454-00	7454-00	7454-00
8.7200	1145-07	1137-00	2748-00	4010-00	0271-00	0000-00	7401-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00	7402-00
1.04720	1145-07	1138-00	2748-00	4011-00	0273-00	0000-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00
1.57000	1145-07	1138-00	2748-00	4012-00	0273-00	0000-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00	7403-00

TABLE OF THE FUNCTION		R(β, L2/A, B)															
L2/A	B (MFP)	0.1	1.0	2.5	5.0	7.5	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00		
β (RAD)		15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00		
0.1745	2008-10	2040-00	0300-00	1130-00	1432-00	1577-00	1001-00	1001-00	1001-00	1001-00	1001-00	1001-00	1001-00	1001-00	1001-00		
0.4303	0040-10	0000-00	1501-00	2022-00	3000-00	3027-00	4137-00	4137-00	4137-00	4137-00	4137-00	4137-00	4137-00	4137-00	4137-00		
0.6727	1310-00	1304-00	3143-00	0572-00	7040-00	7740-00	0101-00	0102-00	0102-00	0102-00	0102-00	0102-00	0102-00	0102-00	0102-00		
1.3090	1030-00	1010-00	0010-00	0104-00	0103-07	1107-07	1107-07	1107-07	1107-07	1107-07	1107-07	1107-07	1107-07	1107-07	1107-07		
1.7453	2502-00	2404-00	0000-00	0000-00	1000-07	1330-07	1471-07	1547-07	1547-07	1547-07	1547-07	1547-07	1547-07	1547-07	1547-07		
20100	3473-00	3448-00	0303-00	0400-07	1840-07	2029-07	2131-07	2131-07	2131-07	2131-07	2131-07	2131-07	2131-07	2131-07	2131-07		
34007	4102-00	4151-00	0000-00	0703-07	2214-07	2420-07	2543-07	2543-07	2543-07	2543-07	2543-07	2543-07	2543-07	2543-07	2543-07		
43033	4030-00	4004-00	1107-07	1040-07	2443-07	2072-07	2707-07	2707-07	2707-07	2707-07	2707-07	2707-07	2707-07	2707-07	2707-07		
52300	4002-00	4005-00	1107-07	2051-07	2500-07	2003-07	2030-07	2030-07	2030-07	2030-07	2030-07	2030-07	2030-07	2030-07	2030-07		
61007	5011-00	4872-00	1100-07	2007-07	2020-07	2000-07	2000-07	2000-07	2000-07	2000-07	2000-07	2000-07	2000-07	2000-07	2000-07		
70504	5000-00	0020-00	1200-07	2110-07	2044-07	2004-07	3013-07	3013-07	3013-07	3013-07	3013-07	3013-07	3013-07	3013-07	3013-07		
0.7200	5070-00	0031-00	1200-07	2110-07	2045-07	2005-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07		
1.57000	5070-00	0031-00	1200-07	2110-07	2045-07	2005-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07	3014-07		

L2/A	B (MFP)	0.1	1.0	2.5	5.0	7.5	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
β (RAD)		20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
0.1745	1707-12	1701-11	4240-11	7302-11	0003-11	0031-11	0700-11	0700-11	0700-11	0700-11	0700-11	0700-11	0700-11	0700-11	0700-11
0.4303	4471-12	4431-10	1037-10	1017-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10	2432-10
0.6727	1701-12	0712-11	2070-10	3070-10	4351-10	4050-10	4770-10	4770-10	4770-10	4770-10	4770-10	4770-10	4770-10	4770-10	4770-10
1.3090	1202-11	1271-10	3031-10	0204-10	0210-10	0670-10	0052-10	0052-10	0052-10	0052-10	0052-10	0052-10	0052-10	0052-10	0052-10
1.7453	1040-11	1031-10	2000-10	0071-10	0117-10	0070-10	0000-10	0000-10	0000-10	0000-10	0000-10	0000-10	0000-10	0000-10	0000-10
20100	2220-11	2205-10	0254-10	0000-10	1002-00	1100-00	1104-00	1104-00	1104-00	1104-00	1104-00	1104-00	1104-00	1104-00	1104-00
34007	2002-11	2377-10	0130-10	1040-00	1270-00	1304-00	1305-00	1305-00	1305-00	1305-00	1305-00	1305-00	1305-00	1305-00	1305-00
43033	2007-11	2700-10	0010-10	1120-00	1304-00	1403-00	1405-00	1405-00	1405-00	1405-00	1405-00	1405-00	1405-00	1405-00	1405-00
52300	2000-11	2071-10	0027-10	1103-00	1007-00	1007-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00
61007	2007-11	2071-10	0027-10	1103-00	1007-00	1007-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00	1540-00
70504	2001-11	2012-10	0024-10	1170-00	1421-00	1512-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00
0.7200	2001-11	2013-10	0024-10	1170-00	1422-00	1512-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00
1.04720	2001-11	2013-10	0024-10	1170-00	1422-00	1512-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00
1.57000	2001-11	2013-10	0024-10	1170-00	1422-00	1512-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00	1545-00

L2/A	B (MFP)	0.1	1.0	2.5	5.0	7.5	1.00	2.50	5.00	7.50	10.00	20.00	30.00	40.00	50.00
β (RAD)		25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
0.1745	1210-14	1107-13	2027-13	4710-13	0070-13	0040-13	0020-13	0020-13	0020-13	0020-13	0020-13	0020-13	0020-13	0020-13	0020-13
0.4303	3000-14	2074-10	7024-13	1172-12	1300-12	1403-12	1472-12	1472-12	1472-12	1472-12	1472-12	1472-12	1472-12	1472-12	1472-12
0.6727	0000-14	0021-13	1374-12	2202-12	2700-12	2040-12	2077-12	2077-12	2077-12	2077-12	2077-12	2077-12	2077-12	2077-12	2077-12
1.3090	0023-14	0420-13	1000-12	3315-12	3014-12	0104-12	4100-12	4100-12	4100-12	4100-12	4100-12	4100-12	4100-12	4100-12	4100-12
1.7453	1003-13	1071-12	0107-12	0107-12	0004-12	0502-12	0200-12	0200-12	0200-12	0200-12	0200-12	0200-12	0200-12	0200-12	0200-12
20100	1004-13	1014-12	3333-12	0037-12	0010-12	0024-12	0000-12	0000-12	0000-12	0000-12	0000-12	0000-12	0000-12	0000-12	0000-12
34007	1030-13	1011-12	3705-12	0202-12	3703-12	3730-12	7010-12	7010-12	7010-12	7010-12	7010-12	7010-12	7010-12	7010-12	7010-12
43033	1722-13	1702-12	4000-12	0034-12	2704-12	0132-12	0224-12	0224-12	0224-12	0224-12	0224-12	0224-12	0224-12	0224-12	0224-12
52300	1705-13	1735-12	4000-12	0753-12	7010-12	0270-12	0301-12	0301-12	0301-12	0301-12	0301-12	0301-12	0301-12	0301-12	0301-12
61007	1704-13	1744-12	4104-12	0703-12	7001-12	0304-12	0300-12	0300-12	0300-12	0300-12	0300-12	0300-12	0300-12	0300-12	0300-12
70504	1700-13	1745-12	4100-12	0700-12	7007-12	0300-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12
0.7200	1700-13	1745-12	4100-12	0700-12	7007-12	0300-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12
1.04720	1700-13	1745-12	4100-12	0700-12	7007-12	0300-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12
1.57000	1700-13	1745-12	4100-12	0700-12	7007-12	0300-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12	0400-12

TABLE 14 (Cont'd)

[illegible]

TABLE 15

The Function $E_1(b)$

B(MFP)	E1(B)
.01000	4038+01
.02000	3355+01
.03000	2959+01
.04000	2681+01
.05000	2468+01
.06000	2295+01
.07000	2151+01
.08000	2027+01
.10000	1823+01
.20000	1223+01
.30000	9057+00
.40000	7024+00
.50000	5590+00
.60000	4544+00
.80000	3100+00
1.00000	2194+00
1.25000	1464+00
1.50000	1000+00
1.75000	6949-01
1.90000	5820-01
2.00000	4890-01
2.50000	2491-01
3.00000	1305-01
3.50000	6970-02
4.00000	3779-02
5.00000	1148-02
6.00000	3691-03
8.00000	3707-04
10.00000	4157-05
12.50000	2773-06
15.00000	1918-07
17.50000	1361-08
20.00000	9834-10
25.00000	5346-12
30.00000	3021-14
35.00000	1753-16
40.00000	1037-18
45.00000	6225-21
50.00000	3783-23
55.00000	2321-25
60.00000	1430-27
65.00000	8941-30
75.00000	3525-34
100.00000	3084-45
150.00000	4752-07
200.00000	6885-09

TABLE 17

The Function $E_2(b)$

B(MFP)	E2(B)
.01000	9497+00
.02000	9131+00
.03000	8817+00
.04000	8535+00
.05000	8278+00
.06000	8040+00
.07000	7818+00
.08000	7610+00
.10000	7225+00
.20000	5742+00
.30000	4691+00
.40000	3894+00
.50000	3286+00
.60000	2782+00
.80000	2000+00
1.00000	1485+00
1.25000	1035+00
1.50000	7310-01
1.75000	5217-01
1.90000	4278-01
2.00000	3753-01
2.50000	1980-01
3.00000	1004-01
3.50000	5802-02
4.00000	3198-02
5.00000	9905-03
6.00000	3183-03
8.00000	3414-04
10.00000	3825-05
12.50000	2598-06
15.00000	1810-07
17.50000	1290-08
20.00000	9433-10
25.00000	5172-12
30.00000	2920-14
35.00000	1711-16
40.00000	1015-18
45.00000	6109-21
50.00000	3710-23
55.00000	2286-25
60.00000	1410-27
65.00000	8825-30
75.00000	3485-34
100.00000	3052-45
150.00000	4725-07
200.00000	6856-09

TABLE 16

The Smoothed Function

$$\bar{E}_1(b) = be^b E_1(b)$$

B(MFP)	B*EXP(B)*E1(B)
.01000	.04079
.02000	.08445
.03000	.09148
.04000	.11183
.05000	.12972
.06000	.14823
.07000	.16148
.08000	.17588
.10000	.20148
.20000	.29867
.30000	.36876
.40000	.41913
.50000	.46148
.60000	.49876
.80000	.55300
1.00000	.58635
1.25000	.63879
1.50000	.67238
1.75000	.69979
1.90000	.71398
2.00000	.72288
2.50000	.75881
3.00000	.78625
3.50000	.80787
4.00000	.82536
5.00000	.85211
6.00000	.87181
8.00000	.89824
10.00000	.91554
12.50000	.93029
15.00000	.94084
17.50000	.94832
20.00000	.95423
25.00000	.96276
30.00000	.96801
35.00000	.97287
40.00000	.97611
45.00000	.97866
50.00000	.98072
55.00000	.98241
60.00000	.98383
65.00000	.98504
75.00000	.98699
100.00000	.99100
150.00000	.99341
200.00000	.99505

TABLE 18

The Smoothed Function

$$\bar{E}_2(b) = be^b E_2(b)$$

B(MFP)	B*EXP(B)*E2(B)
.01000	.00959
.02000	.01863
.03000	.02726
.04000	.03553
.05000	.04351
.06000	.05123
.07000	.05876
.08000	.06595
.10000	.07985
.20000	.14027
.30000	.18997
.40000	.23235
.50000	.26927
.60000	.30104
.80000	.35780
1.00000	.40365
1.25000	.45151
1.50000	.49142
1.75000	.52537
1.90000	.54345
2.00000	.55489
2.50000	.60297
3.00000	.64124
3.50000	.67247
4.00000	.69847
5.00000	.73944
6.00000	.77036
8.00000	.81411
10.00000	.84461
12.50000	.87143
15.00000	.89636
17.50000	.91444
20.00000	.91531
25.00000	.93102
30.00000	.94182
35.00000	.94989
40.00000	.95589
45.00000	.96041
50.00000	.96422
55.00000	.96736
60.00000	.97000
65.00000	.97224
75.00000	.97585
100.00000	.98177
150.00000	.98777
200.00000	.99080

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