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# On the Design of Wing-Body Combinations of Low Zero-Lift Drag Rise at Transonic Speeds

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# On the Design of Wing-Body Combinations of Low Zero-Lift Drag Rise at Transonic Speeds

By W. T. Lord

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*Summary.* This paper has been prepared for publication from several papers written some years ago. It is essentially a new presentation of the more important features of the earlier papers.

The paper is about the transonic area rule, which states that the variation of zero-lift drag of an aircraft configuration at transonic speeds depends primarily on its axial distribution of cross-sectional area. The detailed discussion concerns a more restricted but more explicit result, namely that the drag jump (the discontinuity in zero-lift wave drag predicted by linearised theory at sonic speed) of a smooth wing-body combination is given by a formula which involves only the area distribution of the combination; this result is called the sonic area rule.

The present treatment of the sonic area rule is one of exploitation rather than explanation. The paper does not consider in detail the relation of the sonic area rule to the entire problem of drag rise, but makes some contributions to the use of the sonic area rule in the design of wing-body combinations of low drag rise. Results for several optimum area distributions for minimum drag jump are given, in a more compact and enlightening form than hitherto. Some simple, yet fairly general, cases of the design of wing-body combinations of low drag jump are discussed, and a numerical example is given; the cases investigated illustrate some of the principal features of design for low transonic drag rise.

1. *Introduction.* The subject of transonic drag rise is one on which there have been contributions from many authors. Many of these contributions have in common the conclusion that 'the variation of zero-lift drag of an aircraft configuration at transonic speeds depends primarily on its axial distribution of cross-sectional area'. This is known as the 'transonic area rule'.

1.1. *History.* The first realisation of the dependence of the transonic drag rise of a configuration on its cross-sectional area distribution appears to have occurred in an attempt to delay the start of the inevitable drag rise to as high a speed as possible. Early in 1944, H. Hertel, O. Frenzl and W. Hempel patented[1] an idea for the postponement of drag rise by making the cross-sectional area vary smoothly. While their arguments were rather intuitive, they enunciated the essential basis of the area rule. Recently a new paper has been published[1a] describing this work in more detail.

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The second*, but independent, clue to the dependence of the drag rise of a configuration on its area distribution was contained in a comprehensive paper[2] on linearised supersonic flow, written in 1947, by W. D. Hayes. In this paper, Hayes obtained the result that, according to linearised theory, in the limit as the Mach number tended to unity from above the zero-lift wave drag of certain configurations, which are here described as 'smooth', was given by a formula involving only the area distributions of the configurations. The practical value of this result was regarded with extreme scepticism because it was a result of the application of linearised theory at a Mach number for which that theory was not valid. It seems likely that the wealth of undisputedly valid information in this classic paper was responsible for the quite remarkable generality of the result not being investigated further at the time. Subsequently, other authors issued related papers on linearised supersonic flow for sonic flight speeds, but there was missing from these developments any suggestion that the result about zero-lift wave drag should be investigated seriously, either by a more elaborate theory or by experiment.

Indeed, for several years there was no new development in the establishment of the area rule. Then in 1952 the predominating influence of area distribution on transonic drag was recognised and acted upon independently by K. Oswatitsch and R. T. Whitcomb. In the same year the present author also discovered the fundamental idea of the area rule and started to develop it.

The work of Oswatitsch and his collaborators, notably F. Keune, on the non-linear equations of transonic small-disturbance theory culminated in the presentation[3] by Oswatitsch in August, 1952, of an equivalence rule relating the inviscid transonic flows about slender configurations having the same area distributions. This rule indicated that, according to a theory which took some account of non-linear effects, the area distribution of a configuration was of paramount importance in determining the drag at transonic speeds.

As it happened, the crucial experimental demonstration of the transonic area rule was being provided by Whitcomb at the same time as, but independently of, Oswatitsch's theoretical work. Whitcomb's work was reported[4] in September, 1952. One of Oswatitsch's theoretical results, that the flow fields at some distance from different configurations with the same area distribution were the same, was a conjecture of Whitcomb and was confirmed by his experiments. Whitcomb showed that the distant shock patterns of quite different configurations with the same area distribution were very similar. In addition, he argued that the distant shock patterns controlled the drag rise, and succeeded in showing that there was very good agreement between the measured drag rises of several wing-body combinations and the bodies of revolution with the same area distributions. The experiments of Whitcomb were the decisive contribution to the establishment of the area rule. Whitcomb's work was not published until 1955.

The work of the present author started in 1951 with a theoretical and experimental investigation of wing-body interference effects at supersonic speeds. The theoretical investigation was concerned with slender wing-body combinations only and consisted of an extension[5] of the slender-body theory of Ward. The conclusion was reached that the zero-lift wave drag of slender smooth combinations depended only on their cross-sectional area distributions. In May, 1952, attention was focused on the following specific problem: 'Given a wing and a body, what should be the axial

* These historical remarks do not include a description of the development of the area rule in the U.S.S.R., which was in progress from 1946 onwards; the first reference available is a paper by N. Z. Matyuk in 'Rukovodstvo dlya Konstruktorov,' Vol. 2, Chap. 4, 1946. (The author is indebted to Professor G. A. Tokaty for this information.)

location of the wing in order that the transonic drag rise of the combination should be a minimum?' Because there was a difference between the results of two apparently identical sets of free-flight tests on this problem, theoretical guidance was required in the analysis of the experimental results. In order to investigate this problem, the author applied the maxim that all configurations are slender at sonic speed, and thus concluded that the result for the zero-lift wave drag of slender smooth configurations at supersonic speeds could be taken to apply to all smooth configurations at sonic speed. In this way the formula of Hayes was arrived at in a roundabout way. However, in this instance the formula was taken, with a pinch of salt, to be of practical significance. The application of the formula to the specific problem under consideration led to an encouraging result in close agreement with one of the sets of experiments. Further encouragement was provided in September, 1952, by the first news of Oswatitsch's equivalence rule, and in October, 1952, the author was informed of the principal results of Whitcomb's experiments. This information stimulated him to propound[6] his own arguments leading to the area rule.

In addition to the authors cited, R. Legendre[7] and P. F. Maeder[8] had some knowledge of the area rule at about the same time, and there may have been other contributors of whom the present author is unaware. It appears that a practical recognition of the basic tenet of the area rule occurred independently and nearly simultaneously in several countries.

1.2. *Scope of the Present Paper.* The transonic area rule, as defined at the beginning, is fundamentally a qualitative rule. Several significant deductions can be made from it: firstly, configurations which have the same area distribution have roughly the same drag rise; secondly, corresponding to a given configuration there may be defined an equivalent body of revolution which has the same area distribution and therefore has roughly the same drag rise; thirdly, a configuration should have low drag rise if it has an area distribution which is the same as that of a body of revolution of low drag rise. However, an experimental investigation such as that of Whitcomb, although essential for the establishment of the transonic area rule as a practical rule, could not easily extend the rule quantitatively. Nor was the theoretical work of Oswatitsch suitable for performing systematic quantitative calculations. In contrast, the present author developed an approach which was well suited to quantitative treatment.

The approach may be described as follows. According to linearised theory there is no zero-lift wave drag at any Mach number below unity, whereas there is some zero-lift wave drag at all Mach numbers above unity. Therefore, linearised theory predicts a discontinuity in zero-lift wave drag at sonic speed; this discontinuity is referred to here as the drag jump. The drag jump may be calculated by finding the limit of the zero-lift wave drag, as given by linearised theory, as the Mach number tends to unity from above. The drag jump of a smooth configuration is finite and is given by the formula of Hayes; here this result is called the sonic area rule. The sonic area rule is of such remarkable simplicity and generality that, in spite of the invalidity of linearised theory at transonic speeds, the drag jump of a smooth configuration may give some measure of its transonic drag rise.

The author considered that the experiments of Whitcomb gave practical support to this suggestion and, with the help of Evelyn Eminton, concentrated on a quantitative exploitation of the sonic area rule (Refs. 9 to 12). The present paper is based on the work described in Refs. 6, 9, 10, 11 and 12*. Although some aspects of the work have been published[11a, 12a], and two

* Unpublished R.A.E. work on the area rule, both by the present author and by other authors, is listed in an R.A.E. Library Bibliography.

general reviews have been given[13, 14], there has not been available a detailed unified account of the work, and the present paper attempts to provide this. However, much time has elapsed since the original papers were written, and many of the detailed developments given there, especially in Refs. 6 and 10, are no longer apposite. Also, there have emerged (by using two theorems[15] due to R. T. Jones) better ways of expressing some of the results of more lasting interest from Refs. 9, 11 and 12. Furthermore, a few new relevant results have been obtained (some of them[16] by applications of Jones's theorems). Therefore, the broad policy adopted in this paper is the retention of the essential framework of the original papers and the reproduction of their more important features, together with the new results, in a manner as concise and up to date as possible.

It was expected originally that the drag jump as here defined would be a measure of the transonic drag rise in a comparative rather than an absolute sense, and would be useful for indicating the general effects of the principal geometrical parameters of a configuration. The large amount of evidence which has accumulated since confirms that this expectation has been realised to a great extent. In general, it appears that the comparison of the drag jumps of two configurations gives correct trends although there is a tendency to give a rather exaggerated comparison of the corresponding transonic drag rises. In particular, it turns out that configurations for which the drag jump is a minimum are indeed configurations for which the transonic drag rise is very low. It therefore appears that nowadays the chief role of the sonic area rule is in the design of configurations of low drag rise rather than in the estimation of the drag rise of a given configuration. For this reason this paper concentrates on those parts of the earlier papers which are concerned with the topic of design for low drag rise. However, the original work led also to a method for the numerical evaluation of the formula for the drag jump; this method has application in other branches of aerodynamics also and is treated in a separate paper by Evelyn Eminton[17].

The aircraft configurations considered in this paper are combinations of a wing and a body; the body may have an open nose and a partially closed base, to simulate a fuselage with a non-spilling pitot intake at the nose and an exhaust nozzle at the base. Other aircraft components such as tailplanes, fins and canopies, and other forms of engine installation such as those employing side intakes in the body, root intakes in the wing or nacelles on the wing, are excluded for convenience, although many of the results of the paper can be adapted to take account of their effects.

The paper concentrates on the condition of zero lift and the combinations are taken to have two perpendicular planes of symmetry. Hence, zero lift implies not merely that the total lift is zero but that there are no local lifting forces either.

The whole paper is devoted to a discussion of drag and no mention is made of pressure distributions.

In Section 2 the formula for the drag jump is quoted, and the method of designing wing-body combinations of minimum drag jump is outlined. In order to facilitate such design a number of optimum area distributions for minimum drag jump are given in Section 3. Then in Section 4 some of these results are used to provide some simple quantitative examples of wing-body combinations of low drag jump which illustrate some principal features of design for low drag rise. Finally in Section 5 some remarks are made on the practical application of the sonic area rule in design.

2. *The Sonic Area Rule for Smooth Wing-Body Combinations.* Let $l$ denote the length of a configuration, and let $x$ be the axial co-ordinate measured from the nose. Let $S(x)$, $0 \leqslant x \leqslant l$, be the

axial distribution of cross-sectional area of a configuration, with $S(x)$ continuous in $0 \leqslant x \leqslant l$ and small compared with $l^2$ and with the derivative $S'(x)$ small compared with $l$. If $S'(x)$ is continuous in $0 \leqslant x \leqslant l$, and if moreover $S'(0) = 0$ and $S'(l) = 0$, then a configuration is said to be smooth.

The sonic area rule states that the drag jump $D$ (the discontinuity in zero-lift wave drag predicted by linearised theory at sonic speed) of a smooth configuration is given by

$$\frac{D}{q} = \frac{1}{2\pi}\int_0^l \int_0^l S''(x_1)S''(x_2) \log \left| \frac{l}{x_1 - x_2} \right| dx_1\, dx_2, \tag{1}$$

where $q$ is the kinetic pressure. Discontinuities in $S''(x)$ can be tolerated and this fact allows the application of the sonic area rule to combinations of slender smooth bodies and those thin wings for which the smoothness conditions apply. The formula (1) automatically includes both the size and shape effects of an area distribution.

The configuration with the minimum drag jump under a specified set of conditions can be designed by choosing its area distribution to be that which minimises formula (1) under those conditions. An area distribution which gives minimum drag jump is called an optimum area distribution.

When a wing is given and its axial location fixed, together with the overall properties of the required wing-body combination, the body for minimum drag jump of the combination may be designed by choosing its area distribution to be the difference between the appropriate optimum area distribution of the combination and the area distribution of the exposed wing. This method of design implies that minimum drag jump of a combination may be achieved simply by designing the correct body and that wing design is not very important from the point of view of minimum drag jump; wing planform and thickness distribution, and wing location along the axis of the body, may all be chosen from other considerations. The body which produces an optimum combination area distribution is referred to as a fully-waisted body. However, it is possible to achieve an almost minimum drag jump with a body which is by no means fully-waisted. The sonic area rule allows the cross-sectional shape of a body to be chosen arbitrarily.

3. *Minimisation of the Drag Jump.* In this Section, results for optimum area distributions and the associated minimum values of the drag jump are given for a variety of conditions. A description of the derivation of these results by the calculus of variations is given by Evelyn Eminton[17].

The parameters which may be fixed are selected from the following: $l$ the length; $V$ the volume; $N$ the nose area; $B$ the base area; $A_{ni}$ the area at the distance $k_{ni}$ from the nose, with $i = 1 \ldots n$ (the suffices are omitted when $n = 1$). The expressions for the optimum area distributions and associated minimum drag jumps become more complicated as the number of fixed parameters increases.

From a given optimum area distribution with a certain number of parameters fixed may be deduced optimum area distributions with fewer fixed parameters by minimising the drag jump with respect to those parameters which are no longer fixed. Therefore, the more restrictive the conditions imposed the more general the resulting optimum.

It may happen that an optimum with several parameters fixed at specified values has an associated drag jump greater than the drag jump associated with a simpler optimum which has some of the parameters fixed at the specified values while $V$ or some of the $A_{ni}$ (or possibly $V$ and some of the $A_{ni}$) take values greater than those specified. From the viewpoint of design this is a desirable situation, and it is therefore a good idea to regard the parameters $V$ and $A_{ni}$ not as fixed but as having only their lowest acceptable values fixed.

It happens that the more general optima presented here are built up from the simpler optima, and it is therefore preferable to present the results in the order of increasing number of fixed parameters.

3.1. *The Von Kármán Optimum.* The optimum area distribution when the length $l$, the nose area $N$ and the base area $B$ are fixed (often called the von Kármán optimum[18]) is denoted here by $S_1(x)$ and is given by

$$S_1(x) = N + (B-N) f(\xi), \tag{2}$$

$$\xi = \frac{x}{l}, \tag{3}$$

$$f(\xi) = \frac{1}{\pi}[\cos^{-1}(1-2\xi) - 2(1-2\xi)\xi^{1/2}(1-\xi)^{1/2}]; \tag{4}$$

the function $f(\xi)$ is tabulated for $\xi = 0(0\cdot01)1$ in Table 1 and illustrated in Fig. 1. The volume of this distribution is $V_1$ given by

$$V_1 = \tfrac{1}{2}(N+B)l. \tag{5}$$

The associated minimum drag jump is $D_1$ where

$$\frac{D_1}{q} = \frac{4}{\pi}\frac{(B-N)^2}{l^2}. \tag{6}$$

This area distribution possesses a very important property (which is here referred to as Jones's first theorem[15]): if an area distribution $S(x)$ with given values of length $l$, nose area $N$ and base area $B$ is divided into two portions one of which is the corresponding von Kármán optimum, then it may be written as

$$S(x) = S_1(x) + \bar{S}(x), \tag{7}$$

and its associated drag jump $D$ is given by

$$D = D_1 + \bar{D} \tag{8}$$

where $\bar{D}$ is the drag jump associated with the portion $\bar{S}(x)$.

Therefore the effects of $N$ and $B$ on optimum area distributions and minimum drag jumps can always be calculated easily. The portion $\bar{S}(x)$ of an area distribution has zero nose and base area, and is referred to here as a residual area distribution. Henceforth, in this discussion of the minimisation of drag jump, attention is concentrated on residual area distributions.

3.2. *The Sears-Haack Optimum.* The optimum area distribution when the length $l$ and the residual volume $\bar{V}(= V - V_1)$ are fixed (usually called the Sears-Haack optimum[19, 20]) is denoted here by $\bar{S}_2(x)$ and is given by

$$\bar{S}_2(x) = \frac{16}{3\pi}\frac{\bar{V}}{l} g(\xi), \tag{9}$$

$$g(\xi) = 8\xi^{3/2}(1-\xi)^{3/2}; \tag{10}$$

the function $g(\xi)$ is tabulated for $\xi = 0\ (0\cdot01)1$ in Table 1 and illustrated in Fig. 2. The maximum area of this distribution $(\bar{S}_2)_{max}$ occurs when $\xi = \frac{1}{2}$ and is given by

$$(\bar{S}_2)_{max} = \frac{16}{3\pi}\frac{\bar{V}}{l}. \tag{11}$$

The associated minimum drag jump is $\bar{D}_2$ where

$$\frac{\bar{D}_2}{q} = \frac{128}{\pi}\frac{\bar{V}^2}{l^4}. \tag{12}$$

This area distribution also possesses an important property (which is here referred to as Jones's second theorem[15]): if a residual area distribution $\bar{S}(x)$ of length $l$ and volume $\bar{V}$ is divided into two portions one of which is a Sears-Haack optimum of length $l$ and volume $\alpha\bar{V}$ then $\bar{S}(x)$ may be written as

$$\bar{S}(x) = \alpha\bar{S}_2(x) + \bar{S}^*(x), \tag{13}$$

where $\bar{S}^*(x)$ is of length $l$ and of volume $(1-\alpha)\bar{V}$ and may be negative for any or all values of $x$. The drag jump $\bar{D}$ associated with $\bar{S}(x)$ is given by

$$\bar{D} = \alpha(2-\alpha)\bar{D}_2 + \bar{D}^* \tag{14}$$

where $\bar{D}^*$ is the drag jump associated with the portion $\bar{S}^*(x)$ (and is positive even if $\bar{S}^*(x)$ has negative volume).

Therefore, it is easy to calculate the drag jump associated with an area distribution which consists of the sum of a Sears-Haack distribution and some other distribution. Although in this case the drag jump for $\bar{S}(x)$ is not simply the sum of the drag jumps associated with its components, the extra term is simple and does not depend on the shape of $\bar{S}^*(x)$.

3.3. *The Adams Optimum.* The optimum area distribution when the length $l$ and the residual area distribution $\bar{A}\{= A - S_1(k)\}$ at the location $x = k$ are fixed (which was first derived by Adams[21]) is denoted here by $\bar{S}_3(x)$ and is given by

$$\bar{S}_3(x) = \tfrac{1}{4}\frac{\bar{A}l^4}{k^2(l-k)^2}h(\kappa, \xi), \tag{15}$$

$$\kappa = \frac{k}{l}, \tag{16}$$

$$h(\kappa, \xi) = 2[\kappa(1-\xi) + \xi(1-\kappa)]\,\kappa^{1/2}(1-\kappa)^{1/2}\xi^{1/2}(1-\xi)^{1/2} -$$
$$- \tfrac{1}{2}(\kappa-\xi)^2 \log\left\{\frac{\kappa(1-\xi) + \xi(1-\kappa) + 2\kappa^{1/2}(1-\kappa)^{1/2}\xi^{1/2}(1-\xi)^{1/2}}{\kappa(1-\xi) + \xi(1-\kappa) - 2\kappa^{1/2}(1-\kappa)^{1/2}\xi^{1/2}(1-\xi)^{1/2}}\right\}; \tag{17}$$

the function $h(\kappa, \xi)$ is tabulated for $\xi = 0(0\cdot01)1$ and $\kappa = 0(0\cdot01)\ 0\cdot5$ in Table 1, values for $\kappa = 0\cdot5\ (0\cdot01)1$ being obtainable from the relation $h(\kappa, \xi) = h(1-\kappa, 1-\xi)$. The volume of this distribution is $\bar{V}_3$ given by

$$\bar{V}_3 = \frac{\pi}{12}\frac{\bar{A}l^2}{k^{1/2}(l-k)^{1/2}}. \tag{18}$$

The fixed value $\bar{A}$ does not turn out to be the maximum area $(\bar{S}_3)_{\max}$ except when $\kappa = \frac{1}{2}$ (this particular case was first given by Lighthill[22]). If the location of $(\bar{S}_3)_{\max}$ is denoted by $x = m$, then $m$ is given by writing

$$\mu = \frac{m}{l}, \tag{19}$$

and then finding $\mu$ as a function of $\kappa$ from the condition

$$\left(\frac{\partial h}{\partial \xi}\right)_{\xi=\mu} = 0 ; \tag{20}$$

then $(\bar{S}_3)_{\max}$ may be written

$$(\bar{S}_3)_{\max} = \frac{1}{4} \frac{\bar{A}l^4}{k^2(l-k)^2} h(\kappa, \mu) . \tag{21}$$

The equation for $\mu$ has been solved numerically, and the solution for $\mu$ is shown in Fig. 3; the consequent form of $h(\kappa, \mu)$ is shown in Fig. 4, where it appears that $h(\kappa, \mu)$ resembles $\frac{1}{4}[8\kappa^{3/2}(1-\kappa)^{3/2}]$. In order to illustrate the shapes of $h(\kappa, \xi)$, the function $h(\kappa, \xi)/\frac{1}{4}[8\kappa^{3/2}(1-\kappa)^{3/2}]$ is shown for $\kappa = 0(0 \cdot 05)\, 0 \cdot 5$ in Fig. 5.

The associated minimum drag jump is $\bar{D}_3$ where

$$\frac{\bar{D}_3}{q} = \frac{\pi}{4} \frac{A^2 l^2}{k^2(l-k)^2} . \tag{22}$$

3.4. *The Author's Optimum.* When the residual volume $V$ as well as the length $l$ and the residual area $\bar{A}$ at the location $x = k$ are fixed the appropriate optimum area distribution [11, 11a] is denoted by $\bar{S}_4(x)$ and may be written

$$\bar{S}_4(x) = \alpha \bar{S}_2(x) + \beta \bar{S}_3(x) , \tag{23}$$

where the coefficients $\alpha$ and $\beta$ are given by

$$\alpha = 1 - \frac{\beta\chi}{\omega} , \tag{24}$$

$$\beta = \frac{(9/8) - \omega}{(9/8) - \chi} , \tag{25}$$

with $\chi$ and $\omega$ defined by

$$\chi = 4 \frac{k(l-k)}{l^2} , \tag{26}$$

$$\omega = \frac{48}{\pi} \frac{\bar{V} k^{3/2}(l-k)^{3/2}}{\bar{A} l^4} . \tag{27}$$

The associated minimum drag jump $\bar{D}_4$ may be written

$$\bar{D}_4 = \alpha \bar{D}_2 + \beta \bar{D}_3 . \tag{28}$$

From this result for $\bar{D}_4$ it can be shown[11] that if the values of $\bar{V}$ and $\bar{A}$ are regarded not as fixed but as lowest acceptable values, then the minimum drag jumps in these circumstances are given by the following criteria:

$$\left.\begin{aligned} &\text{if } \omega \geqslant 9/8, \text{ then take } \alpha = 1 \text{ and } \beta = 0 ; \\ &\text{and if } \omega \leqslant \chi, \text{ then take } \alpha = 0 \text{ and } \beta = 1 ; \\ &\text{but if } \chi \leqslant \omega \leqslant 9/8, \text{ then take } \alpha \text{ as given by (24) and } \beta \text{ as given by (25)} \end{aligned}\right\} \tag{29}$$

3.5. *The Adams Optimum Generalised.* Let $k_{ni}$ and $\bar{A}_{ni}$ denote the location and value of the $i$th of $n$ fixed residual areas. Let the optimum area distribution with the length $l$ and with $n$ residual areas $\bar{A}_{ni}$ fixed (which was first given by Eminton[12]) be denoted by $\bar{S}_{3n}(x)$. Also, let $\bar{S}_{3ni}(x)$ denote the Adams optimum with the length $l$ and the single residual area $\bar{A} = \bar{A}_{ni}$ at the location $k = k_{ni}$ fixed, and let other corresponding quantities be similarly distinguished. Then $\bar{S}_{3n}(x)$ may be written

$$\bar{S}_{3n}(x) = \sum_{i=1}^{n} \beta_{ni}\bar{S}_{3ni}(x), \tag{30}$$

where the coefficients $\beta_{n\,i}$, $i = 1 \ldots n$, are the solution of the system of simultaneous linear equations

$$\sum_{i=1}^{n} \beta_{ni} \frac{\bar{A}_{ni}}{\bar{A}_{nj}} \frac{h(\kappa_{ni}, \kappa_{nj})}{\frac{1}{4}\chi_{ni}^2} = 1, \quad j = 1 \ldots n, \tag{31}$$

where

$$\chi_{ni} = \frac{4k_{ni}(l-k_{ni})}{l^2}. \tag{32}$$

The volume of this distribution $\bar{V}_{3n}$ is given by

$$\bar{V}_{3n} = \sum_{i=1}^{n} \beta_{ni}\bar{V}_{3ni}. \tag{33}$$

The associated minimum drag jump $\bar{D}_{3n}$ is given by

$$\bar{D}_{3n} = \sum_{i=1}^{n} \beta_{ni}\bar{D}_{3ni}. \tag{34}$$

3.6. *The Author's Optimum Generalised.* If the optimum area distribution with the length $l$, the residual volume $\bar{V}$ and with $n$ residual areas $\bar{A}_{ni}$ at the locations $x = k_{ni}$ fixed (which was first given by Eminton[12]) is denoted by $\bar{S}_{4n}(x)$, then $\bar{S}_{4n}(x)$ may be written

$$\bar{S}_{4n}(x) = \alpha\bar{S}_2(x) + \sum_{i=1}^{n} \beta_{ni}\bar{S}_{3ni}(x), \tag{35}$$

where the coefficient $\alpha$ is given by

$$\alpha = 1 - \sum_{i=1}^{n} \beta_{ni} \frac{\chi_{ni}}{\omega_{ni}}, \tag{36}$$

and the coefficients $\beta_{ni}$, $i = 1 \ldots n$, are the solution of the equations

$$\sum_{i=1}^{n} \beta_{ni} \frac{\omega_{nj}}{\omega_{ni}} \left[\frac{9}{8} \frac{h(\kappa_{ni}, \kappa_{nj})}{\frac{1}{4}\chi_{ni}^{1/2}\chi_{nj}^{3/2}} - \chi_{ni}\right] = \left(\frac{9}{8} - \omega_{nj}\right), \quad j = 1 \ldots n, \tag{37}$$

with $\omega_{ni}$ defined by

$$\omega_{ni} = \frac{48}{\pi} \frac{\bar{V}k_{ni}^{3/2}(l-k_{ni})^{3/2}}{\bar{A}_{ni}l^4}. \tag{38}$$

The associated minimum drag jump $\bar{D}_{4n}$ is given by

$$\bar{D}_{4n} = \alpha\bar{D}_2 + \sum_{i=1}^{n} \beta_{ni}\bar{D}_{3ni}. \tag{39}$$

4. *Quantitative Examples of the Design of Wing-Body Combinations of Low Drag Jump.* Some examples of the design of wing-body combinations for low drag jump are given here, and they are so chosen that a comparatively large amount of detailed quantitative information is deduced purely

by applying Jones's theorems concerning the drag jumps of the von Kármán and the Sears-Haack optima.

The design problem considered is as follows: given the geometry of the wing and the location of the wing on the body, and given certain specified requirements of the body, design the body so that the wing-body combination has the minimum drag jump. The design is achieved by making the area distribution of the combination equal to the appropriate optimum area distribution and then making the area distribution of the body equal to the difference between the optimum combination area distribution and the area distribution of the exposed part of the wing. The cross-sectional shape of the body is arbitrary, according to the sonic area rule.

The basic combination consists of a body, with a pitot intake at the nose and an exhaust nozzle at the base, on which is mounted, in a symmetrical location about the middle of the body, a wing with a symmetrical area distribution; the isolated body is assumed to have the optimum area distribution for its given length, volume, and nose and base areas. Two kinds of low drag-jump combinations are considered: firstly, when the length and maximum cross-sectional area of the combination are kept constant and the volume is increased, and secondly, when the length and volume of the combination are kept constant. In the first case only the low drag-jump combination with the fully-waisted body is considered, but in the second case a family of combinations with partially-waisted bodies is investigated. A numerical example is given.

4.1. *A Basic Combination.* The body of the basic combination is denoted by $B_0$ and its length, volume, nose area and base area are denoted by $l_B$, $V_B$, $N$ and $B$ respectively. Its area distribution $S_{B_0}$, a function of $x$ for $0 \leqslant x \leqslant l_B$, is chosen to be

$$S_{B_0} = S_{B_{02}} + \bar{S}_{B_0}, \tag{40}$$

where $S_{B_{02}}$ is the von Kármán distribution for $l_B$, $N$, $B$, and $\bar{S}_{B_0}$ is the Sears-Haack distribution for $l_B$ and the residual volume $\bar{V}_B$ given by

$$\bar{V}_B = V_B - \tfrac{1}{2}(N+B)l_B \tag{41}$$

The area at the middle of the body is

$$(S_{B_0})_{x=l_B/2} = \tfrac{1}{2}(N+B) + (\bar{S}_{B_0})_{\max} \tag{42}$$

where

$$(\bar{S}_{B_0})_{\max} = \frac{16}{3\pi}\frac{\bar{V}_B}{l_B} \tag{43}$$

The drag jump $D_{B_0}$ of the body in isolation is given by Jones's first theorem as

$$\frac{D_{B_0}}{q} = \frac{4}{\pi}\frac{(B-N)^2}{{l_B}^2} + \frac{\bar{D}_{B_0}}{q}, \tag{44}$$

where

$$\frac{\bar{D}_{B_0}}{q} = \frac{128}{\pi}\frac{{\bar{V}_B}^2}{{l_B}^4} \tag{45}$$

Because of Jones's first theorem it is sufficient to consider henceforth the residual area distribution $\bar{S}_{B_0}$ as representative of the basic body.

The exposed-wing area distribution is denoted by $S_W$ and is assumed to be symmetrical and to be symmetrically disposed about the middle of the body. The four quantities connected with the exposed wing $W$ which are required in the following calculations are the overall length $l_W$, the volume $V_W$, the maximum area $(S_W)_{\max}$ and the associated drag jump of the exposed wing in isolation $D_W$. It is convenient to relate these quantities to the corresponding quantities for the basic body by writing

$$l_W = al_B, \quad a \leqslant 1, \tag{46}$$

$$V_W = b\bar{V}_B, \tag{47}$$

$$(S_W)_{\max} = a^{-1}bc(\bar{S}_{B_0})_{\max}, \tag{48}$$

$$D_W = a^{-4}b^2d\bar{D}_{B_0}, \quad d \geqslant 1. \tag{49}$$

The area distribution $\bar{S}_{C_0}$ of the residual basic combination $\bar{C}_0$ is given by

$$\bar{S}_{C_0} = \bar{S}_{B_0} + S_W; \tag{50}$$

this distribution is illustrated in Fig. 6. Hence the residual volume and maximum residual area are given by

$$\bar{V}_{C_0} = (1+b)\bar{V}_B, \tag{51}$$

$$(\bar{S}_{C_0})_{\max} = (1+a^{-1}bc)(\bar{S}_{B_0})_{\max}. \tag{52}$$

By using Jones's second theorem, with $\bar{S}_2 = \alpha^{-1}\bar{S}_{B_0}$, $\bar{S}^* = S_W$ and $\alpha = (1+b)^{-1}$, it follows that the drag jump $\bar{D}_{C_0}$ is given by

$$\bar{D}_{C_0} = (1+2b+a^{-4}b^2d)\bar{D}_{B_0}. \tag{53}$$

Then, defining the interference drag jump for a given wing-body combination as the difference between the drag jump of the combination and the sum of the drag jumps of the isolated body and the isolated exposed wing, it follows that in this case the interference drag jump $D_{I_0}$ is

$$D_{I_0} = 2b\bar{D}_{B_0}. \tag{54}$$

4.2. *Optimum Combination with Greater Volume.* The optimum residual combination $\bar{C}_+$ is chosen to have the same length and maximum area as the basic residual combination $\bar{C}_0$ and to have a Sears-Haack area distribution $S_{C_+}$, as illustrated in Fig. 7. Therefore

$$(\bar{S}_{C_+})_{\max} = (\bar{S}_{C_0})_{\max}, \tag{55}$$

and since both $\bar{S}_{B_0}$ and $\bar{S}_{C_+}$ are Sears-Haack distributions it follows that the volume $\bar{V}_{C_+}$ is given by

$$\bar{V}_{C_+} = (1+a^{-1}bc)\bar{V}_B, \tag{56}$$

and the associated drag jump $\bar{D}_{C_+}$ is given by

$$\bar{D}_{C_+} = (1+a^{-1}bc)^2\bar{D}_{B_0}. \tag{57}$$

By an application of Jones's second theorem, with $\bar{S}_2 = \alpha^{-1}S_{C_+}$, $\bar{S}^* = -S_W$ and $\alpha = (1+a^{-1}bc) \times$ $\times (1+a^{-1}bc-b)^{-1}$, it follows that the drag jump $\bar{D}_{B_+}$ of the isolated body is given by

$$\bar{D}_{B_+} = [(1+a^{-1}bc)^2 - 2b(1+a^{-1}bc) + a^{-4}b^2d]\,\bar{D}_{B_0}, \tag{58}$$

and hence the interference drag jump $D_{I_+}$ is

$$D_{I_+} = [1 - (a^{-4}d - a^{-1}c)b]\,2b\bar{D}_{B_0}. \tag{59}$$

4.3. *A Family of Combinations with the Same Volume.* Consider a family of residual combinations $\bar{C}_p$, with the same volume and length, in which a member is characterised by its value of the parameter $p$, the proportion of body waisting; $p$ lies in the range $0 \leqslant p \leqslant 1$, $p = 0$ denoting the basic combination with the unwaisted body and $p = 1$ denoting the optimum combination with the fully-waisted body; for $0 < p < 1$ the body has some amount of partial waisting. (In the case $p = 1$ the suffix 1 may tend to cause confusion with the suffix 1 used earlier to distinguish the von Kármán optimum; however, the uses of the suffix 1 in the two senses do not overlap.)

4.3.1. *Optimum combination with fully-waisted body.* The optimum residual combination $\bar{C}_1$ has the same length and volume as the basic residual combination $\bar{C}_0$ and has a Sears-Haack area distribution $\bar{S}_{C_1}$, as illustrated in Fig. 8a. The volume $\bar{V}_{C_1}$ is

$$\bar{V}_{C_1} = (1+b)\bar{V}_B, \tag{60}$$

and hence it follows that

$$(\bar{S}_{C_1})_{\max} = (1+b)(\bar{S}_{B_0})_{\max}, \tag{61}$$

$$\bar{D}_{C_1} = (1+b)^2\bar{D}_{B_0}. \tag{62}$$

Therefore the difference between the drag jumps of $\bar{C}_1$ and $\bar{C}_0$ may be expressed in the form

$$\frac{\bar{D}_{C_1} - \bar{D}_{C_0}}{\bar{D}_{C_0}} = -\frac{(a^{-4}d-1)b^2}{(1+2b+a^{-4}b^2d)}. \tag{63}$$

By applying Jones's second theorem with $\bar{S}_2 = \alpha^{-1}\bar{S}_{C_1}$, $\bar{S}^* = -S_W$ and $\alpha = (1+b)$ it follows that the drag jump $\bar{D}_{B_1}$ of the isolated residual body $\bar{B}_1$ is given by

$$\bar{D}_{B_1} = [1 + (a^{-4}d-1)b^2]\,\bar{D}_{B_0}, \tag{64}$$

so that the difference between the drag jumps of the isolated residual body $\bar{B}_1$ and the basic residual body $B_0$ may be expressed as

$$\frac{\bar{D}_{B_1} - \bar{D}_{B_0}}{\bar{D}_{B_0}} = (a^{-4}d-1)b^2. \tag{65}$$

The interference drag jump $D_{I_1}$ is

$$D_{I_1} = [1 - (a^{-4}d-1)b]\,2b\bar{D}_{B_0}, \tag{66}$$

so that the change of interference drag jump is expressed by

$$\frac{D_{I_1} - D_{I_0}}{D_{I_0}} = -(a^{-4}d-1)b. \tag{67}$$

4.3.2. *Combinations with partially-waisted bodies.* The residual combinations $\bar{C}_p$ are chosen to have area distributions $\bar{S}_{C_p}$, $0 \leqslant p \leqslant 1$, defined by

$$\bar{S}_{C_p} = (1-p)\bar{S}_{C_0} + p\bar{S}_{C_1}; \tag{68}$$

an illustration of the case $p = \frac{1}{2}$ is given in Fig. 8b. It follows that

$$\bar{S}_{B_p} = (1-p)\bar{S}_{B_0} + p\bar{S}_{B_1}, \tag{69}$$

$$S_{B_p} = (1-p)S_{B_0} + pS_{B_1}, \tag{70}$$

so that $p$ may be written

$$p = \frac{S_{B_p} - S_{B_0}}{S_{B_1} - S_{B_0}}, \tag{71}$$

and therefore $p$ may reasonably be described as the proportion of body waisting. An application of Jones's second theorem, with $\bar{S}_2 = \bar{S}_{C_1}$, $\bar{S}^* = (1-\alpha)\bar{S}_{C_0}$ and $\alpha = p$, yields the result for the drag jump $\bar{D}_{C_p}$ as

$$\bar{D}_{C_p} = [(1+b)^2 + (1-p)^2(a^{-4}d-1)b^2]\,\bar{D}_{B_0}; \tag{72}$$

alternatively the drag jump obtained by partial waisting may be expressed by the formula

$$\frac{\bar{D}_{C_p} - \bar{D}_{C_0}}{\bar{D}_{C_1} - \bar{D}_{C_0}} = 1 - (1-p)^2. \tag{73}$$

A further application of Jones's second theorem, with $\bar{S}_2 = \bar{S}_{B_0}$, $\bar{S}^* = (1-\alpha)\bar{S}_{B_1}$ and $\alpha = (1-p)$, gives the drag jump $\bar{D}_{B_p}$ of an isolated residual body $\bar{B}_p$ as

$$\bar{D}_{B_p} = [1 + p^2(a^{-4}d-1)b^2]\,\bar{D}_{B_0}; \tag{74}$$

the increase of the drag jump of an isolated body as $p$ increases can be expressed by

$$\frac{\bar{D}_{B_p} - \bar{D}_{B_0}}{\bar{D}_{B_1} - \bar{D}_{B_0}} = p^2. \tag{75}$$

The interference drag jump $D_{I_p}$ follows as

$$D_{I_p} = [1 - p(a^{-4}d-1)b]\,2b\bar{D}_{B_0}, \tag{76}$$

and the change of interference drag jump can be written

$$\frac{D_{I_p} - D_{I_0}}{D_{I_1} - D_{I_0}} = p. \tag{77}$$

4.4. *A Numerical Example.* Comprehensive numerical illustrations of the preceding formulae are not given since the formulae are in many instances sufficiently simple for the principal variations to be seen on inspection, but a single numerical example is presented here. The case is chosen so that the drag jump of the von Kármán portion of the unwaisted body of the basic combination is very small compared with the value for the Sears-Haack portion (a very common situation), and therefore it is reasonable to ignore it and concentrate on comparisons of the drag jumps associated with residual area distributions only.

The wing selected has the following overall properties:

$$l_W = \tfrac{1}{2}l_B, \qquad \text{so } a = \tfrac{1}{2}, \tag{78}$$

$$V_W = \tfrac{1}{2}\bar{V}_B, \qquad \text{so } b = \tfrac{1}{2}, \tag{79}$$

$$(S_W)_{\max} = (\bar{S}_{B_0})_{\max}, \qquad \text{so } c = 1, \tag{80}$$

$$D_W = 4\bar{D}_{B_0}, \qquad \text{so } d = 1; \tag{81}$$

the Figs. 6, 7 and 8 have in fact been drawn for this particular case. This wing is based on the wing used in a series of experiments[23] on the transonic area rule. The wing used in the tests had an untapered straight-edged planform with 45 deg sweepback and with an exposed aspect ratio of 2, while the thickness distribution had similar chordwise sections of biconvex parabolic shape and with the thickness/chord ratio constant and equal to 0·0743. The overall length of the wing was a half of the length of the body, so that $a = \frac{1}{2}$; the volume of the wing was such that $b = 0{\cdot}493$; the maximum cross-sectional area was such that $c = 1{\cdot}18$; the drag jump of the exposed wing was such that $d = 1{\cdot}33$. The values of $b$, $c$ and $d$ for the example are chosen to be simpler than those for the experimental wing; the chosen values $c = 1$ and $d = 1$ indicate that the illustrative wing has a Sears-Haack area distribution.

The values of the volumes and maximum areas of the combinations, and the drag jumps for the combinations and isolated bodies and the interference drag jumps, for the basic combination $\bar{C}_0$, the fully-waisted combination $\bar{C}_+$ with greater volume, the fully-waisted combination $\bar{C}_1$ with the same volume and the combination $\bar{C}_{1/2}$ with the same volume and a body with half of full waisting, are given in the following table.

| Combination | $\bar{V}_C/\bar{V}_B$ | $(\bar{S}_C)_{\max}/(\bar{S}_{B_0})_{\max}$ | $\bar{D}_C/\bar{D}_{B_0}$ | $\bar{D}_B/\bar{D}_{B_0}$ | $D_I/\bar{D}_{B_0}$ |
|---|---|---|---|---|---|
| $\bar{C}_0$ | $\frac{3}{2} = 1{\cdot}5$ | 2 | 6 | 1 | 1 |
| $\bar{C}_+$ | 2 | 2 | 4 | 6 | $-6$ |
| $\bar{C}_1$ | $\frac{3}{2} = 1{\cdot}5$ | $\frac{3}{2} = 1{\cdot}5$ | $\frac{9}{4} = 2{\cdot}25$ | $\frac{19}{4} = 4{\cdot}75$ | $-\frac{13}{2} = -6{\cdot}5$ |
| $\bar{C}_{1/2}$ | $\frac{3}{2} = 1{\cdot}5$ | $\frac{7}{4} = 1{\cdot}75$ | $\frac{51}{16} = 3{\cdot}19$ | $\frac{31}{16} = 1{\cdot}94$ | $-\frac{11}{4} = -2{\cdot}75$ |

4.5. *Comments.* The formulae given in these particular examples involve only a few parameters and, since these parameters define overall properties of the combinations, the formulae may be of some use in making rough estimates for less specialised configurations.

The numerical example illustrates a general property of drag jump at sonic speed, namely that design of the wing and body separately to have low drag jump in isolation does not incur a particularly large penalty of unfavourable interference drag jump, but rather it fails to make use of the large favourable interference which can be obtained by suitable waisting of the body. It may be noted that large favourable interferences and low combination drag jumps are produced by bodies which have high drag jumps in isolation. Although the optimum bodies have pronounced waists, it is not necessary that a body designed by the sonic area rule for low drag jump should have an exaggerated waist; the values of the wing and body parameters may themselves result in an unremarkable waist, but even if they do not it is seen that partial waisting can be very effective in reducing the body waisting without increasing too much the drag jump.

5. *Concluding Remarks.* The sonic area rule is important in the first stage of the design of wing-body combinations of low drag rise at transonic speeds. It provides a simple design method together with quantitative information on the appropriate body waisting and the magnitude of the corresponding drag rise. The area rule is therefore well suited to give a 'feeling' for a transonic design problem. It certainly does not eliminate the need for great care in the detailed design of the component parts of a configuration, but it does seem to be true that a configuration designed without regard to the area rule is unlikely to achieve maximum transonic performance no matter how carefully its components parts may be designed.

## LIST OF SYMBOLS

| | | |
|---|---|---|
| $a$ | = | $l_W/l_B$ |
| $b$ | = | $V_W/\bar{V}_B$ |
| $c$ | = | $ab^{-1}(S_W)_{\max}/(\bar{S}_{B_0})_{\max}$ |
| $d$ | = | $a^4b^{-2}D_W/\bar{D}_{B_0}$ |
| $f(\xi)$ | | Function occurring in von Kármán optimum |
| $g(\xi)$ | | Function occurring in Sears-Haack optimum |
| $h(\kappa, \xi)$ | | Function occurring in Adams optimum |
| $k$ | | Location of fixed area $A$ |
| $l$ | | Length of area distribution |
| $m$ | | Location of $S_{\max}$ |
| $n$ | | Number of fixed areas in generalised forms of the Adams and the author's optima |
| $p$ | | Proportion of body waisting, $0 \leqslant p \leqslant 1$ |
| $q$ | | Kinetic pressure |
| $x$ | | Axial co-ordinate, measured from nose of combination |
| $A$ | | A fixed area |
| $B$ | | Base area |
| $D$ | | Drag jump |
| $M$ | | Mach number |
| $N$ | | Nose area |
| $S(x)$ | | Area distribution |
| $S_{\max}$ | | Maximum residual area |
| $V$ | | Volume |
| $\alpha$ | | Coefficient of Sears-Haack portion of any residual area distribution |
| $\beta$ | | Coefficient of Adams portion of any residual area distribution with a fixed area |
| $\kappa$ | = | $k/l$ |
| $\mu$ | = | $m/l$ |
| $\xi$ | = | $x/l$ |
| $\chi$ | = | $4k(l-k)/l^2$ |
| $\omega$ | = | $48\bar{V}k^{3/2}(l-k)^{3/2}/\pi\bar{A}l^4$ |

*Superscripts*

| | |
|---|---|
| — | Denotes quantities associated with a residual area distribution |
| * | Denotes quantities associated with the remainder of any residual area distribution when a Sears-Haack portion is subtracted |

*Subscripts*

| | |
|---|---|
| $W$ | Exposed wing |
| $B$ | Total body, including engine air |
| $C$ | Total combination |
| $I$ | Interference |
| 0 | Pertains to basic combination in quantitative examples |
| + | Pertains to minimum drag-jump combination with increased volume |
| $p, 0 \leqslant p \leqslant 1$ | Pertains to combination with same volume as basic combination and with a proportion $p$ of body waisting |
| 1 | Pertains to combination with same volume as basic combination and with full waisting (the two uses of subscript 1 do not overlap) |
| 1 | Denotes quantities associated with von Kármán optimum (the two uses of subscript 1 do not overlap) |
| 2 | Denotes quantities associated with Sears-Haack optimum |
| 3 | Denotes quantities associated with Adams optima |
| 4 | Denotes quantities associated with the author's optima |
| $ni$ (or $nj$) | Additional subscripts used for generalised forms of the Adams and the author's optima; denote quantities associated with the original forms of the Adams and the author's optima with the $i$th (or $j$th) of $n$ residual areas fixed; omitted entirely when $n = 1$. |

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## TABLE 1

*f(ξ) and g(ξ)*

| $\xi$ | $f(\xi)$ | $g(\xi)$ | $\xi$ | $f(\xi)$ | $g(\xi)$ |
|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·50 | 0·50000 | 1·00000 |
| 0·01 | 0·00169 | 0·00788 | 0·51 | 0·51273 | 0·99940 |
| 0·02 | 0·00477 | 0·02195 | 0·52 | 0·52546 | 0·99760 |
| 0·03 | 0·00874 | 0·03971 | 0·53 | 0·53817 | 0·99460 |
| 0·04 | 0·01342 | 0·06020 | 0·54 | 0·55088 | 0·99042 |
| 0·05 | 0·01869 | 0·08282 | 0·55 | 0·56356 | 0·98504 |
| 0·06 | 0·02450 | 0·10715 | 0·56 | 0·57621 | 0·97848 |
| 0·07 | 0·03077 | 0·13288 | 0·57 | 0·58883 | 0·97074 |
| 0·08 | 0·03748 | 0·15974 | 0·58 | 0·60142 | 0·96185 |
| 0·09 | 0·04458 | 0·18751 | 0·59 | 0·61397 | 0·95180 |
| 0·10 | 0·05204 | 0·21600 | 0·60 | 0·62647 | 0·94060 |
| 0·11 | 0·05985 | 0·24506 | 0·61 | 0·63892 | 0·92829 |
| 0·12 | 0·06797 | 0·27453 | 0·62 | 0·65131 | 0·91486 |
| 0·13 | 0·07639 | 0·30429 | 0·63 | 0·66364 | 0·90033 |
| 0·14 | 0·08509 | 0·33422 | 0·64 | 0·67590 | 0·88474 |
| 0·15 | 0·09406 | 0·36421 | 0·65 | 0·68808 | 0·86808 |
| 0·16 | 0·10328 | 0·39417 | 0·66 | 0·70019 | 0·85040 |
| 0·17 | 0·11273 | 0·42401 | 0·67 | 0·71220 | 0·83171 |
| 0·18 | 0·12240 | 0·45365 | 0·68 | 0·72413 | 0·81204 |
| 0·19 | 0·13229 | 0·48300 | 0·69 | 0·73596 | 0·79142 |
| 0·20 | 0·14238 | 0·51200 | 0·70 | 0·74768 | 0·76987 |
| 0·21 | 0·15266 | 0·54058 | 0·71 | 0·75930 | 0·74744 |
| 0·22 | 0·16312 | 0·56868 | 0·72 | 0·77079 | 0·72415 |
| 0·23 | 0·17375 | 0·59624 | 0·73 | 0·78216 | 0·70004 |
| 0·24 | 0·18455 | 0·62320 | 0·74 | 0·79340 | 0·67515 |
| 0·25 | 0·19550 | 0·64952 | 0·75 | 0·80450 | 0·64952 |
| 0·26 | 0·20660 | 0·67515 | 0·76 | 0·81545 | 0·62320 |
| 0·27 | 0·21784 | 0·70004 | 0·77 | 0·82625 | 0·59624 |
| 0·28 | 0·22921 | 0·72415 | 0·78 | 0·83688 | 0·56868 |
| 0·29 | 0·24070 | 0·74744 | 0·79 | 0·84734 | 0·54058 |
| 0·30 | 0·25232 | 0·76987 | 0·80 | 0·85762 | 0·51200 |
| 0·31 | 0·26404 | 0·79142 | 0·81 | 0·86771 | 0·48300 |
| 0·32 | 0·27587 | 0·81204 | 0·82 | 0·87760 | 0·45365 |
| 0·33 | 0·28780 | 0·83171 | 0·83 | 0·88727 | 0·42401 |
| 0·34 | 0·29981 | 0·85040 | 0·84 | 0·89672 | 0·39417 |
| 0·35 | 0·31192 | 0·86808 | 0·85 | 0·90594 | 0·36421 |
| 0·36 | 0·32410 | 0·88474 | 0·86 | 0·91491 | 0·33422 |
| 0·37 | 0·33636 | 0·90033 | 0·87 | 0·92361 | 0·30429 |
| 0·38 | 0·34869 | 0·91486 | 0·88 | 0·93203 | 0·27453 |
| 0·39 | 0·36108 | 0·92829 | 0·89 | 0·94015 | 0·24506 |
| 0·40 | 0·37353 | 0·94060 | 0·90 | 0·94796 | 0·21600 |
| 0·41 | 0·38603 | 0·95180 | 0·91 | 0·95542 | 0·18751 |
| 0·42 | 0·39858 | 0·96185 | 0·92 | 0·96252 | 0·15974 |
| 0·43 | 0·41117 | 0·97074 | 0·93 | 0·96923 | 0·13288 |
| 0·44 | 0·42379 | 0·97848 | 0·94 | 0·97550 | 0·10715 |
| 0·45 | 0·43644 | 0·98504 | 0·95 | 0·98131 | 0·08282 |
| 0·46 | 0·44912 | 0·99042 | 0·96 | 0·98658 | 0·06020 |
| 0·47 | 0·46183 | 0·99460 | 0·97 | 0·99126 | 0·03971 |
| 0·48 | 0·47454 | 0·99760 | 0·98 | 0·99523 | 0·02195 |
| 0·49 | 0·48727 | 0·99940 | 0·99 | 0·99831 | 0·00788 |
| 0·50 | 0·50000 | 1·00000 | 1·00 | 1·00000 | 0·00000 |

## TABLE 2

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·00 | 0·01 | 0·02 | 0·03 | 0·04 | 0·05 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00000 | 0·00039 | 0·00065 | 0·00082 | 0·00095 | 0·00106 |
| 0·02 | 0·00000 | 0·00065 | 0·00154 | 0·00210 | 0·00251 | 0·00284 |
| 0·03 | 0·00000 | 0·00082 | 0·00210 | 0·00339 | 0·00426 | 0·00492 |
| 0·04 | 0·00000 | 0·00095 | 0·00251 | 0·00426 | 0·00590 | 0·00706 |
| 0·05 | 0·00000 | 0·00106 | 0·00284 | 0·00492 | 0·00706 | 0·00902 |
| 0·06 | 0·00000 | 0·00115 | 0·00311 | 0·00545 | 0·00796 | 0·01046 |
| 0·07 | 0·00000 | 0·00122 | 0·00334 | 0·00591 | 0·00871 | 0·01160 |
| 0·08 | 0·00000 | 0·00129 | 0·00355 | 0·00630 | 0·00935 | 0·01255 |
| 0·09 | 0·00000 | 0·00135 | 0·00372 | 0·00664 | 0·00990 | 0·01337 |
| 0·10 | 0·00000 | 0·00141 | 0·00388 | 0·00694 | 0·01039 | 0·01408 |
| 0·11 | 0·00000 | 0·00145 | 0·00402 | 0·00721 | 0·01081 | 0·01471 |
| 0·12 | 0·00000 | 0·00149 | 0·00414 | 0·00744 | 0·01119 | 0·01526 |
| 0·13 | 0·00000 | 0·00153 | 0·00425 | 0·00764 | 0·01152 | 0·01574 |
| 0·14 | 0·00000 | 0·00156 | 0·00434 | 0·00783 | 0·01181 | 0·01616 |
| 0·15 | 0·00000 | 0·00159 | 0·00443 | 0·00799 | 0·01207 | 0·01654 |
| 0·16 | 0·00000 | 0·00162 | 0·00450 | 0·00813 | 0·01229 | 0·01687 |
| 0·17 | 0·00000 | 0·00164 | 0·00456 | 0·00825 | 0·01249 | 0·01715 |
| 0·18 | 0·00000 | 0·00166 | 0·00462 | 0·00835 | 0·01266 | 0·01740 |
| 0·19 | 0·00000 | 0·00167 | 0·00466 | 0·00844 | 0·01280 | 0·01761 |
| 0·20 | 0·00000 | 0·00168 | 0·00470 | 0·00851 | 0·01292 | 0·01779 |
| 0·21 | 0·00000 | 0·00169 | 0·00473 | 0·00857 | 0·01302 | 0·01794 |
| 0·22 | 0·00000 | 0·00170 | 0·00475 | 0·00862 | 0·01310 | 0·01806 |
| 0·23 | 0·00000 | 0·00171 | 0·00477 | 0·00866 | 0·01316 | 0·01815 |
| 0·24 | 0·00000 | 0·00171 | 0·00478 | 0·00868 | 0·01320 | 0·01822 |
| 0·25 | 0·00000 | 0·00171 | 0·00479 | 0·00870 | 0·01323 | 0·01826 |
| 0·26 | 0·00000 | 0·00171 | 0·00479 | 0·00870 | 0·01324 | 0·01829 |
| 0·27 | 0·00000 | 0·00171 | 0·00479 | 0·00870 | 0·01324 | 0·01829 |
| 0·28 | 0·00000 | 0·00171 | 0·00478 | 0·00868 | 0·01322 | 0·01827 |
| 0·29 | 0·00000 | 0·00170 | 0·00476 | 0·00866 | 0·01319 | 0·01823 |
| 0·30 | 0·00000 | 0·00169 | 0·00474 | 0·00863 | 0·01315 | 0·01818 |
| 0·31 | 0·00000 | 0·00169 | 0·00472 | 0·00859 | 0·01309 | 0·01810 |
| 0·32 | 0·00000 | 0·00168 | 0·00470 | 0·00854 | 0·01302 | 0·01802 |
| 0·33 | 0·00000 | 0·00166 | 0·00467 | 0·00849 | 0·01294 | 0·01791 |
| 0·34 | 0·00000 | 0·00165 | 0·00463 | 0·00843 | 0·01286 | 0·01779 |
| 0·35 | 0·00000 | 0·00164 | 0·00459 | 0·00836 | 0·01276 | 0·01766 |
| 0·36 | 0·00000 | 0·00162 | 0·00455 | 0·00829 | 0·01265 | 0·01752 |
| 0·37 | 0·00000 | 0·00161 | 0·00451 | 0·00821 | 0·01253 | 0·01736 |
| 0·38 | 0·00000 | 0·00159 | 0·00446 | 0·00813 | 0·01241 | 0·01719 |
| 0·39 | 0·00000 | 0·00157 | 0·00441 | 0·00804 | 0·01227 | 0·01700 |
| 0·40 | 0·00000 | 0·00156 | 0·00436 | 0·00795 | 0·01213 | 0·01681 |
| 0·41 | 0·00000 | 0·00154 | 0·00431 | 0·00785 | 0·01198 | 0·01661 |
| 0·42 | 0·00000 | 0·00151 | 0·00425 | 0·00775 | 0·01183 | 0·01639 |
| 0·43 | 0·00000 | 0·00149 | 0·00419 | 0·00764 | 0·01167 | 0·01617 |
| 0·44 | 0·00000 | 0·00147 | 0·00413 | 0·00753 | 0·01150 | 0·01594 |
| 0·45 | 0·00000 | 0·00145 | 0·00407 | 0·00741 | 0·01132 | 0·01570 |
| 0·46 | 0·00000 | 0·00142 | 0·00400 | 0·00729 | 0·01114 | 0·01545 |
| 0·47 | 0·00000 | 0·00140 | 0·00393 | 0·00717 | 0·01095 | 0·01519 |
| 0·48 | 0·00000 | 0·00138 | 0·00386 | 0·00704 | 0·01076 | 0·01493 |
| 0·49 | 0·00000 | 0·00135 | 0·00379 | 0·00691 | 0·01057 | 0·01465 |
| 0·50 | 0·00000 | 0·00132 | 0·00372 | 0·00678 | 0·01036 | 0·01438 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·05 | 0·06 | 0·07 | 0·08 | 0·09 | 0·10 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00106 | 0·00115 | 0·00122 | 0·00129 | 0·00135 | 0·00141 |
| 0·02 | 0·00284 | 0·00311 | 0·00334 | 0·00355 | 0·00372 | 0·00388 |
| 0·03 | 0·00492 | 0·00545 | 0·00591 | 0·00630 | 0·00664 | 0·00694 |
| 0·04 | 0·00706 | 0·00796 | 0·00871 | 0·00935 | 0·00990 | 0·01039 |
| 0·05 | 0·00902 | 0·01046 | 0·01160 | 0·01255 | 0·01337 | 0·01408 |
| 0·06 | 0·01046 | 0·01272 | 0·01442 | 0·01578 | 0·01693 | 0·01792 |
| 0·07 | 0·01160 | 0·01442 | 0·01695 | 0·01888 | 0·02045 | 0·02178 |
| 0·08 | 0·01255 | 0·01578 | 0·01888 | 0·02167 | 0·02382 | 0·02558 |
| 0·09 | 0·01337 | 0·01693 | 0·02045 | 0·02382 | 0·02683 | 0·02918 |
| 0·10 | 0·01408 | 0·01792 | 0·02178 | 0·02558 | 0·02918 | 0·03240 |
| 0·11 | 0·01471 | 0·01878 | 0·02293 | 0·02708 | 0·03112 | 0·03493 |
| 0·12 | 0·01526 | 0·01953 | 0·02394 | 0·02838 | 0·03277 | 0·03703 |
| 0·13 | 0·01574 | 0·02020 | 0·02482 | 0·02951 | 0·03420 | 0·03882 |
| 0·14 | 0·01616 | 0·02078 | 0·02559 | 0·03050 | 0·03545 | 0·04037 |
| 0·15 | 0·01654 | 0·02130 | 0·02627 | 0·03137 | 0·03655 | 0·04173 |
| 0·16 | 0·01687 | 0·02175 | 0·02686 | 0·03214 | 0·03751 | 0·04291 |
| 0·17 | 0·01715 | 0·02214 | 0·02738 | 0·03281 | 0·03835 | 0·04395 |
| 0·18 | 0·01740 | 0·02248 | 0·02784 | 0·03339 | 0·03908 | 0·04485 |
| 0·19 | 0·01761 | 0·02278 | 0·02823 | 0·03389 | 0·03971 | 0·04563 |
| 0·20 | 0·01779 | 0·02303 | 0·02856 | 0·03432 | 0·04025 | 0·04631 |
| 0·21 | 0·01794 | 0·02324 | 0·02884 | 0·03468 | 0·04071 | 0·04688 |
| 0·22 | 0·01806 | 0·02340 | 0·02907 | 0·03498 | 0·04109 | 0·04736 |
| 0·23 | 0·01815 | 0·02354 | 0·02925 | 0·03522 | 0·04141 | 0·04775 |
| 0·24 | 0·01822 | 0·02364 | 0·02939 | 0·03541 | 0·04165 | 0·04807 |
| 0·25 | 0·01826 | 0·02371 | 0·02949 | 0·03555 | 0·04184 | 0·04831 |
| 0·26 | 0·01829 | 0·02375 | 0·02955 | 0·03564 | 0·04197 | 0·04848 |
| 0·27 | 0·01829 | 0·02376 | 0·02958 | 0·03569 | 0·04204 | 0·04859 |
| 0·28 | 0·01827 | 0·02374 | 0·02957 | 0·03569 | 0·04206 | 0·04864 |
| 0·29 | 0·01823 | 0·02370 | 0·02953 | 0·03565 | 0·04203 | 0·04862 |
| 0·30 | 0·01818 | 0·02364 | 0·02945 | 0·03558 | 0·04196 | 0·04856 |
| 0·31 | 0·01810 | 0·02355 | 0·02935 | 0·03547 | 0·04184 | 0·04844 |
| 0·32 | 0·01802 | 0·02344 | 0·02923 | 0·03532 | 0·04168 | 0·04827 |
| 0·33 | 0·01791 | 0·02331 | 0·02907 | 0·03514 | 0·04149 | 0·04805 |
| 0·34 | 0·01779 | 0·02316 | 0·02889 | 0·03494 | 0·04125 | 0·04779 |
| 0·35 | 0·01766 | 0·02299 | 0·02869 | 0·03470 | 0·04098 | 0·04749 |
| 0·36 | 0·01752 | 0·02281 | 0·02846 | 0·03443 | 0·04068 | 0·04715 |
| 0·37 | 0·01736 | 0·02260 | 0·02822 | 0·03414 | 0·04034 | 0·04677 |
| 0·38 | 0·01719 | 0·02239 | 0·02795 | 0·03382 | 0·03997 | 0·04636 |
| 0·39 | 0·01700 | 0·02215 | 0·02766 | 0·03348 | 0·03958 | 0·04591 |
| 0·40 | 0·01681 | 0·02190 | 0·02736 | 0·03312 | 0·03915 | 0·04542 |
| 0·41 | 0·01661 | 0·02164 | 0·02703 | 0·03273 | 0·03870 | 0·04491 |
| 0·42 | 0·01639 | 0·02137 | 0·02669 | 0·03233 | 0·03823 | 0·04436 |
| 0·43 | 0·01617 | 0·02108 | 0·02634 | 0·03190 | 0·03773 | 0·04379 |
| 0·44 | 0·01594 | 0·02078 | 0·02596 | 0·03145 | 0·03721 | 0·04319 |
| 0·45 | 0·01570 | 0·02047 | 0·02558 | 0·03099 | 0·03666 | 0·04257 |
| 0·46 | 0·01545 | 0·02014 | 0·02518 | 0·03051 | 0·03610 | 0·04192 |
| 0·47 | 0·01519 | 0·01981 | 0·02476 | 0·03001 | 0·03551 | 0·04124 |
| 0·48 | 0·01493 | 0·01947 | 0·02434 | 0·02950 | 0·03491 | 0·04055 |
| 0·49 | 0·01465 | 0·01912 | 0·02390 | 0·02897 | 0·03429 | 0·03983 |
| 0·50 | 0·01438 | 0·01875 | 0·02345 | 0·02843 | 0·03365 | 0·03910 |

## TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·10 | 0·11 | 0·12 | 0·13 | 0·14 | 0·15 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00141 | 0·00145 | 0·00149 | 0·00153 | 0·00156 | 0·00159 |
| 0·02 | 0·00388 | 0·00402 | 0·00414 | 0·00425 | 0·00434 | 0·00443 |
| 0·03 | 0·00694 | 0·00721 | 0·00744 | 0·00764 | 0·00783 | 0·00799 |
| 0·04 | 0·01039 | 0·01081 | 0·01119 | 0·01152 | 0·01181 | 0·01207 |
| 0·05 | 0·01408 | 0·01471 | 0·01526 | 0·01574 | 0·01616 | 0·01654 |
| 0·06 | 0·01792 | 0·01878 | 0·01953 | 0·02020 | 0·02078 | 0·02130 |
| 0·07 | 0·02178 | 0·02293 | 0·02394 | 0·02482 | 0·02559 | 0·02627 |
| 0·08 | 0·02558 | 0·02708 | 0·02838 | 0·02951 | 0·03050 | 0·03137 |
| 0·09 | 0·02918 | 0·03112 | 0·03277 | 0·03420 | 0·03545 | 0·03655 |
| 0·10 | 0·03240 | 0·03493 | 0·03703 | 0·03882 | 0·04037 | 0·04173 |
| 0·11 | 0·03493 | 0·03834 | 0·04103 | 0·04327 | 0·04519 | 0·04685 |
| 0·12 | 0·03703 | 0·04103 | 0·04461 | 0·04745 | 0·04981 | 0·05184 |
| 0·13 | 0·03882 | 0·04327 | 0·04745 | 0·05117 | 0·05413 | 0·05661 |
| 0·14 | 0·04037 | 0·04519 | 0·04981 | 0·05413 | 0·05798 | 0·06106 |
| 0·15 | 0·04173 | 0·04685 | 0·05184 | 0·05661 | 0·06106 | 0·06502 |
| 0·16 | 0·04291 | 0·04830 | 0·05359 | 0·05873 | 0·06363 | 0·06820 |
| 0·17 | 0·04395 | 0·04956 | 0·05511 | 0·06056 | 0·06583 | 0·07084 |
| 0·18 | 0·04485 | 0·05066 | 0·05644 | 0·06215 | 0·06773 | 0·07311 |
| 0·19 | 0·04563 | 0·05161 | 0·05759 | 0·06353 | 0·06937 | 0·07505 |
| 0·20 | 0·04631 | 0·05243 | 0·05859 | 0·06472 | 0·07078 | 0·07673 |
| 0·21 | 0·04688 | 0·05314 | 0·05944 | 0·06574 | 0·07200 | 0·07817 |
| 0·22 | 0·04736 | 0·05373 | 0·06016 | 0·06661 | 0·07304 | 0·07941 |
| 0·23 | 0·04775 | 0·05422 | 0·06076 | 0·06734 | 0·07391 | 0·08045 |
| 0·24 | 0·04807 | 0·05461 | 0·06125 | 0·06794 | 0·07464 | 0·08132 |
| 0·25 | 0·04831 | 0·05492 | 0·06164 | 0·06842 | 0·07523 | 0·08203 |
| 0·26 | 0·04848 | 0·05515 | 0·06193 | 0·06879 | 0·07568 | 0·08259 |
| 0·27 | 0·04859 | 0·05530 | 0·06213 | 0·06905 | 0·07602 | 0·08302 |
| 0·28 | 0·04864 | 0·05538 | 0·06225 | 0·06922 | 0·07625 | 0·08332 |
| 0·29 | 0·04862 | 0·05539 | 0·06229 | 0·06929 | 0·07637 | 0·08350 |
| 0·30 | 0·04856 | 0·05533 | 0·06225 | 0·06928 | 0·07640 | 0·08357 |
| 0·31 | 0·04844 | 0·05522 | 0·06215 | 0·06919 | 0·07633 | 0·08353 |
| 0·32 | 0·04827 | 0·05504 | 0·06197 | 0·06903 | 0·07618 | 0·08340 |
| 0·33 | 0·04805 | 0·05481 | 0·06173 | 0·06879 | 0·07594 | 0·08317 |
| 0·34 | 0·04779 | 0·05453 | 0·06144 | 0·06848 | 0·07562 | 0·08285 |
| 0·35 | 0·04749 | 0·05420 | 0·06108 | 0·06810 | 0·07523 | 0·08245 |
| 0·36 | 0·04715 | 0·05383 | 0·06068 | 0·06767 | 0·07477 | 0·08197 |
| 0·37 | 0·04677 | 0·05341 | 0·06022 | 0·06717 | 0·07424 | 0·08142 |
| 0·38 | 0·04636 | 0·05294 | 0·05971 | 0·06662 | 0·07365 | 0·08079 |
| 0·39 | 0·04591 | 0·05244 | 0·05915 | 0·06601 | 0·07300 | 0·08009 |
| 0·40 | 0·04542 | 0·05190 | 0·05855 | 0·06536 | 0·07229 | 0·07934 |
| 0·41 | 0·04491 | 0·05132 | 0·05791 | 0·06466 | 0·07153 | 0·07852 |
| 0·42 | 0·04436 | 0·05071 | 0·05723 | 0·06391 | 0·07072 | 0·07764 |
| 0·43 | 0·04379 | 0·05006 | 0·05651 | 0·06311 | 0·06985 | 0·07670 |
| 0·44 | 0·04319 | 0·04938 | 0·05575 | 0·06228 | 0·06894 | 0·07572 |
| 0·45 | 0·04257 | 0·04867 | 0·05496 | 0·06141 | 0·06798 | 0·07468 |
| 0·46 | 0·04192 | 0·04794 | 0·05414 | 0·06049 | 0·06699 | 0·07359 |
| 0·47 | 0·04124 | 0·04717 | 0·05328 | 0·05955 | 0·06595 | 0·07246 |
| 0·48 | 0·04055 | 0·04639 | 0·05240 | 0·05857 | 0·06487 | 0·07129 |
| 0·49 | 0·03983 | 0·04557 | 0·05149 | 0·05755 | 0·06376 | 0·07008 |
| 0·50 | 0·03910 | 0·04474 | 0·05055 | 0·05651 | 0·06261 | 0·06883 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·15 | 0·16 | 0·17 | 0·18 | 0·19 | 0·20 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00159 | 0·00162 | 0·00164 | 0·00166 | 0·00167 | 0·00168 |
| 0·02 | 0·00443 | 0·00450 | 0·00456 | 0·00462 | 0·00466 | 0·00470 |
| 0·03 | 0·00799 | 0·00813 | 0·00825 | 0·00835 | 0·00844 | 0·00851 |
| 0·04 | 0·01207 | 0·01229 | 0·01249 | 0·01266 | 0·01280 | 0·01292 |
| 0·05 | 0·01654 | 0·01687 | 0·01715 | 0·01740 | 0·01761 | 0·01779 |
| 0·06 | 0·02130 | 0·02175 | 0·02214 | 0·02248 | 0·02278 | 0·02303 |
| 0·07 | 0·02627 | 0·02686 | 0·02738 | 0·02784 | 0·02823 | 0·02856 |
| 0·08 | 0·03137 | 0·03214 | 0·03281 | 0·03339 | 0·03389 | 0·03432 |
| 0·09 | 0·03655 | 0·03751 | 0·03835 | 0·03908 | 0·03971 | 0·04025 |
| 0·10 | 0·04173 | 0·04291 | 0·04395 | 0·04485 | 0·04563 | 0·04631 |
| 0·11 | 0·04685 | 0·04830 | 0·04956 | 0·05066 | 0·05161 | 0·05243 |
| 0·12 | 0·05184 | 0·05359 | 0·05511 | 0·05644 | 0·05759 | 0·05859 |
| 0·13 | 0·05661 | 0·05873 | 0·06056 | 0·06215 | 0·06353 | 0·06472 |
| 0·14 | 0·06106 | 0·06363 | 0·06583 | 0·06773 | 0·06937 | 0·07078 |
| 0·15 | 0·06502 | 0·06820 | 0·07084 | 0·07311 | 0·07505 | 0·07673 |
| 0·16 | 0·06820 | 0·07225 | 0·07550 | 0·07821 | 0·08052 | 0·08251 |
| 0·17 | 0·07084 | 0·07550 | 0·07964 | 0·08295 | 0·08571 | 0·08805 |
| 0·18 | 0·07311 | 0·07821 | 0·08295 | 0·08714 | 0·09050 | 0·09329 |
| 0·19 | 0·07505 | 0·08052 | 0·08571 | 0·09050 | 0·09474 | 0·09813 |
| 0·20 | 0·07673 | 0·08251 | 0·08805 | 0·09329 | 0·09813 | 0·10240 |
| 0·21 | 0·07817 | 0·08421 | 0·09006 | 0·09566 | 0·10094 | 0·10581 |
| 0·22 | 0·07941 | 0·08567 | 0·09177 | 0·09768 | 0·10332 | 0·10862 |
| 0·23 | 0·08045 | 0·08690 | 0·09323 | 0·09939 | 0·10533 | 0·11099 |
| 0·24 | 0·08132 | 0·08794 | 0·09445 | 0·10083 | 0·10703 | 0·11299 |
| 0·25 | 0·08203 | 0·08879 | 0·09547 | 0·10204 | 0·10845 | 0·11466 |
| 0·26 | 0·08259 | 0·08947 | 0·09629 | 0·10302 | 0·10962 | 0·11604 |
| 0·27 | 0·08302 | 0·09000 | 0·09694 | 0·10380 | 0·11056 | 0·11717 |
| 0·28 | 0·08332 | 0·09039 | 0·09742 | 0·10440 | 0·11129 | 0·11806 |
| 0·29 | 0·08350 | 0·09064 | 0·09776 | 0·10483 | 0·11184 | 0·11873 |
| 0·30 | 0·08357 | 0·09076 | 0·09795 | 0·10510 | 0·11220 | 0·11921 |
| 0·31 | 0·08353 | 0·09076 | 0·09800 | 0·10522 | 0·11240 | 0·11949 |
| 0·32 | 0·08340 | 0·09066 | 0·09794 | 0·10520 | 0·11244 | 0·11961 |
| 0·33 | 0·08317 | 0·09045 | 0·09775 | 0·10505 | 0·11233 | 0·11956 |
| 0·34 | 0·08285 | 0·09014 | 0·09745 | 0·10478 | 0·11209 | 0·11936 |
| 0·35 | 0·08245 | 0·08973 | 0·09705 | 0·10439 | 0·11172 | 0·11902 |
| 0·36 | 0·08197 | 0·08924 | 0·09655 | 0·10389 | 0·11122 | 0·11854 |
| 0·37 | 0·08142 | 0·08866 | 0·09596 | 0·10328 | 0·11062 | 0·11794 |
| 0·38 | 0·08079 | 0·08800 | 0·09527 | 0·10258 | 0·10990 | 0·11721 |
| 0·39 | 0·08009 | 0·08727 | 0·09450 | 0·10178 | 0·10908 | 0·11637 |
| 0·40 | 0·07934 | 0·08646 | 0·09365 | 0·10089 | 0·10816 | 0·11543 |
| 0·41 | 0·07852 | 0·08559 | 0·09273 | 0·09992 | 0·10714 | 0·11438 |
| 0·42 | 0·07764 | 0·08465 | 0·09173 | 0·09887 | 0·10604 | 0·11323 |
| 0·43 | 0·07670 | 0·08365 | 0·09067 | 0·09774 | 0·10486 | 0·11200 |
| 0·44 | 0·07572 | 0·08259 | 0·08953 | 0·09654 | 0·10359 | 0·11067 |
| 0·45 | 0·07468 | 0·08147 | 0·08834 | 0·09527 | 0·10225 | 0·10926 |
| 0·46 | 0·07359 | 0·08030 | 0·08709 | 0·09394 | 0·10084 | 0·10778 |
| 0·47 | 0·07246 | 0·07908 | 0·08578 | 0·09254 | 0·09936 | 0·10622 |
| 0·48 | 0·07129 | 0·07781 | 0·08442 | 0·09109 | 0·09782 | 0·10458 |
| 0·49 | 0·07008 | 0·07650 | 0·08301 | 0·08958 | 0·09621 | 0·10289 |
| 0·50 | 0·06883 | 0·07514 | 0·08155 | 0·08802 | 0·09455 | 0·10112 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·20 | 0·21 | 0·22 | 0·23 | 0·24 | 0·25 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00168 | 0·00169 | 0·00170 | 0·00171 | 0·00171 | 0·00171 |
| 0·02 | 0·00470 | 0·00473 | 0·00475 | 0·00477 | 0·00478 | 0·00479 |
| 0·03 | 0·00851 | 0·00857 | 0·00862 | 0·00866 | 0·00868 | 0·00870 |
| 0·04 | 0·01292 | 0·01302 | 0·01310 | 0·01316 | 0·01320 | 0·01323 |
| 0·05 | 0·01779 | 0·01794 | 0·01806 | 0·01815 | 0·01822 | 0·01826 |
| 0·06 | 0·02303 | 0·02324 | 0·02340 | 0·02354 | 0·02364 | 0·02371 |
| 0·07 | 0·02856 | 0·02884 | 0·02907 | 0·02925 | 0·02939 | 0·02949 |
| 0·08 | 0·03432 | 0·03468 | 0·03498 | 0·03522 | 0·03541 | 0·03555 |
| 0·09 | 0·04025 | 0·04071 | 0·04109 | 0·04141 | 0·04165 | 0·04184 |
| 0·10 | 0·04631 | 0·04688 | 0·04736 | 0·04775 | 0·04807 | 0·04831 |
| 0·11 | 0·05243 | 0·05314 | 0·05373 | 0·05422 | 0·05461 | 0·05492 |
| 0·12 | 0·05859 | 0·95944 | 0·06016 | 0·06076 | 0·06125 | 0·06164 |
| 0·13 | 0·06472 | 0·06574 | 0·06661 | 0·06734 | 0·06794 | 0·06842 |
| 0·14 | 0·07078 | 0·07200 | 0·07304 | 0·07391 | 0·07464 | 0·07523 |
| 0·15 | 0·07673 | 0·07817 | 0·07941 | 0·08045 | 0·08132 | 0·08203 |
| 0·16 | 0·08251 | 0·08421 | 0·08567 | 0·08690 | 0·08794 | 0·08879 |
| 0·17 | 0·08805 | 0·09006 | 0·09177 | 0·09323 | 0·09445 | 0·09547 |
| 0·18 | 0·09329 | 0·09566 | 0·09768 | 0·09939 | 0·10083 | 0·10204 |
| 0·19 | 0·09813 | 0·10094 | 0·10332 | 0·10533 | 0·10703 | 0·10845 |
| 0·20 | 0·10240 | 0·10581 | 0·10862 | 0·11099 | 0·11299 | 0·11466 |
| 0·21 | 0·10581 | 0·11009 | 0·11350 | 0·11631 | 0·11866 | 0·12063 |
| 0·22 | 0·10862 | 0·11350 | 0·11779 | 0·12119 | 0·12397 | 0·12629 |
| 0·23 | 0·11099 | 0·11631 | 0·12119 | 0·12546 | 0·12883 | 0·13159 |
| 0·24 | 0·11299 | 0·11866 | 0·12397 | 0·12883 | 0·13308 | 0·13642 |
| 0·25 | 0·11466 | 0·12063 | 0·12629 | 0·13159 | 0·13642 | 0·14062 |
| 0·26 | 0·11604 | 0·12226 | 0·12822 | 0·13386 | 0·13913 | 0·14392 |
| 0·27 | 0·11717 | 0·12360 | 0·12980 | 0·13573 | 0·14135 | 0·14656 |
| 0·28 | 0·11806 | 0·12467 | 0·13108 | 0·13726 | 0·14316 | 0·14872 |
| 0·29 | 0·11873 | 0·12549 | 0·13208 | 0·13847 | 0·14461 | 0·15045 |
| 0·30 | 0·11921 | 0·12610 | 0·13284 | 0·13940 | 0·14574 | 0·15182 |
| 0·31 | 0·11949 | 0·12649 | 0·13336 | 0·14006 | 0·14658 | 0·15287 |
| 0·32 | 0·11961 | 0·12669 | 0·13367 | 0·14050 | 0·14715 | 0·15361 |
| 0·33 | 0·11956 | 0·12672 | 0·13377 | 0·14071 | 0·14749 | 0·15408 |
| 0·34 | 0·11936 | 0·12657 | 0·13370 | 0·14071 | 0·14759 | 0·15430 |
| 0·35 | 0·11902 | 0·12627 | 0·13345 | 0·14052 | 0·14748 | 0·15429 |
| 0·36 | 0·11854 | 0·12582 | 0·13303 | 0·14016 | 0·14718 | 0·15407 |
| 0·37 | 0·11794 | 0·12523 | 0·13246 | 0·13962 | 0·14669 | 0·15364 |
| 0·38 | 0·11721 | 0·12450 | 0·13175 | 0·13893 | 0·14603 | 0·15302 |
| 0·39 | 0·11637 | 0·12366 | 0·13090 | 0·13809 | 0·14520 | 0·15222 |
| 0·40 | 0·11543 | 0·12269 | 0·12992 | 0·13710 | 0·14422 | 0·15126 |
| 0·41 | 0·11438 | 0·12161 | 0·12882 | 0·13599 | 0·14310 | 0·15013 |
| 0·42 | 0·11323 | 0·12042 | 0·12760 | 0·13474 | 0·14184 | 0·14886 |
| 0·43 | 0·11200 | 0·11914 | 0·12627 | 0·13338 | 0·14044 | 0·14745 |
| 0·44 | 0·11067 | 0·11776 | 0·12484 | 0·13190 | 0·13893 | 0·14590 |
| 0·45 | 0·10926 | 0·11629 | 0·12331 | 0·13032 | 0·13730 | 0·14423 |
| 0·46 | 0·10778 | 0·11473 | 0·12169 | 0·12863 | 0·13555 | 0·14244 |
| 0·47 | 0·10622 | 0·11309 | 0·11997 | 0·12685 | 0·13371 | 0·14053 |
| 0·48 | 0·10458 | 0·11138 | 0·11818 | 0·12498 | 0·13176 | 0·13852 |
| 0·49 | 0·10289 | 0·10959 | 0·11630 | 0·12302 | 0·12972 | 0·13641 |
| 0·50 | 0·10112 | 0·10773 | 0·11435 | 0·12098 | 0·12760 | 0·13420 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·25 | 0·26 | 0·27 | 0·28 | 0·29 | 0·30 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00171 | 0·00171 | 0·00171 | 0·00171 | 0·00170 | 0·00169 |
| 0·02 | 0·00479 | 0·00479 | 0·00479 | 0·00478 | 0·00476 | 0·00474 |
| 0·03 | 0·00870 | 0·00870 | 0·00870 | 0·00868 | 0·00866 | 0·00863 |
| 0·04 | 0·01323 | 0·01324 | 0·01324 | 0·01322 | 0·01319 | 0·01315 |
| 0·05 | 0·01826 | 0·01829 | 0·01829 | 0·01827 | 0·01823 | 0·01818 |
| 0·06 | 0·02371 | 0·02375 | 0·02376 | 0·02374 | 0·02370 | 0·02364 |
| 0·07 | 0·02949 | 0·02955 | 0·02958 | 0·02957 | 0·02953 | 0·02945 |
| 0·08 | 0·03555 | 0·03564 | 0·03569 | 0·03569 | 0·03565 | 0·03558 |
| 0·09 | 0·04184 | 0·04197 | 0·04204 | 0·04206 | 0·04203 | 0·04196 |
| 0·10 | 0·04831 | 0·04848 | 0·04859 | 0·04864 | 0·04862 | 0·04856 |
| 0·11 | 0·05492 | 0·05515 | 0·05530 | 0·05538 | 0·05539 | 0·05533 |
| 0·12 | 0·06164 | 0·06193 | 0·06213 | 0·06225 | 0·06229 | 0·06225 |
| 0·13 | 0·06842 | 0·06879 | 0·06905 | 0·06922 | 0·06929 | 0·06928 |
| 0·14 | 0·07523 | 0·07568 | 0·07602 | 0·07625 | 0·07637 | 0·07640 |
| 0·15 | 0·08203 | 0·08259 | 0·08302 | 0·08332 | 0·08350 | 0·08357 |
| 0·16 | 0·08879 | 0·08947 | 0·09000 | 0·09039 | 0·09064 | 0·09076 |
| 0·17 | 0·09547 | 0·09629 | 0·09694 | 0·09742 | 0·09776 | 0·09795 |
| 0·18 | 0·10204 | 0·10302 | 0·10380 | 0·10440 | 0·10483 | 0·10510 |
| 0·19 | 0·10845 | 0·10962 | 0·11056 | 0·11129 | 0·11184 | 0·11220 |
| 0·20 | 0·11466 | 0·11604 | 0·11717 | 0·11806 | 0·11873 | 0·11921 |
| 0·21 | 0·12063 | 0·12226 | 0·12360 | 0·12467 | 0·12549 | 0·12610 |
| 0·22 | 0·12629 | 0·12822 | 0·12980 | 0·13108 | 0·13208 | 0·13284 |
| 0·23 | 0·13159 | 0·13386 | 0·13573 | 0·13726 | 0·13847 | 0·13940 |
| 0·24 | 0·13642 | 0·13913 | 0·14135 | 0·14316 | 0·14461 | 0·14574 |
| 0·25 | 0·14062 | 0·14392 | 0·14656 | 0·14872 | 0·15045 | 0·15182 |
| 0·26 | 0·14392 | 0·14807 | 0·15130 | 0·15388 | 0·15596 | 0·15761 |
| 0·27 | 0·14656 | 0·15130 | 0·15539 | 0·15855 | 0·16105 | 0·16304 |
| 0·28 | 0·14872 | 0·15388 | 0·15855 | 0·16257 | 0·16565 | 0·16806 |
| 0·29 | 0·15045 | 0·15596 | 0·16105 | 0·16565 | 0·16958 | 0·17256 |
| 0·30 | 0·15182 | 0·15761 | 0·16304 | 0·16806 | 0·17256 | 0·17640 |
| 0·31 | 0·15287 | 0·15889 | 0·16460 | 0·16995 | 0·17487 | 0·17928 |
| 0·32 | 0·15361 | 0·15983 | 0·16577 | 0·17140 | 0·17666 | 0·18148 |
| 0·33 | 0·15408 | 0·16047 | 0·16661 | 0·17247 | 0·17800 | 0·18315 |
| 0·34 | 0·15430 | 0·16083 | 0·16713 | 0·17318 | 0·17894 | 0·18437 |
| 0·35 | 0·15429 | 0·16093 | 0·16737 | 0·17359 | 0·17953 | 0·18518 |
| 0·36 | 0·15407 | 0·16080 | 0·16735 | 0·17370 | 0·17981 | 0·18564 |
| 0·37 | 0·15364 | 0·16045 | 0·16709 | 0·17354 | 0·17978 | 0·18578 |
| 0·38 | 0·15302 | 0·15988 | 0·16660 | 0·17314 | 0·17949 | 0·18561 |
| 0·39 | 0·15222 | 0·15913 | 0·16590 | 0·17251 | 0·17894 | 0·18517 |
| 0·40 | 0·15126 | 0·15819 | 0·16499 | 0·17166 | 0·17816 | 0·18447 |
| 0·41 | 0·15013 | 0·15708 | 0·16391 | 0·17060 | 0·17715 | 0·18353 |
| 0·42 | 0·14886 | 0·15580 | 0·16264 | 0·16936 | 0·17594 | 0·18236 |
| 0·43 | 0·14745 | 0·15438 | 0·16121 | 0·16794 | 0·17454 | 0·18099 |
| 0·44 | 0·14590 | 0·15281 | 0·15963 | 0·16635 | 0·17295 | 0·17942 |
| 0·45 | 0·14423 | 0·15110 | 0·15789 | 0·16460 | 0·17119 | 0·17766 |
| 0·46 | 0·14244 | 0·14926 | 0·15602 | 0·16270 | 0·16927 | 0·17573 |
| 0·47 | 0·14053 | 0·14730 | 0·15402 | 0·16065 | 0·16720 | 0·17364 |
| 0·48 | 0·13852 | 0·14523 | 0·15189 | 0·15848 | 0·16498 | 0·17139 |
| 0·49 | 0·13641 | 0·14305 | 0·14964 | 0·15617 | 0·16263 | 0·16899 |
| 0·50 | 0·13420 | 0·14076 | 0·14728 | 0·15375 | 0·16014 | 0·16646 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·30 | 0·31 | 0·32 | 0·33 | 0·34 | 0·35 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00169 | 0·00169 | 0·00168 | 0·00166 | 0·00165 | 0·00164 |
| 0·02 | 0·00474 | 0·00472 | 0·00470 | 0·00467 | 0·00463 | 0·00459 |
| 0·03 | 0·00863 | 0·00859 | 0·00854 | 0·00849 | 0·00843 | 0·00836 |
| 0·04 | 0·01315 | 0·01309 | 0·01302 | 0·01294 | 0·01286 | 0·01276 |
| 0·05 | 0·01818 | 0·01810 | 0·01802 | 0·01791 | 0·01779 | 0·01766 |
| 0·06 | 0·02364 | 0·02355 | 0·02344 | 0·02331 | 0·02316 | 0·02299 |
| 0·07 | 0·02945 | 0·02935 | 0·02923 | 0·02907 | 0·02889 | 0·02869 |
| 0·08 | 0·03558 | 0·03547 | 0·03532 | 0·03514 | 0·03494 | 0·03470 |
| 0·09 | 0·04196 | 0·04184 | 0·04168 | 0·04149 | 0·04125 | 0·04098 |
| 0·10 | 0·04856 | 0·04844 | 0·04827 | 0·04805 | 0·04779 | 0·04749 |
| 0·11 | 0·05533 | 0·05522 | 0·05504 | 0·05481 | 0·05453 | 0·05420 |
| 0·12 | 0·06225 | 0·06215 | 0·06197 | 0·06173 | 0·06144 | 0·06108 |
| 0·13 | 0·06928 | 0·06919 | 0·06903 | 0·06879 | 0·06848 | 0·06810 |
| 0·14 | 0·07640 | 0·07633 | 0·07618 | 0·07594 | 0·07562 | 0·07523 |
| 0·15 | 0·08357 | 0·08353 | 0·08340 | 0·08317 | 0·08285 | 0·08245 |
| 0·16 | 0·09076 | 0·09076 | 0·09066 | 0·09045 | 0·09014 | 0·08973 |
| 0·17 | 0·09795 | 0·09800 | 0·09794 | 0·09775 | 0·09745 | 0·09705 |
| 0·18 | 0·10510 | 0·10522 | 0·10520 | 0·10505 | 0·10478 | 0·10439 |
| 0·19 | 0·11220 | 0·11240 | 0·11244 | 0·11233 | 0·11209 | 0·11172 |
| 0·20 | 0·11921 | 0·11949 | 0·11961 | 0·11956 | 0·11936 | 0·11902 |
| 0·21 | 0·12610 | 0·12649 | 0·12669 | 0·12672 | 0·12657 | 0·12627 |
| 0·22 | 0·13284 | 0·13336 | 0·13367 | 0·13377 | 0·13370 | 0·13345 |
| 0·23 | 0·13940 | 0·14006 | 0·14050 | 0·14071 | 0·14071 | 0·14052 |
| 0·24 | 0·14574 | 0·14658 | 0·14715 | 0·14749 | 0·14759 | 0·14748 |
| 0·25 | 0·15182 | 0·15287 | 0·15361 | 0·15408 | 0·15430 | 0·15429 |
| 0·26 | 0·15761 | 0·15889 | 0·15983 | 0·16047 | 0·16083 | 0·16093 |
| 0·27 | 0·16304 | 0·16460 | 0·16577 | 0·16661 | 0·16713 | 0·16737 |
| 0·28 | 0·16806 | 0·16995 | 0·17140 | 0·17247 | 0·17318 | 0·17359 |
| 0·29 | 0·17256 | 0·17487 | 0·17666 | 0·17800 | 0·17894 | 0·17953 |
| 0·30 | 0·17640 | 0·17928 | 0·18148 | 0·18315 | 0·18437 | 0·18518 |
| 0·31 | 0·17928 | 0·18301 | 0·18578 | 0·18786 | 0·18941 | 0·19049 |
| 0·32 | 0·18148 | 0·18578 | 0·18940 | 0·19205 | 0·19400 | 0·19541 |
| 0·33 | 0·18315 | 0·18786 | 0·19205 | 0·19554 | 0·19806 | 0·19988 |
| 0·34 | 0·18437 | 0·18941 | 0·19400 | 0·19806 | 0·20142 | 0·20380 |
| 0·35 | 0·18518 | 0·19049 | 0·19541 | 0·19988 | 0·20380 | 0·20702 |
| 0·36 | 0·18564 | 0·19118 | 0·19636 | 0·20115 | 0·20548 | 0·20926 |
| 0·37 | 0·18578 | 0·19149 | 0·19690 | 0·20195 | 0·20660 | 0·21079 |
| 0·38 | 0·18561 | 0·19148 | 0·19707 | 9·20234 | 0·20725 | 0·21176 |
| 0·39 | 0·18517 | 0·19117 | 0·19691 | 0·20236 | 0·20749 | 0·21225 |
| 0·40 | 0·18447 | 0·19057 | 0·19643 | 0·20203 | 0·20734 | 0·21232 |
| 0·41 | 0·18353 | 0·18971 | 0·19568 | 0·20140 | 0·20685 | 0·21201 |
| 0·42 | 0·18236 | 0·18861 | 0·19465 | 0·20048 | 0·20605 | 0·21135 |
| 0·43 | 0·18099 | 0·18728 | 0·19339 | 0·19928 | 0·20495 | 0·21037 |
| 0·44 | 0·17942 | 0·18574 | 0·19189 | 0·19784 | 0·20359 | 0·20910 |
| 0·45 | 0·17766 | 0·18400 | 0·19017 | 0·19617 | 0·20197 | 0·20756 |
| 0·46 | 0·17573 | 0·18207 | 0·18825 | 0·19427 | 0·20012 | 0·20576 |
| 0·47 | 0·17364 | 0·17996 | 0·18614 | 0·19218 | 0·19804 | 0·20372 |
| 0·48 | 0·17139 | 0·17768 | 0·18386 | 0·18989 | 0·19576 | 0·20146 |
| 0·49 | 0·16899 | 0·17525 | 0·18140 | 0·18741 | 0·19328 | 0·19899 |
| 0·50 | 0·16646 | 0·17267 | 0·17878 | 0·18477 | 0·19062 | 0·19632 |

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·35 | 0·36 | 0·37 | 0·38 | 0·39 | 0·40 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00164 | 0·00162 | 0·00161 | 0·00159 | 0·00157 | 0·00156 |
| 0·02 | 0·00459 | 0·00455 | 0·00451 | 0·00446 | 0·00441 | 0·00436 |
| 0·03 | 0·00836 | 0·00829 | 0·00821 | 0·00813 | 0·00804 | 0·00795 |
| 0·04 | 0·01276 | 0·01265 | 0·01253 | 0·01241 | 0·01227 | 0·01213 |
| 0·05 | 0·01766 | 0·01752 | 0·01736 | 0·01719 | 0·01700 | 0·01681 |
| 0·06 | 0·02299 | 0·02281 | 0·02260 | 0·02239 | 0·02215 | 0·02190 |
| 0·07 | 0·02869 | 0·02846 | 0·02822 | 0·02795 | 0·02766 | 0·02736 |
| 0·08 | 0·03470 | 0·03443 | 0·03414 | 0·03382 | 0·03348 | 0·03312 |
| 0·09 | 0·04098 | 0·04068 | 0·04034 | 0·03997 | 0·03958 | 0·03915 |
| 0·10 | 0·04749 | 0·04715 | 0·04677 | 0·04636 | 0·04591 | 0·04542 |
| 0·11 | 0·05420 | 0·05383 | 0·05341 | 0·05294 | 0·05244 | 0·05190 |
| 0·12 | 0·06108 | 0·06068 | 0·06022 | 0·05971 | 0·05915 | 0·05855 |
| 0·13 | 0·06810 | 0·06767 | 0·06717 | 0·06662 | 0·06601 | 0·06536 |
| 0·14 | 0·07523 | 0·07477 | 0·07424 | 0·07365 | 0·07300 | 0·07229 |
| 0·15 | 0·08245 | 0·08197 | 0·08142 | 0·08079 | 0·08009 | 0·07934 |
| 0·16 | 0·08973 | 0·08924 | 0·08866 | 0·08800 | 0·08727 | 0·08646 |
| 0·17 | 0·09705 | 0·09655 | 0·09596 | 0·09527 | 0·09450 | 0·09365 |
| 0·18 | 0·10439 | 0·10389 | 0·10328 | 0·10258 | 0·10178 | 0·10089 |
| 0·19 | 0·11172 | 0·11122 | 0·11062 | 0·10990 | 0·10908 | 0·10816 |
| 0·20 | 0·11902 | 0·11854 | 0·11794 | 0·11721 | 0·11637 | 0·11543 |
| 0·21 | 0·12627 | 0·12582 | 0·12523 | 0·12450 | 0·12366 | 0·12269 |
| 0·22 | 0·13345 | 0·13303 | 0·13246 | 0·13175 | 0·13090 | 0·12992 |
| 0·23 | 0·14052 | 0·14016 | 0·13962 | 0·13893 | 0·13809 | 0·13710 |
| 0·24 | 0·14748 | 0·14718 | 0·14669 | 0·14603 | 0·14520 | 0·14422 |
| 0·25 | 0·15429 | 0·15407 | 0·15364 | 0·15302 | 0·15222 | 0·15126 |
| 0·26 | 0·16093 | 0·16080 | 0·16045 | 0·15988 | 0·15913 | 0·15819 |
| 0·27 | 0·16737 | 0·16735 | 0·16709 | 0·16660 | 0·16590 | 0·16499 |
| 0·28 | 0·17359 | 0·17370 | 0·17354 | 0·17314 | 0·17251 | 0·17166 |
| 0·29 | 0·17953 | 0·17981 | 0·17978 | 0·17949 | 0·17894 | 0·17816 |
| 0·30 | 0·18518 | 0·18564 | 0·18578 | 0·18561 | 0·18517 | 0·18447 |
| 0·31 | 0·19049 | 0·19118 | 0·19149 | 0·19148 | 0·19117 | 0·19057 |
| 0·32 | 0·19541 | 0·19636 | 0·19690 | 0·19707 | 0·19691 | 0·19643 |
| 0·33 | 0·19988 | 0·20115 | 0·20195 | 0·20234 | 0·20236 | 0·20203 |
| 0·34 | 0·20380 | 0·20548 | 0·20660 | 0·20725 | 0·20749 | 0·20734 |
| 0·35 | 0·20702 | 0·20926 | 0·21079 | 0·21176 | 0·21225 | 0·21232 |
| 0·36 | 0·20926 | 0·21234 | 0·21442 | 0·21579 | 0·21660 | 0·21693 |
| 0·37 | 0·21079 | 0·21442 | 0·21734 | 0·21927 | 0·22048 | 0·22112 |
| 0·38 | 0·21176 | 0·21579 | 0·21927 | 0·22203 | 0·22379 | 0·22483 |
| 0·39 | 0·21225 | 0·21660 | 0·22048 | 0·22379 | 0·22639 | 0·22798 |
| 0·40 | 0·21232 | 0·21693 | 0·22112 | 0·22483 | 0·22798 | 0·23040 |
| 0·41 | 0·21201 | 0·21683 | 0·22128 | 0·22530 | 0·22884 | 0·23182 |
| 0·42 | 0·21135 | 0·21635 | 0·22100 | 0·22528 | 0·22914 | 0·23250 |
| 0·43 | 0·21037 | 0·21551 | 0·22034 | 0·22483 | 0·22894 | 0·23262 |
| 0·44 | 0·20910 | 0·21436 | 0·21933 | 0·22399 | 0·22831 | 0·23223 |
| 0·45 | 0·20756 | 0·21291 | 0·21799 | 0·22280 | 0·22728 | 0·23141 |
| 0·46 | 0·20576 | 0·21118 | 0·21636 | 0·22127 | 0·22590 | 0·23020 |
| 0·47 | 0·20372 | 0·20919 | 0·21444 | 0·21945 | 0·22419 | 0·22863 |
| 0·48 | 0·20146 | 0·20697 | 0·21227 | 0·21735 | 0·22217 | 0·22672 |
| 0·49 | 0·19899 | 0·20452 | 0·20986 | 0·21498 | 0·21987 | 0·22452 |
| 0·50 | 0·19632 | 0·20186 | 0·20722 | 0·21237 | 0·21732 | 0·22202 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·40 | 0·41 | 0·42 | 0·43 | 0·44 | 0·45 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00156 | 0·00154 | 0·00151 | 0·00149 | 0·00147 | 0·00145 |
| 0·02 | 0·00436 | 0·00431 | 0·00425 | 0·00419 | 0·00413 | 0·00407 |
| 0·03 | 0·00795 | 0·00785 | 0·00775 | 0·00764 | 0·00753 | 0·00741 |
| 0·04 | 0·01213 | 0·01198 | 0·01183 | 0·01167 | 0·01150 | 0·01132 |
| 0·05 | 0·01681 | 0·01661 | 0·01639 | 0·01617 | 0·01594 | 0·01570 |
| 0·06 | 0·02190 | 0·02164 | 0·02137 | 0·02108 | 0·02078 | 0·02047 |
| 0·07 | 0·02736 | 0·02703 | 0·02669 | 0·02634 | 0·02596 | 0·02558 |
| 0·08 | 0·03312 | 0·03273 | 0·03233 | 0·03190 | 0·03145 | 0·03099 |
| 0·09 | 0·03915 | 0·03870 | 0·03823 | 0·03773 | 0·03721 | 0·03666 |
| 0·10 | 0·04542 | 0·04491 | 0·04436 | 0·04379 | 0·04319 | 0·04257 |
| 0·11 | 0·05190 | 0·05132 | 0·05071 | 0·05006 | 0·04938 | 0·04867 |
| 0·12 | 0·05855 | 0·05791 | 0·05723 | 0·05651 | 0·05575 | 0·05496 |
| 0·13 | 0·06536 | 0·06466 | 0·06391 | 0·06311 | 0·06228 | 0·06141 |
| 0·14 | 0·07229 | 0·07153 | 0·07072 | 0·06985 | 0·06894 | 0·06798 |
| 0·15 | 0·07934 | 0·07852 | 0·07764 | 0·07670 | 0·07572 | 0·07468 |
| 0·16 | 0·08646 | 0·08559 | 0·08465 | 0·08365 | 0·08259 | 0·08147 |
| 0·17 | 0·09365 | 0·09273 | 0·09173 | 0·09067 | 0·08953 | 0·08834 |
| 0·18 | 0·10089 | 0·09992 | 0·09887 | 0·09774 | 0·09654 | 0·09527 |
| 0·19 | 0·10816 | 0·10714 | 0·10604 | 0·10486 | 0·10359 | 0·10225 |
| 0·20 | 0·11543 | 0·11438 | 0·11323 | 0·11200 | 0·11067 | 0·10926 |
| 0·21 | 0·12269 | 0·12161 | 0·12042 | 0·11914 | 0·11776 | 0·11629 |
| 0·22 | 0·12992 | 0·12882 | 0·12760 | 0·12627 | 0·12484 | 0·12331 |
| 0·23 | 0·13710 | 0·13599 | 0·13474 | 0·13338 | 0·13190 | 0·13032 |
| 0·24 | 0·14422 | 0·14310 | 0·14184 | 0·14044 | 0·13893 | 0·13730 |
| 0·25 | 0·15126 | 0·15013 | 0·14886 | 0·14745 | 0·14590 | 0·14423 |
| 0·26 | 0·15819 | 0·15708 | 0·15580 | 0·15438 | 0·15281 | 0·15110 |
| 0·27 | 0·16499 | 0·16391 | 0·16264 | 0·16121 | 0·15963 | 0·15789 |
| 0·28 | 0·17166 | 0·17060 | 0·16936 | 0·16794 | 0·16635 | 0·16460 |
| 0·29 | 0·17816 | 0·17715 | 0·17594 | 0·17454 | 0·17295 | 0·17119 |
| 0·30 | 0·18447 | 0·18353 | 0·18236 | 0·18099 | 0·17942 | 0·17766 |
| 0·31 | 0·19057 | 0·18971 | 0·18861 | 0·18728 | 0·18574 | 0·18400 |
| 0·32 | 0·19643 | 0·19568 | 0·19465 | 0·19339 | 0·19189 | 0·19017 |
| 0·33 | 0·20203 | 0·20140 | 0·20048 | 0·19928 | 0·19784 | 0·19617 |
| 0·34 | 0·20734 | 0·20685 | 0·20605 | 0·20495 | 0·20359 | 0·20197 |
| 0·35 | 0·21232 | 0·21201 | 0·21135 | 0·21037 | 0·20910 | 0·20756 |
| 0·36 | 0·21693 | 0·21683 | 0·21635 | 0·21551 | 0·21436 | 0·21291 |
| 0·37 | 0·22112 | 0·22128 | 0·22100 | 0·22034 | 0·21933 | 0·21799 |
| 0·38 | 0·22483 | 0·22530 | 0·22528 | 0·22483 | 0·22399 | 0·22280 |
| 0·39 | 0·22798 | 0·22884 | 0·22914 | 0·22894 | 0·22831 | 0·22728 |
| 0·40 | 0·23040 | 0·23182 | 0·23250 | 0·23262 | 0·23223 | 0·23141 |
| 0·41 | 0·23182 | 0·23406 | 0·23530 | 0·23580 | 0·23573 | 0·23516 |
| 0·42 | 0·23250 | 0·23530 | 0·23736 | 0·23842 | 0·23874 | 0·23847 |
| 0·43 | 0·23262 | 0·23580 | 0·23842 | 0·24030 | 0·24116 | 0·24129 |
| 0·44 | 0·23223 | 0·23573 | 0·23874 | 0·24116 | 0·24285 | 0·24353 |
| 0·45 | 0·23141 | 0·23516 | 0·23847 | 0·24129 | 0·24353 | 0·24502 |
| 0·46 | 0·23020 | 0·23415 | 0·23771 | 0·24084 | 0·24346 | 0·24551 |
| 0·47 | 0·22863 | 0·23275 | 0·23651 | 0·23988 | 0·24281 | 0·24525 |
| 0·48 | 0·22672 | 0·23098 | 0·23491 | 0·23849 | 0·24166 | 0·24440 |
| 0·49 | 0·22452 | 0·22888 | 0·23295 | 0·23669 | 0·24007 | 0·24306 |
| 0·50 | 0·22202 | 0·22648 | 0·23066 | 0·23453 | 0·23808 | 0·24126 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·45 | 0·46 | 0·47 | 0·48 | 0·49 | 0·50 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00145 | 0·00142 | 0·00140 | 0·00138 | 0·00135 | 0·00132 |
| 0·02 | 0·00407 | 0·00400 | 0·00393 | 9·00386 | 0·00379 | 0·00372 |
| 0·03 | 0·00741 | 0·00729 | 0·00717 | 0·00704 | 0·00691 | 0·00678 |
| 0·04 | 0·01132 | 0·01114 | 0·01095 | 0·01076 | 0·01057 | 0·01036 |
| 0·05 | 0·01570 | 0·01545 | 0·01519 | 0·01493 | 0·01465 | 0·01438 |
| 0·06 | 0·02047 | 0·02014 | 0·01981 | 0·01947 | 0·01912 | 0·01875 |
| 0·07 | 0·02558 | 0·02518 | 0·02476 | 0·02434 | 0·02390 | 0·02345 |
| 0·08 | 0·03099 | 0·03051 | 0·03001 | 0·02950 | 0·02897 | 0·02843 |
| 0·09 | 0·03666 | 0·03610 | 0·03551 | 0·03491 | 0·03429 | 0·03365 |
| 0·10 | 0·04257 | 0·04192 | 0·04124 | 0·04055 | 0·03983 | 0·03910 |
| 0·11 | 0·04867 | 0·04794 | 0·04717 | 0·04639 | 0·04557 | 0·04474 |
| 0·12 | 0·05496 | 0·05414 | 0·05328 | 0·05240 | 0·05149 | 0·05055 |
| 0·13 | 0·06141 | 0·06049 | 0·05955 | 0·05857 | 0·05755 | 0·05651 |
| 0·14 | 0·06798 | 0·06699 | 0·06595 | 0·06487 | 0·06376 | 0·06261 |
| 0·15 | 0·07468 | 0·07359 | 0·07246 | 0·07129 | 0·07008 | 0·06883 |
| 0·16 | 0·08147 | 0·08030 | 0·07908 | 0·07781 | 0·07650 | 0·07514 |
| 0·17 | 0·08834 | 0·08709 | 0·08578 | 0·08442 | 0·08301 | 0·08155 |
| 0·18 | 0·09527 | 0·09394 | 0·09254 | 0·09109 | 0·08958 | 0·08802 |
| 0·19 | 0·10225 | 0·10084 | 0·09936 | 0·09782 | 0·09621 | 0·09455 |
| 0·20 | 0·10926 | 0·10778 | 0·10622 | 0·10458 | 0·10289 | 0·10112 |
| 0·21 | 0·11629 | 0·11473 | 0·11309 | 0·11138 | 0·10959 | 0·10773 |
| 0·22 | 0·12331 | 0·12169 | 0·11997 | 0·11818 | 0·11630 | 0·11435 |
| 0·23 | 0·13032 | 0·12863 | 0·12685 | 0·12498 | 0·12302 | 0·12098 |
| 0·24 | 0·13730 | 0·13555 | 0·13371 | 0·13176 | 0·12972 | 0·12760 |
| 0·25 | 0·14423 | 0·14244 | 0·14053 | 0·13852 | 0·13641 | 0·13420 |
| 0·26 | 0·15110 | 0·14926 | 0·14730 | 0·14523 | 0·14305 | 0·14076 |
| 0·27 | 0·15789 | 0·15602 | 0·15402 | 0·15189 | 0·14964 | 0·14728 |
| 0·28 | 0·16460 | 0·16270 | 0·16065 | 0·15848 | 0·15617 | 0·15375 |
| 0·29 | 0·17119 | 0·16927 | 0·16720 | 0·16498 | 0·16263 | 0·16014 |
| 0·30 | 0·17766 | 0·17573 | 0·17364 | 0·17139 | 0·16899 | 0·16646 |
| 0·31 | 0·18400 | 0·18207 | 0·17996 | 0·17768 | 0·17525 | 0·17267 |
| 0·32 | 0·19017 | 0·18825 | 0·18614 | 0·18386 | 0·18140 | 0·17878 |
| 0·33 | 0·19617 | 0·19427 | 0·19218 | 0·18989 | 0·18741 | 0·18477 |
| 0·34 | 0·20197 | 0·20012 | 0·19804 | 0·19576 | 0·19328 | 0·19062 |
| 0·35 | 0·20756 | 0·20576 | 0·20372 | 0·20146 | 0·19899 | 0·19632 |
| 0·36 | 0·21291 | 0·21118 | 0·20919 | 0·20697 | 0·20452 | 0·20186 |
| 0·37 | 0·21799 | 0·21636 | 0·21444 | 0·21227 | 0·20986 | 0·20722 |
| 0·38 | 0·22280 | 0·22127 | 0·21945 | 0·21735 | 0·21498 | 0·21237 |
| 0·39 | 0·22728 | 0·22590 | 0·22419 | 0·22217 | 0·21987 | 0·21732 |
| 0·40 | 0·23141 | 0·23020 | 0·22863 | 0·22672 | 0·22452 | 0·22202 |
| 0·41 | 0·23516 | 0·23415 | 0·23275 | 0·23098 | 0·22888 | 0·22648 |
| 0·42 | 0·23847 | 0·23771 | 0·23651 | 0·23491 | 0·23295 | 0·23066 |
| 0·43 | 0·24129 | 0·24084 | 0·23988 | 0·23849 | 0·23669 | 0·23453 |
| 0·44 | 0·24353 | 0·24346 | 0·24281 | 0·24166 | 0·24007 | 0·23808 |
| 0·45 | 0·24502 | 0·24551 | 0·24525 | 0·24440 | 0·24306 | 0·24126 |
| 0·46 | 0·24551 | 0·24681 | 0·24710 | 0·24664 | 0·24560 | 0·24405 |
| 0·47 | 0·24525 | 0·24710 | 0·24820 | 0·24829 | 0·24764 | 0·24639 |
| 0·48 | 0·24440 | 0·24664 | 0·24829 | 0·24920 | 0·24909 | 0·24824 |
| 0·49 | 0·24306 | 0·24560 | 0·24764 | 0·24909 | 0·24980 | 0·24949 |
| 0·50 | 0·24126 | 0·24405 | 0·24639 | 0·24824 | 0·24949 | 0·25000 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·50 | 0·51 | 0·52 | 0·53 | 0·54 | 0·55 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00132 | 0·00130 | 0·00127 | 0·00124 | 0·00121 | 0·00119 |
| 0·02 | 0·00372 | 0·00364 | 0·00357 | 0·00349 | 0·00341 | 0·00333 |
| 0·03 | 0·00678 | 0·00665 | 0·00651 | 0·00637 | 0·00622 | 0·00608 |
| 0·04 | 0·01036 | 0·01016 | 0·00995 | 0·00973 | 0·00952 | 0·00929 |
| 0·05 | 0·01438 | 0·01409 | 0·01380 | 0·01351 | 0·01320 | 0·01290 |
| 0·06 | 0·01875 | 0·01838 | 0·01801 | 0·01762 | 0·01723 | 0·01683 |
| 0·07 | 0·02345 | 0·02299 | 0·02252 | 0·02204 | 0·02156 | 0·02106 |
| 0·08 | 0·02843 | 0·02787 | 0·02731 | 0·02673 | 0·02614 | 0·02554 |
| 0·09 | 0·03365 | 0·03300 | 0·03233 | 0·03165 | 0·03096 | 0·03025 |
| 0·10 | 0·03910 | 0·03834 | 0·03757 | 0·03678 | 0·03598 | 0·03516 |
| 0·11 | 0·04474 | 0·04388 | 0·04300 | 0·04210 | 0·04118 | 0·04025 |
| 0·12 | 0·05555 | 0·04958 | 0·04859 | 0·04759 | 0·04655 | 0·04550 |
| 0·13 | 0·05651 | 0·05544 | 0·05434 | 0·05322 | 0·05207 | 0·05090 |
| 0·14 | 0·06261 | 0·06143 | 0·06022 | 0·05898 | 0·05772 | 0·05643 |
| 0·15 | 0·06883 | 0·06754 | 0·06622 | 0·06486 | 0·06348 | 0·06206 |
| 0·16 | 0·07514 | 0·07375 | 0·07231 | 0·07084 | 0·06934 | 0·06780 |
| 0·17 | 0·08155 | 0·08004 | 0·07849 | 0·07691 | 0·07528 | 0·07362 |
| 0·18 | 0·08802 | 0·08641 | 0·08475 | 0·08305 | 0·08130 | 0·07952 |
| 0·19 | 0·09455 | 0·09283 | 0·09106 | 0·08925 | 0·08739 | 0·08548 |
| 0·20 | 0·10112 | 0·09930 | 0·09743 | 0·09550 | 0·09352 | 0·09149 |
| 0·21 | 0·10773 | 0·10581 | 0·10382 | 0·10178 | 0·09968 | 0·09754 |
| 0·22 | 0·11435 | 0·11233 | 0·11024 | 0·10809 | 0·10588 | 0·10361 |
| 0·23 | 0·12098 | 0·11886 | 0·11667 | 0·11441 | 0·11209 | 0·10970 |
| 0·24 | 0·12760 | 0·12539 | 0·12310 | 0·12073 | 0·11830 | 0·11580 |
| 0·25 | 0·13420 | 0·13190 | 0·12951 | 0·12705 | 0·12451 | 0·12190 |
| 0·26 | 0·14076 | 0·13838 | 0·13591 | 0·13334 | 0·13070 | 0·12798 |
| 0·27 | 0·14728 | 0·14482 | 0·14226 | 0·13961 | 0·13687 | 0·13404 |
| 0·28 | 0·15375 | 0·15121 | 0·14857 | 0·14583 | 0·14299 | 0·14007 |
| 0·29 | 0·16014 | 0·15754 | 0·15482 | 0·15200 | 0·14907 | 0·14605 |
| 0·30 | 0·16646 | 0·16379 | 0·16100 | 0·15810 | 0·15509 | 0·15198 |
| 0·31 | 0·17267 | 0·16996 | 0·16710 | 0·16413 | 0·16104 | 0·15784 |
| 0·32 | 0·17878 | 0·17602 | 0·17311 | 0·17007 | 0·16691 | 0·16363 |
| 0·33 | 0·18477 | 0·18197 | 0·17901 | 0·17592 | 0·17269 | 0·16934 |
| 0·34 | 0·19062 | 0·18779 | 0·18480 | 0·18165 | 0·17837 | 0·17495 |
| 0·35 | 0·19632 | 0·19347 | 0·19045 | 0·18727 | 0·18393 | 0·18045 |
| 0·36 | 0·20186 | 0·19900 | 0·19596 | 0·19275 | 0·18937 | 0·18584 |
| 0·37 | 0·20722 | 0·20436 | 0·20131 | 0·19808 | 0·19467 | 0·19109 |
| 0·38 | 0·21237 | 0·20954 | 0·20649 | 0·20325 | 0·19981 | 0·19621 |
| 0·39 | 0·21732 | 0·21451 | 0·21148 | 0·20824 | 0·20480 | 0·20117 |
| 0·40 | 0·22202 | 0·21927 | 0·21627 | 0·21305 | 0·20961 | 0·20597 |
| 0·41 | 0·22648 | 0·22379 | 0·22084 | 0·21765 | 0·21422 | 0·21058 |
| 0·42 | 0·23066 | 0·22806 | 0·22517 | 0·22202 | 0·21863 | 0·21501 |
| 0·43 | 0·23453 | 0·23204 | 0·22924 | 0·22616 | 0·22281 | 0·21922 |
| 0·44 | 0·23808 | 0·23572 | 0·23303 | 0·23003 | 0·22675 | 0·22321 |
| 0·45 | 0·24126 | 0·23907 | 0·23652 | 0·23363 | 0·23043 | 0·22695 |
| 0·46 | 0·24405 | 0·24206 | 0·23967 | 0·23691 | 0·23383 | 0·23043 |
| 0·47 | 0·24639 | 0·24465 | 0·24246 | 0·23987 | 0·23691 | 0·23363 |
| 0·48 | 0·24824 | 0·24679 | 0·24485 | 0·24246 | 0·23967 | 0·23652 |
| 0·49 | 0·24949 | 0·24844 | 0·24679 | 0·24465 | 0·24206 | 0·23907 |
| 0·50 | 0·25000 | 0·24949 | 0·24824 | 0·24639 | 0·24405 | 0·24126 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·55 | 0·56 | 0·57 | 0·58 | 0·59 | 0·60 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00119 | 0·00116 | 0·00113 | 0·00110 | 0·00107 | 0·00104 |
| 0·02 | 0·00333 | 0·00325 | 0·00317 | 0·00309 | 0·00300 | 0·00292 |
| 0·03 | 0·00608 | 0·00593 | 0·00578 | 0·00563 | 0·00548 | 0·00533 |
| 0·04 | 0·00929 | 0·00907 | 0·00884 | 0·00861 | 0·00838 | 0·00815 |
| 0·05 | 0·01290 | 0·01259 | 0·01227 | 0·01196 | 0·01163 | 0·01131 |
| 0·06 | 0·01683 | 0·01643 | 0·01602 | 0·01561 | 0·01519 | 0·01476 |
| 0·07 | 0·02106 | 0·02056 | 0·02005 | 0·01953 | 0·01901 | 0·01848 |
| 0·08 | 0·02554 | 0·02493 | 0·02432 | 0·02369 | 0·02306 | 0·02242 |
| 0·09 | 0·03025 | 0·02953 | 0·02880 | 0·02806 | 0·02732 | 0·02656 |
| 0·10 | 0·03516 | 0·03433 | 0·03348 | 0·03263 | 0·03176 | 0·03088 |
| 0·11 | 0·04025 | 0·03930 | 0·03834 | 0·03736 | 0·03637 | 0·03537 |
| 0·12 | 0·04550 | 0·04444 | 0·04335 | 0·04225 | 0·04113 | 0·04000 |
| 0·13 | 0·05090 | 0·04971 | 0·04850 | 0·04727 | 0·04603 | 0·04477 |
| 0·14 | 0·05643 | 0·05511 | 0·05377 | 0·05242 | 0·05104 | 0·04965 |
| 0·15 | 0·06206 | 0·06062 | 0·05916 | 0·05767 | 0·05616 | 0·05464 |
| 0·16 | 0·06780 | 0·06624 | 0·06464 | 0·06302 | 0·06138 | 0·05972 |
| 0·17 | 0·07362 | 0·07193 | 0·07021 | 0·06846 | 0·06668 | 0·06488 |
| 0·18 | 0·07952 | 0·07770 | 0·07585 | 0·07397 | 0·07205 | 0·07011 |
| 0·19 | 0·08548 | 0·08353 | 0·08155 | 0·07953 | 0·07749 | 0·07541 |
| 0·20 | 0·09149 | 0·08942 | 0·08731 | 0·08516 | 0·08297 | 0·08075 |
| 0·21 | 0·09754 | 0·09534 | 0·09310 | 0·09082 | 0·08850 | 0·08614 |
| 0·22 | 0·10361 | 0·10129 | 0·09892 | 0·09651 | 0·09406 | 0·09156 |
| 0·23 | 0·10970 | 0·10726 | 0·10477 | 0·10223 | 0·09964 | 0·09701 |
| 0·24 | 0·11580 | 0·11324 | 0·11063 | 0·10795 | 0·10523 | 0·10247 |
| 0·25 | 0·12190 | 0·11922 | 0·11648 | 0·11369 | 0·11084 | 0·10794 |
| 0·26 | 0·12798 | 0·12519 | 0·12233 | 0·11941 | 0·11644 | 0·11340 |
| 0·27 | 0·13404 | 0·13114 | 0·12817 | 0·12513 | 0·12202 | 0·11886 |
| 0·28 | 0·14007 | 0·13706 | 0·13397 | 0·13081 | 0·12759 | 0·12430 |
| 0·29 | 0·14605 | 0·14294 | 0·13974 | 0·13647 | 0·13313 | 0·12972 |
| 0·30 | 0·15198 | 0·14877 | 0·14547 | 0·14209 | 0·13863 | 0·13510 |
| 0·31 | 0·15784 | 0·15454 | 0·15114 | 0·14765 | 0·14408 | 0·14044 |
| 0·32 | 0·16363 | 0·16024 | 0·15675 | 0·15316 | 0·14949 | 0·14573 |
| 0·33 | 0·16934 | 0·16587 | 0·16228 | 0·15860 | 0·15482 | 0·15096 |
| 0·34 | 0·17495 | 0·17140 | 0·16774 | 0·16396 | 0·16009 | 0·15612 |
| 0·35 | 0·18045 | 0·17684 | 0·17310 | 0·16924 | 0·16528 | 0·16121 |
| 0·36 | 0·18584 | 0·18216 | 0·17835 | 0·17442 | 0·17037 | 0·16622 |
| 0·37 | 0·19109 | 0·18737 | 0·18350 | 0·17950 | 0·17537 | 0·17113 |
| 0·38 | 0·19621 | 0·19244 | 0·18852 | 0·18446 | 0·18026 | 0·17594 |
| 0·39 | 0·20117 | 0·19737 | 0·19340 | 0·18929 | 0·18503 | 0·18064 |
| 0·40 | 0·20597 | 0·20214 | 0·19814 | 0·19398 | 0·18967 | 0·18522 |
| 0·41 | 0·21058 | 0·20675 | 0·20273 | 0·19853 | 0·19418 | 0·18967 |
| 0·42 | 0·21501 | 0·21117 | 0·20714 | 0·20292 | 0·19853 | 0·19398 |
| 0·43 | 0·21922 | 0·21540 | 0·21137 | 0·20714 | 0·20273 | 0·19814 |
| 0·44 | 0·22321 | 0·21942 | 0·21540 | 0·21117 | 0·20675 | 0·20214 |
| 0·45 | 0·22695 | 0·22321 | 0·21922 | 0·21501 | 0·21058 | 0·20597 |
| 0·46 | 0·23043 | 0·22675 | 0·22281 | 0·21863 | 0·21422 | 0·20961 |
| 0·47 | 0·23363 | 0·23003 | 0·22616 | 0·22202 | 0·21765 | 0·21305 |
| 0·48 | 0·23652 | 0·23303 | 0·22924 | 0·22517 | 0·22084 | 0·21627 |
| 0·49 | 0·23907 | 0·23572 | 0·23204 | 0·22806 | 0·22379 | 0·21927 |
| 0·50 | 0·24126 | 0·23808 | 0·23453 | 0·23066 | 0·22648 | 0·22202 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·60 | 0·61 | 0·62 | 0·63 | 0·64 | 0·65 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00104 | 0·00101 | 0·00098 | 0·00095 | 0·00092 | 0·00088 |
| 0·02 | 0·00292 | 0·00283 | 0·00275 | 0·00266 | 0·00257 | 0·00249 |
| 0·03 | 0·00533 | 0·00517 | 0·00502 | 0·00486 | 0·00470 | 0·00454 |
| 0·04 | 0·00815 | 0·00791 | 0·00767 | 0·00743 | 0·00719 | 0·00695 |
| 0·05 | 0·01131 | 0·01098 | 0·01065 | 0·01032 | 0·00998 | 0·00965 |
| 0·06 | 0·01476 | 0·01434 | 0·01391 | 0·01347 | 0·01304 | 0·01260 |
| 0·07 | 0·01848 | 0·01794 | 0·01741 | 0·01686 | 0·01632 | 0·01577 |
| 0·08 | 0·02242 | 0·02177 | 0·02112 | 0·02046 | 0·01980 | 0·01914 |
| 0·09 | 0·02656 | 0·02580 | 0·02503 | 0·02425 | 0·02347 | 0·02269 |
| 0·10 | 0·03088 | 0·03000 | 0·02911 | 0·02821 | 0·02730 | 0·02639 |
| 0·11 | 0·03537 | 0·03436 | 0·03334 | 0·03231 | 0·03127 | 0·03023 |
| 0·12 | 0·04000 | 0·03886 | 0·03771 | 0·03655 | 0·03538 | 0·03420 |
| 0·13 | 0·04477 | 0·04349 | 0·04221 | 0·04091 | 0·03961 | 0·03829 |
| 0·14 | 0·04965 | 0·04824 | 0·04682 | 0·04538 | 0·04394 | 0·04248 |
| 0·15 | 0·05464 | 0·05309 | 0·05153 | 0·04996 | 0·04837 | 0·04677 |
| 0·16 | 0·05972 | 0·05803 | 0·05633 | 0·05461 | 0·05288 | 0·05114 |
| 0·17 | 0·06488 | 0·06305 | 0·06121 | 0·05935 | 0·05747 | 0·05558 |
| 0·18 | 0·07011 | 0·06815 | 0·06616 | 0·06415 | 0·06213 | 0·06009 |
| 0·19 | 0·07541 | 0·07330 | 0·07117 | 0·06902 | 0·06684 | 0·06466 |
| 0·20 | 0·08075 | 0·07850 | 0·07623 | 0·07393 | 0·07161 | 0·06927 |
| 0·21 | 0·08614 | 0·08375 | 0·08133 | 0·07889 | 0·07642 | 0·07393 |
| 0·22 | 0·09156 | 0·08903 | 0·08647 | 0·08388 | 0·08126 | 0·07862 |
| 0·23 | 0·09701 | 0·09434 | 0·09163 | 0·08889 | 0·08613 | 0·08334 |
| 0·24 | 0·10247 | 0·09966 | 0·09681 | 0·09393 | 0·09102 | 0·08808 |
| 0·25 | 0·10794 | 0·10499 | 0·10200 | 0·09898 | 0·09592 | 0·09283 |
| 0·26 | 0·11340 | 0·11032 | 0·10720 | 0·10403 | 0·10082 | 0·09759 |
| 0·27 | 0·11886 | 0·11565 | 0·11238 | 0·10908 | 0·10573 | 0·10234 |
| 0·28 | 0·12430 | 0·12096 | 0·11756 | 0·11411 | 0·11062 | 0·10709 |
| 0·29 | 0·12972 | 0·12624 | 0·12271 | 0·11913 | 0·11550 | 0·11183 |
| 0·30 | 0·13510 | 0·13150 | 0·12784 | 0·12413 | 0·12036 | 0·11655 |
| 0·31 | 0·14044 | 0·13672 | 0·13293 | 0·12909 | 0·12519 | 0·12124 |
| 0·32 | 0·14573 | 0·14189 | 0·13798 | 0·13401 | 0·12998 | 0·12590 |
| 0·33 | 0·15096 | 0·14701 | 0·14298 | 0·13889 | 0·13473 | 0·13052 |
| 0·34 | 0·15612 | 0·15206 | 0·14793 | 0·14371 | 0·13944 | 0·13510 |
| 0·35 | 0·16121 | 0·15705 | 0·15280 | 0·14848 | 0·14408 | 0·13962 |
| 0·36 | 0·16622 | 0·16196 | 0·15761 | 0·15317 | 0·14866 | 0·14408 |
| 0·37 | 0·17113 | 0·16678 | 0·16233 | 0·15780 | 0·15317 | 0·14848 |
| 0·38 | 0·17594 | 0·17151 | 0·16697 | 0·16233 | 0·15761 | 0·15280 |
| 0·39 | 0·18064 | 0·17613 | 0·17151 | 0·16678 | 0·16196 | 0·15705 |
| 0·40 | 0·18522 | 0·18064 | 0·17594 | 0·17113 | 0·16622 | 0·16121 |
| 0·41 | 0·18967 | 0·18503 | 0·18026 | 0·17537 | 0·17037 | 0·16528 |
| 0·42 | 0·19398 | 0·18929 | 0·18446 | 0·17950 | 0·17442 | 0·16924 |
| 0·43 | 0·19814 | 0·19340 | 0·18852 | 0·18350 | 0·17835 | 0·17310 |
| 0·44 | 0·20214 | 0·19737 | 0·19244 | 0·18737 | 0·18216 | 0·17684 |
| 0·45 | 0·20597 | 0·20117 | 0·19621 | 0·19109 | 0·18584 | 0·18045 |
| 0·46 | 0·20961 | 0·20480 | 0·19981 | 0·19467 | 0·18937 | 0·18393 |
| 0·47 | 0·21305 | 0·20824 | 0·20325 | 0·19808 | 0·19275 | 0·18727 |
| 0·48 | 0·21627 | 0·21148 | 0·20649 | 0·20131 | 0·19596 | 0·19045 |
| 0·49 | 0·21927 | 0·21451 | 0·20954 | 0·20436 | 0·19900 | 0·19347 |
| 0·50 | 0·22202 | 0·21732 | 0·21237 | 0·20722 | 0·20186 | 0·19632 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·65 | 0·66 | 0·67 | 0·68 | 0·69 | 0·70 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00088 | 0·00085 | 0·00082 | 0·00079 | 0·00076 | 0·00073 |
| 0·02 | 0·00249 | 0·00240 | 0·00231 | 0·00222 | 0·00214 | 0·00205 |
| 0·03 | 0·00454 | 0·00438 | 0·00422 | 0·00406 | 0·00390 | 0·00374 |
| 0·04 | 0·00695 | 0·00670 | 0·00646 | 0·00622 | 0·00597 | 0·00573 |
| 0·05 | 0·00965 | 0·00931 | 0·00897 | 0·00863 | 0·00829 | 0·00795 |
| 0·06 | 0·01260 | 0·01216 | 0·01172 | 0·01128 | 0·01083 | 0·01039 |
| 0·07 | 0·01577 | 0·01522 | 0·01467 | 0·01412 | 0·01356 | 0·01301 |
| 0·08 | 0·01914 | 0·01847 | 0·01781 | 0·01714 | 0·01647 | 0·01579 |
| 0·09 | 0·02269 | 0·02190 | 0·02111 | 0·02031 | 0·01952 | 0·01872 |
| 0·10 | 0·02639 | 0·02547 | 0·02455 | 0·02363 | 0·02271 | 0·02179 |
| 0·11 | 0·03023 | 0·02918 | 0·02813 | 0·02708 | 0·02602 | 0·02497 |
| 0·12 | 0·03420 | 0·03302 | 0·03183 | 0·03064 | 0·02945 | 0·02825 |
| 0·13 | 0·03829 | 0·03697 | 0·03564 | 0·03431 | 0·03298 | 0·03164 |
| 0·14 | 0·04248 | 0·04102 | 0·03955 | 0·03807 | 0·03660 | 0·03512 |
| 0·15 | 0·04677 | 0·04516 | 0·04355 | 0·04192 | 0·04030 | 0·03867 |
| 0·16 | 0·05114 | 0·04938 | 0·04762 | 0·04585 | 0·04408 | 0·04230 |
| 0·17 | 0·05558 | 0·05368 | 0·05176 | 0·04984 | 0·04792 | 0·04599 |
| 0·18 | 0·06009 | 0·05804 | 0·05597 | 0·05390 | 0·05182 | 0·04974 |
| 0·19 | 0·06466 | 0·06245 | 0·06024 | 0·05801 | 0·05578 | 0·05354 |
| 0·20 | 0·06927 | 0·06692 | 0·06455 | 0·06216 | 0·05978 | 0·05738 |
| 0·21 | 0·07393 | 0·07142 | 0·06890 | 0·06636 | 0·06381 | 0·06126 |
| 0·22 | 0·07862 | 0·07596 | 0·07328 | 0·07059 | 0·06789 | 0·06518 |
| 0·23 | 0·08334 | 0·08052 | 0·07769 | 0·07485 | 0·07199 | 0·06912 |
| 0·24 | 0·08808 | 0·08511 | 0·08213 | 0·07912 | 0·07611 | 0·07308 |
| 0·25 | 0·09283 | 0·08971 | 0·08657 | 0·08341 | 0·08024 | 0·07706 |
| 0·26 | 0·09759 | 0·09432 | 0·09103 | 0·08772 | 0·08439 | 0·08104 |
| 0·27 | 0·10234 | 0·09893 | 0·09549 | 0·09202 | 0·08854 | 0·08504 |
| 0·28 | 0·10709 | 0·10353 | 0·09994 | 0·09632 | 0·09268 | 0·08903 |
| 0·29 | 0·11183 | 0·10812 | 0·10438 | 0·10062 | 0·09683 | 0·09302 |
| 0·30 | 0·11655 | 0·11270 | 0·10881 | 0·10490 | 0·10096 | 0·09699 |
| 0·31 | 0·12124 | 0·11725 | 0·11322 | 0·10916 | 0·10507 | 0·10096 |
| 0·32 | 0·12590 | 0·12177 | 0·11760 | 0·11339 | 0·10916 | 0·10490 |
| 0·33 | 0·13052 | 0·12626 | 0·12195 | 0·11760 | 0·11322 | 0·10881 |
| 0·34 | 0·13510 | 0·13070 | 0·12626 | 0·12177 | 0·11725 | 0·11270 |
| 0·35 | 0·13962 | 0·13510 | 0·13052 | 0·12590 | 0·12124 | 0·11655 |
| 0·36 | 0·14408 | 0·13944 | 0·13473 | 0·12998 | 0·12519 | 0·12036 |
| 0·37 | 0·14848 | 0·14371 | 0·13889 | 0·13401 | 0·12909 | 0·12413 |
| 0·38 | 0·15280 | 0·14793 | 0·14298 | 0·13798 | 0·13293 | 0·12784 |
| 0·39 | 0·15705 | 0·15206 | 0·14701 | 0·14189 | 0·13672 | 0·13150 |
| 0·40 | 0·16121 | 0·15612 | 0·15096 | 0·14573 | 0·14044 | 0·13510 |
| 0·41 | 0·16528 | 0·16009 | 0·15482 | 0·14949 | 0·14408 | 0·13863 |
| 0·42 | 0·16924 | 0·16396 | 0·15860 | 0·15316 | 0·14765 | 0·14209 |
| 0·43 | 0·17310 | 0·16774 | 0·16228 | 0·15675 | 0·15114 | 0·14547 |
| 0·44 | 0·17684 | 0·17140 | 0·16587 | 0·16024 | 0·15454 | 0·14877 |
| 0·45 | 0·18045 | 0·17495 | 0·16934 | 0·16363 | 0·15784 | 0·15198 |
| 0·46 | 0·18393 | 0·17837 | 0·17269 | 0·16691 | 0·16104 | 0·15509 |
| 0·47 | 0·18727 | 0·18165 | 0·17592 | 0·17007 | 0·16413 | 0·15810 |
| 0·48 | 0·19045 | 0·18480 | 0·17901 | 0·17311 | 0·16710 | 0·16100 |
| 0·49 | 0·19347 | 0·18779 | 0·18197 | 0·17602 | 0·16996 | 0·16379 |
| 0·50 | 0·19632 | 0·19062 | 0·18477 | 0·17878 | 0·17267 | 0·16646 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·70 | 0·71 | 0·72 | 0·73 | 0·74 | 0·75 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00073 | 0·00070 | 0·00067 | 0·00064 | 0·00060 | 0·00057 |
| 0·02 | 0·00205 | 0·00196 | 0·00187 | 0·00179 | 0·00170 | 0·00161 |
| 0·03 | 0·00374 | 0·00358 | 0·00342 | 0·00326 | 0·00311 | 0·00295 |
| 0·04 | 0·00573 | 0·00548 | 0·00524 | 0·00500 | 0·00475 | 0·00451 |
| 0·05 | 0·00795 | 0·00761 | 0·00728 | 0·00694 | 0·00660 | 0·00627 |
| 0·06 | 0·01039 | 0·00995 | 0·00951 | 0·00907 | 0·00863 | 0·00819 |
| 0·07 | 0·01301 | 0·01246 | 0·01191 | 0·01135 | 0·01081 | 0·01026 |
| 0·08 | 0·01579 | 0·01512 | 0·01445 | 0·01379 | 0·01312 | 0·01246 |
| 0·09 | 0·01872 | 0·01793 | 0·01714 | 0·01634 | 0·01556 | 0·01477 |
| 0·10 | 0·02179 | 0·02086 | 0·01994 | 0·01902 | 0·01810 | 0·01719 |
| 0·11 | 0·02497 | 0·02391 | 0·02285 | 0·02180 | 0·02075 | 0·01971 |
| 0·12 | 0·02825 | 0·02706 | 0·02587 | 0·02468 | 0·02349 | 0·02231 |
| 0·13 | 0·03164 | 0·03031 | 0·02897 | 0·02764 | 0·02631 | 0·02499 |
| 0·14 | 0·03512 | 0·03364 | 0·03216 | 0·03068 | 0·02921 | 0·02774 |
| 0·15 | 0·03867 | 0·03704 | 0·03541 | 0·03379 | 0·03217 | 0·03056 |
| 0·16 | 0·04230 | 0·04052 | 0·03874 | 0·03697 | 0·03520 | 0·03343 |
| 0·17 | 0·04599 | 0·04406 | 0·04213 | 0·04020 | 0·03828 | 0·03636 |
| 0·18 | 0·04974 | 0·04765 | 0·04557 | 0·04348 | 0·04141 | 0·03934 |
| 0·19 | 0·05354 | 0·05130 | 0·04905 | 0·04681 | 0·04458 | 0·04235 |
| 0·20 | 0·05738 | 0·05498 | 0·05258 | 0·05019 | 0·04779 | 0·04541 |
| 0·21 | 0·06126 | 0·05871 | 0·05615 | 0·05359 | 0·05104 | 0·04850 |
| 0·22 | 0·06518 | 0·06246 | 0·05974 | 0·05703 | 0·05432 | 0·05161 |
| 0·23 | 0·06912 | 0·06624 | 0·06337 | 0·06049 | 0·05762 | 0·05475 |
| 0·24 | 0·07308 | 0·07004 | 0·06701 | 0·06397 | 0·06094 | 0·05791 |
| 0·25 | 0·07706 | 0·07386 | 0·07067 | 0·06747 | 0·06427 | 0·06109 |
| 0·26 | 0·08104 | 0·07769 | 0·07434 | 0·07098 | 0·06762 | 0·06427 |
| 0·27 | 0·08504 | 0·08153 | 0·07801 | 0·07449 | 0·07098 | 0·06747 |
| 0·28 | 0·08903 | 0·08536 | 0·08169 | 0·07801 | 0·07434 | 0·07067 |
| 0·29 | 0·09302 | 0·08919 | 0·08536 | 0·08153 | 0·17769 | 0·07386 |
| 0·30 | 0·09699 | 0·09302 | 0·08903 | 0·08504 | 0·08104 | 0·07706 |
| 0·31 | 0·10096 | 0·09683 | 0·09268 | 0·08854 | 0·08439 | 0·08024 |
| 0·32 | 0·10490 | 0·10062 | 0·09632 | 0·09202 | 0·08772 | 0·08341 |
| 0·33 | 0·10881 | 0·10438 | 0·09994 | 0·09549 | 0·09103 | 0·08657 |
| 0·34 | 0·11270 | 0·10812 | 0·10353 | 0·09893 | 0·09432 | 0·08971 |
| 0·35 | 0·11655 | 0·11183 | 0·10709 | 0·10234 | 0·09759 | 0·09283 |
| 0·36 | 0·12036 | 0·11550 | 0·11062 | 0·10573 | 0·10082 | 0·09592 |
| 0·37 | 0·12413 | 0·11913 | 0·11411 | 0·10908 | 0·10403 | 0·09898 |
| 0·38 | 0·12784 | 0·12271 | 0·11756 | 0·11238 | 0·10720 | 0·10200 |
| 0·39 | 0·13150 | 0·12624 | 0·12096 | 0·11565 | 0·11032 | 0·10499 |
| 0·40 | 0·13510 | 0·12972 | 0·12430 | 0·11886 | 0·11340 | 0·10794 |
| 0·41 | 0·13863 | 0·13313 | 0·12759 | 0·12202 | 0·11644 | 0·11084 |
| 0·42 | 0·14209 | 0·13647 | 0·13081 | 0·12513 | 0·11941 | 0·11369 |
| 0·43 | 0·14547 | 0·13974 | 0·13397 | 0·12817 | 0·12233 | 0·11648 |
| 0·44 | 0·14877 | 0·14294 | 0·13706 | 0·13114 | 0·12519 | 0·11922 |
| 0·45 | 0·15198 | 0·14605 | 0·14007 | 0·13404 | 0·12798 | 0·12190 |
| 0·46 | 0·15509 | 0·14907 | 0·14299 | 0·13687 | 0·13070 | 0·12451 |
| 0·47 | 0·15810 | 0·15200 | 0·14583 | 0·13961 | 0·13334 | 0·12705 |
| 0·48 | 0·16100 | 0·15482 | 0·14857 | 0·14226 | 0·13591 | 0·12951 |
| 0·49 | 0·16379 | 0·15754 | 0·15121 | 0·14482 | 0·13838 | 0·13190 |
| 0·50 | 0·16646 | 0·16014 | 0·15375 | 0·14728 | 0·14076 | 0·13420 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·75 | 0·76 | 0·77 | 0·78 | 0·79 | 0·80 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00057 | 0·00054 | 0·00051 | 0·00048 | 0·00045 | 0·00042 |
| 0·02 | 0·00161 | 0·00153 | 0·00144 | 0·00136 | 0·00128 | 0·00119 |
| 0·03 | 0·00295 | 0·00279 | 0·00264 | 0·00248 | 0·00233 | 0·00218 |
| 0·04 | 0·00451 | 0·00427 | 0·00404 | 0·00380 | 0·00357 | 0·00334 |
| 0·05 | 0·00627 | 0·00594 | 0·00561 | 0·00528 | 0·00496 | 0·00464 |
| 0·06 | 0·00819 | 0·00776 | 0·00733 | 0·00690 | 0·00648 | 0·00606 |
| 0·07 | 0·01026 | 0·00972 | 0·00918 | 0·00864 | 0·00811 | 0·00759 |
| 0·08 | 0·01246 | 0·01180 | 0·01115 | 0·01050 | 0·00985 | 0·00922 |
| 0·09 | 0·01477 | 0·01399 | 0·01322 | 0·01245 | 0·01169 | 0·01093 |
| 0·10 | 0·01719 | 0·01628 | 0·01538 | 0·01449 | 0·01360 | 0·01273 |
| 0·11 | 0·01971 | 0·01867 | 0·01764 | 0·01661 | 0·01560 | 0·01459 |
| 0·12 | 0·02231 | 0·02113 | 0·01997 | 0·01881 | 0·01766 | 0·01652 |
| 0·13 | 0·02499 | 0·02367 | 0·02237 | 0·02107 | 0·01978 | 0·01851 |
| 0·14 | 0·02774 | 0·02628 | 0·02483 | 0·02339 | 0·02197 | 0·02056 |
| 0·15 | 0·03056 | 0·02895 | 0·02736 | 0·02577 | 0·02420 | 0·02265 |
| 0·16 | 0·03343 | 0·03168 | 0·02993 | 0·02820 | 0·02649 | 0·02479 |
| 0·17 | 0·03636 | 0·03445 | 0·03256 | 0·03068 | 0·02881 | 0·02696 |
| 0·18 | 0·03934 | 0·03727 | 0·03523 | 0·03319 | 0·03118 | 0·02918 |
| 0·19 | 0·04235 | 0·04014 | 0·03793 | 0·03574 | 0·03357 | 0·03143 |
| 0·20 | 0·04541 | 0·04303 | 0·04067 | 0·03833 | 0·03601 | 0·03370 |
| 0·21 | 0·04850 | 0·04596 | 0·04345 | 0·04094 | 0·03846 | 0·03601 |
| 0·22 | 0·05161 | 0·04892 | 0·04624 | 0·04358 | 0·04094 | 0·03833 |
| 0·23 | 0·05475 | 0·05190 | 0·04906 | 0·04624 | 0·04345 | 0·04067 |
| 0·24 | 0·05791 | 0·05490 | 0·05190 | 0·04892 | 0·04596 | 0·04303 |
| 0·25 | 0·06109 | 0·05791 | 0·05475 | 0·05161 | 0·04850 | 0·04541 |
| 0·26 | 0·06427 | 0·06094 | 0·05762 | 0·05432 | 0·05104 | 0·04779 |
| 0·27 | 0·06747 | 0·06397 | 0·06049 | 0·05703 | 0·05359 | 0·05019 |
| 0·28 | 0·07067 | 0·06701 | 0·06337 | 0·05974 | 0·05615 | 0·05258 |
| 0·29 | 0·07386 | 0·07004 | 0·06624 | 0·06246 | 0·05871 | 0·05498 |
| 0·30 | 0·07706 | 0·07308 | 0·06912 | 0·06518 | 0·06126 | 0·05738 |
| 0·31 | 0·08024 | 0·07611 | 0·07199 | 0·06789 | 0·06381 | 0·05978 |
| 0·32 | 0·08341 | 0·07912 | 0·07485 | 0·07059 | 0·06636 | 0·06216 |
| 0·33 | 0·08657 | 0·08213 | 0·07769 | 0·07328 | 0·06890 | 0·06455 |
| 0·34 | 0·08971 | 0·08511 | 0·08052 | 0·07596 | 0·07142 | 0·06692 |
| 0·35 | 0·09283 | 0·08808 | 0·08334 | 0·07862 | 0·07393 | 0·06927 |
| 0·36 | 0·09592 | 0·09102 | 0·08613 | 0·08126 | 0·07642 | 0·07161 |
| 0·37 | 0·09898 | 0·09393 | 0·08889 | 0·08388 | 0·07889 | 0·07393 |
| 0·38 | 0·10200 | 0·09681 | 0·09163 | 0·08647 | 0·08133 | 0·07623 |
| 0·39 | 0·10499 | 0·09966 | 0·09434 | 0·08903 | 0·08375 | 0·07850 |
| 0·40 | 0·10794 | 0·10247 | 0·09701 | 0·09156 | 0·08614 | 0·08075 |
| 0·41 | 0·11084 | 0·10523 | 0·09964 | 0·09406 | 0·08850 | 0·08297 |
| 0·42 | 0·11369 | 0·10795 | 0·10223 | 0·09651 | 0·09082 | 0·08516 |
| 0·43 | 0·11648 | 0·11063 | 0·10477 | 0·09892 | 0·09310 | 0·08731 |
| 0·44 | 0·11922 | 0·11324 | 0·10726 | 0·10129 | 0·09534 | 0·08942 |
| 0·45 | 0·12190 | 0·11580 | 0·10970 | 0·10361 | 0·09754 | 0·09149 |
| 0·46 | 0·12451 | 0·11830 | 0·11209 | 0·10588 | 0·09968 | 0·09352 |
| 0·47 | 0·12705 | 0·12073 | 0·11441 | 0·10809 | 0·10178 | 0·09550 |
| 0·48 | 0·12951 | 0·12310 | 0·11667 | 0·11024 | 0·10382 | 0·09743 |
| 0·49 | 0·13190 | 0·12539 | 0·11886 | 0·11233 | 0·10581 | 0·09930 |
| 0·50 | 0·13420 | 0·12760 | 0·12098 | 0·11435 | 0·10773 | 0·10112 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·80 | 0·81 | 0·82 | 0·83 | 0·84 | 0·85 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00042 | 0·00040 | 0·00037 | 0·00034 | 0·00031 | 0·00028 |
| 0·02 | 0·00119 | 0·00111 | 0·00103 | 0·00095 | 0·00088 | 0·00080 |
| 0·03 | 0·00218 | 0·00203 | 0·00188 | 0·00174 | 0·00160 | 0·00146 |
| 0·04 | 0·00334 | 0·00311 | 0·00289 | 0·00266 | 0·00245 | 0·00224 |
| 0·05 | 0·00464 | 0·00432 | 0·00401 | 0·00370 | 0·00340 | 0·00311 |
| 0·06 | 0·00606 | 0·00565 | 0·00524 | 0·00484 | 0·00445 | 0·00406 |
| 0·07 | 0·00759 | 0·00707 | 0·00657 | 0·00606 | 0·00557 | 0·00509 |
| 0·08 | 0·00922 | 0·00859 | 0·00797 | 0·00737 | 0·00677 | 0·00618 |
| 0·09 | 0·01093 | 0·01019 | 0·00946 | 0·00874 | 0·00803 | 0·00733 |
| 0·10 | 0·01273 | 0·01186 | 0·01101 | 0·01017 | 0·00935 | 0·00854 |
| 0·11 | 0·01459 | 0·01360 | 0·01262 | 0·01166 | 0·01072 | 0·00979 |
| 0·12 | 0·01652 | 0·01540 | 0·01430 | 0·01321 | 0·01214 | 0·01109 |
| 0·13 | 0·01851 | 0·01726 | 0·01602 | 0·01480 | 0·01360 | 0·01242 |
| 0·14 | 0·02056 | 0·01916 | 0·01779 | 0·01643 | 0·01510 | 0·01380 |
| 0·15 | 0·02265 | 0·02111 | 0·01960 | 0·01811 | 0·01664 | 0·01520 |
| 0·16 | 0·02479 | 0·02311 | 0·02145 | 0·01982 | 0·01822 | 0·01664 |
| 0·17 | 0·02696 | 0·02514 | 0·02334 | 0·02156 | 0·01982 | 0·01811 |
| 0·18 | 0·02918 | 0·02721 | 0·02526 | 0·02334 | 0·02145 | 0·01960 |
| 0·19 | 0·03143 | 0·02930 | 0·02721 | 0·02514 | 0·02311 | 0·02111 |
| 0·20 | 0·03370 | 0·03143 | 0·02918 | 0·02696 | 0·02479 | 0·02265 |
| 0·21 | 0·03601 | 0·03357 | 0·03118 | 0·02881 | 0·02649 | 0·02420 |
| 0·22 | 0·03833 | 0·03574 | 0·03319 | 0·03068 | 0·02820 | 0·02577 |
| 0·23 | 0·04067 | 0·03793 | 0·03523 | 0·03256 | 0·02993 | 0·02736 |
| 0·24 | 0·04303 | 0·04014 | 0·03727 | 0·03445 | 0·03168 | 0·02895 |
| 0·25 | 0·04541 | 0·04235 | 0·03934 | 0·03636 | 0·03343 | 0·03056 |
| 0·26 | 0·04779 | 0·04458 | 0·04141 | 0·03828 | 0·03520 | 0·03217 |
| 0·27 | 0·05019 | 0·04681 | 0·04348 | 0·04020 | 0·03697 | 0·03379 |
| 0·28 | 0·05258 | 0·04905 | 0·04557 | 0·04213 | 0·03874 | 0·03541 |
| 0·29 | 0·05498 | 0·05130 | 0·04765 | 0·04406 | 0·04052 | 0·03704 |
| 0·30 | 0·05738 | 0·05354 | 0·04974 | 0·04599 | 0·04230 | 0·03867 |
| 0·31 | 0·05978 | 0·05578 | 0·05182 | 0·04792 | 0·04408 | 0·04030 |
| 0·32 | 0·06216 | 0·05801 | 0·05390 | 0·04984 | 0·04585 | 0·04192 |
| 0·33 | 0·06455 | 0·06024 | 0·05597 | 0·05176 | 0·04762 | 0·04355 |
| 0·34 | 0·06692 | 0·06245 | 0·05804 | 0·05368 | 0·04938 | 0·04516 |
| 0·35 | 0·06927 | 0·06466 | 0·06009 | 0·05558 | 0·05114 | 0·04677 |
| 0·36 | 0·07161 | 0·06684 | 0·06213 | 0·05747 | 0·05288 | 0·04837 |
| 0·37 | 0·07393 | 0·06902 | 0·06415 | 0·05935 | 0·05461 | 0·04996 |
| 0·38 | 0·07623 | 0·07117 | 0·06616 | 0·06121 | 0·05633 | 0·05153 |
| 0·39 | 0·07850 | 0·07330 | 0·06815 | 0·06305 | 0·05803 | 0·05309 |
| 0·40 | 0·08075 | 0·07541 | 0·07011 | 0·06488 | 0·05972 | 0·05464 |
| 0·41 | 0·08297 | 0·07749 | 0·07205 | 0·06668 | 0·06138 | 0·05616 |
| 0·42 | 0·08516 | 0·07953 | 0·07397 | 0·06846 | 0·06302 | 0·05767 |
| 0·43 | 0·08731 | 0·08155 | 0·07585 | 0·07021 | 0·06464 | 0·05916 |
| 0·44 | 0·08942 | 0·08353 | 0·07770 | 0·07193 | 0·06624 | 0·06062 |
| 0·45 | 0·09149 | 0·08548 | 0·07952 | 0·07362 | 0·06780 | 0·06206 |
| 0·46 | 0·09352 | 0·08739 | 0·08130 | 0·07528 | 0·06934 | 0·06348 |
| 0·47 | 0·09550 | 0·08925 | 0·08305 | 0·07691 | 0·07084 | 0·06486 |
| 0·48 | 0·09743 | 0·09106 | 0·08475 | 0·07849 | 0·07231 | 0·06622 |
| 0·49 | 0·09930 | 0·09283 | 0·08641 | 0·08004 | 0·07375 | 0·06754 |
| 0·50 | 0·10112 | 0·09455 | 0·08802 | 0·08155 | 0·07514 | 0·06883 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·85 | 0·86 | 0·87 | 0·88 | 0·89 | 0·90 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00028 | 0·00026 | 0·00023 | 0·00021 | 0·00018 | 0·00016 |
| 0·02 | 0·00080 | 0·00072 | 0·00065 | 0·00058 | 0·00051 | 0·00045 |
| 0·03 | 0·00146 | 0·00132 | 0·00119 | 0·00106 | 0·00094 | 0·00082 |
| 0·04 | 0·00224 | 0·00203 | 0·00183 | 0·00163 | 0·00144 | 0·00125 |
| 0·05 | 0·00311 | 0·00282 | 0·00254 | 0·00226 | 0·00200 | 0·00174 |
| 0·06 | 0·00406 | 0·00368 | 0·00332 | 0·00296 | 0·00261 | 0·00228 |
| 0·07 | 0·00509 | 0·00462 | 0·00416 | 0·00371 | 0·00327 | 0·00285 |
| 0·08 | 0·00618 | 0·00561 | 0·00505 | 0·00450 | 0·00398 | 0·00347 |
| 0·09 | 0·00733 | 0·00665 | 0·00599 | 0·00534 | 0·00472 | 0·00411 |
| 0·10 | 0·00854 | 0·00774 | 0·00697 | 0·00622 | 0·00549 | 0·00479 |
| 0·11 | 0·00979 | 0·00888 | 0·00800 | 0·00713 | 0·00630 | 0·00549 |
| 0·12 | 0·01109 | 0·01006 | 0·00906 | 0·00808 | 0·00713 | 0·00622 |
| 0·13 | 0·01242 | 0·01127 | 0·01015 | 0·00906 | 0·00800 | 0·00697 |
| 0·14 | 0·01380 | 0·01252 | 0·01127 | 0·01006 | 0·00888 | 0·00774 |
| 0·15 | 0·01520 | 0·01380 | 0·01242 | 0·01109 | 0·00979 | 0·00854 |
| 0·16 | 0·01664 | 0·01510 | 0·01360 | 0·01214 | 0·01072 | 0·00935 |
| 0·17 | 0·01811 | 0·01643 | 0·01480 | 0·01321 | 0·01166 | 0·01017 |
| 0·18 | 0·01960 | 0·01779 | 0·01602 | 0·01430 | 0·01262 | 0·01101 |
| 0·19 | 0·02111 | 0·01916 | 0·01726 | 0·01540 | 0·01360 | 0·01186 |
| 0·20 | 0·02265 | 0·02056 | 0·01851 | 0·01652 | 0·01459 | 0·01273 |
| 0·21 | 0·02420 | 0·02197 | 0·01978 | 0·01766 | 0·01560 | 0·01360 |
| 0·22 | 0·02577 | 0·02339 | 0·02107 | 0·01881 | 0·01661 | 0·01449 |
| 0·23 | 0·02736 | 0·02483 | 0·02237 | 0·01997 | 0·01764 | 0·01538 |
| 0·24 | 0·02895 | 0·02628 | 0·02367 | 0·02113 | 0·01867 | 0·01628 |
| 0·25 | 0·03056 | 0·02774 | 0·02499 | 0·02231 | 0·01971 | 0·01719 |
| 0·26 | 0·03217 | 0·02921 | 0·02631 | 0·02349 | 0·02075 | 0·01810 |
| 0·27 | 0·03379 | 0·03068 | 0·02764 | 0·02468 | 0·02180 | 0·01902 |
| 0·28 | 0·03541 | 0·03216 | 0·02897 | 0·02587 | 0·02285 | 0·01994 |
| 0·29 | 0·03704 | 0·03364 | 0·03031 | 0·02706 | 0·02391 | 0·02086 |
| 0·30 | 0·03867 | 0·03512 | 0·03164 | 0·02825 | 0·02497 | 0·02179 |
| 0·31 | 0·04030 | 0·03660 | 0·03298 | 0·02945 | 0·02602 | 0·02271 |
| 0·32 | 0·04192 | 0·03807 | 0·03431 | 0·03064 | 0·02708 | 0·02363 |
| 0·33 | 0·04355 | 0·03955 | 0·03564 | 0·03183 | 0·02813 | 0·02455 |
| 0·34 | 0·04516 | 0·04102 | 0·03697 | 0·03302 | 0·02918 | 0·02547 |
| 0·35 | 0·04677 | 0·04248 | 0·03829 | 0·03420 | 0·03023 | 0·02639 |
| 0·36 | 0·04837 | 0·04394 | 0·03961 | 0·03538 | 0·03127 | 0·02730 |
| 0·37 | 0·04996 | 0·04538 | 0·04091 | 0·03655 | 0·03231 | 0·02821 |
| 0·38 | 0·05153 | 0·04682 | 0·04221 | 0·03771 | 0·03334 | 0·02911 |
| 0·39 | 0·05309 | 0·04824 | 0·04349 | 0·03886 | 0·03436 | 0·03000 |
| 0·40 | 0·05464 | 0·04965 | 0·04477 | 0·04000 | 0·03537 | 0·03088 |
| 0·41 | 0·05616 | 0·05104 | 0·04603 | 0·04113 | 0·03637 | 0·03176 |
| 0·42 | 0·05767 | 0·05242 | 0·04727 | 0·04225 | 0·03736 | 0·03263 |
| 0·43 | 0·05916 | 0·05377 | 0·04850 | 0·04335 | 0·03834 | 0·03348 |
| 0·44 | 0·06062 | 0·05511 | 0·04971 | 0·04444 | 0·03930 | 0·03433 |
| 0·45 | 0·06206 | 0·05643 | 0·05090 | 0·04550 | 0·04025 | 0·03516 |
| 0·46 | 0·06348 | 0·05772 | 0·05207 | 0·04655 | 0·04118 | 0·03598 |
| 0·47 | 0·06486 | 0·05898 | 0·05322 | 0·04758 | 0·04210 | 0·03678 |
| 0·48 | 0·06622 | 0·06022 | 0·05434 | 0·04859 | 0·04300 | 0·03757 |
| 0·49 | 0·06754 | 0·06143 | 0·05544 | 0·04958 | 0·04388 | 0·03834 |
| 0·50 | 0·06883 | 0·06261 | 0·05651 | 0·05055 | 0·04474 | 0·03910 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·90 | 0·91 | 0·92 | 0·93 | 0·94 | 0·95 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00016 | 0·00014 | 0·00012 | 0·00009 | 0·00008 | 0·00006 |
| 0·02 | 0·00045 | 0·00038 | 0·00032 | 0·00027 | 0·00021 | 0·00016 |
| 0·03 | 0·00082 | 0·00070 | 0·00059 | 0·00049 | 0·00039 | 0·00030 |
| 0·04 | 0·00125 | 0·00108 | 0·00091 | 0·00075 | 0·00060 | 0·00046 |
| 0·05 | 0·00174 | 0·00150 | 0·00126 | 0·00104 | 0·00083 | 0·00063 |
| 0·06 | 0·00228 | 0·00195 | 0·00165 | 0·00136 | 0·00108 | 0·00083 |
| 0·07 | 0·00285 | 0·00245 | 0·00206 | 0·00170 | 0·00136 | 0·00104 |
| 0·08 | 0·00347 | 0·00298 | 0·00251 | 0·00206 | 0·00165 | 0·00126 |
| 0·09 | 0·00411 | 0·00353 | 0·00298 | 0·00245 | 0·00195 | 0·00150 |
| 0·10 | 0·00479 | 0·00411 | 0·00347 | 0·00285 | 0·00228 | 0·00174 |
| 0·11 | 0·00549 | 0·00472 | 0·00398 | 0·00327 | 0·00261 | 0·00200 |
| 0·12 | 0·00622 | 0·00534 | 0·00450 | 0·00371 | 0·00296 | 0·00226 |
| 0·13 | 0·00697 | 0·00599 | 0·00505 | 0·00416 | 0·00332 | 0·00254 |
| 0·14 | 0·00774 | 0·00665 | 0·00561 | 0·00462 | 0·00368 | 0·00282 |
| 0·15 | 0·00854 | 0·00733 | 0·00618 | 0·00509 | 0·00406 | 0·00311 |
| 0·16 | 0·00935 | 0·00803 | 0·00677 | 0·00557 | 0·00445 | 0·00340 |
| 0·17 | 0·01017 | 0·00874 | 0·00737 | 0·00606 | 0·00484 | 0·00370 |
| 0·18 | 0·01101 | 0·00946 | 0·00797 | 0·00657 | 0·00524 | 0·00401 |
| 0·19 | 0·01186 | 0·01019 | 0·00859 | 0·00707 | 0·00565 | 0·00432 |
| 0·20 | 0·01273 | 0·01093 | 0·00922 | 0·00759 | 0·00606 | 0·00464 |
| 0·21 | 0·01360 | 0·01169 | 0·00985 | 0·00811 | 0·00648 | 0·00496 |
| 0·22 | 0·01449 | 0·01245 | 0·01050 | 0·00864 | 0·00690 | 0·00528 |
| 0·23 | 0·01538 | 0·01322 | 0·01115 | 0·00918 | 0·00733 | 0·00561 |
| 0·24 | 0·01628 | 0·01399 | 0·01180 | 0·00972 | 0·00776 | 0·00594 |
| 0·25 | 0·01719 | 0·01477 | 0·01246 | 0·01026 | 0·00819 | 0·00627 |
| 0·26 | 0·01810 | 0·01556 | 0·01312 | 0·01081 | 0·00863 | 0·00660 |
| 0·27 | 0·01902 | 0·01634 | 0·01379 | 0·01135 | 0·00907 | 0·00694 |
| 0·28 | 0·01994 | 0·01714 | 0·01445 | 0·01191 | 0·00951 | 0·90728 |
| 0·29 | 0·02086 | 0·01793 | 0·01512 | 0·01246 | 0·00995 | 0·00761 |
| 0·30 | 0·02179 | 0·01872 | 0·01579 | 0·01301 | 0·01039 | 0·00795 |
| 0·31 | 0·02271 | 0·01952 | 0·01647 | 0·01356 | 0·01083 | 0·00829 |
| 0·32 | 0·02363 | 0·02031 | 0·01714 | 0·01412 | 0·01128 | 0·00863 |
| 0·33 | 0·02455 | 0·02111 | 0·01781 | 0·01467 | 0·01172 | 0·00897 |
| 0·34 | 0·02547 | 0·02190 | 0·01847 | 0·01522 | 0·01216 | 0·00931 |
| 0·35 | 0·02639 | 0·02269 | 0·01914 | 0·01577 | 0·01260 | 0·00965 |
| 0·36 | 0·02730 | 0·02347 | 0·01980 | 0·01632 | 0·01304 | 0·00998 |
| 0·37 | 0·02821 | 0·02425 | 0·02046 | 0·01686 | 0·01347 | 0·01032 |
| 0·38 | 0·02911 | 0·02503 | 0·02112 | 0·01741 | 0·01391 | 0·01065 |
| 0·39 | 0·03000 | 0·02580 | 0·02177 | 0·01794 | 0·01434 | 0·01098 |
| 0·40 | 0·03088 | 0·02656 | 0·02242 | 0·01848 | 0·01476 | 0·01131 |
| 0·41 | 0·03176 | 0·02732 | 0·02306 | 0·01901 | 0·01519 | 0·01163 |
| 0·42 | 0·03263 | 0·02806 | 0·02369 | 0·01953 | 0·01561 | 0·01196 |
| 0·43 | 0·03348 | 0·02880 | 0·02432 | 0·02005 | 0·01602 | 0·01227 |
| 0·44 | 0·03433 | 0·02953 | 0·02493 | 0·02056 | 0·01643 | 0·01259 |
| 0·45 | 0·03516 | 0·03025 | 0·02554 | 0·02106 | 0·01683 | 0·01290 |
| 0·46 | 0·03598 | 0·03096 | 0·02614 | 0·02156 | 0·01723 | 0·01320 |
| 0·47 | 0·03678 | 0·03165 | 0·02673 | 0·02204 | 0·01762 | 0·01351 |
| 0·48 | 0·03757 | 0·03233 | 0·02731 | 0·02252 | 0·01801 | 0·01380 |
| 0·49 | 0·03834 | 0·03300 | 0·02787 | 0·02299 | 0·01838 | 0·01409 |
| 0·50 | 0·03910 | 0·03365 | 0·02843 | 0·02345 | 0·01875 | 0·01438 |

TABLE 2—*continued*

$h(\kappa, \xi)$

| $\kappa$ \| $\xi$ | 0·95 | 0·96 | 0·97 | 0·98 | 0·99 | 1·00 |
|---|---|---|---|---|---|---|
| 0·00 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 | 0·00000 |
| 0·01 | 0·00006 | 0·00004 | 0·00003 | 0·00001 | 0·00001 | 0·00000 |
| 0·02 | 0·00016 | 0·00012 | 0·00008 | 0·00004 | 0·00001 | 0·00000 |
| 0·03 | 0·00030 | 0·00021 | 0·00014 | 0·00008 | 0·00003 | 0·00000 |
| 0·04 | 0·00046 | 0·00033 | 0·00021 | 0·00012 | 0·00004 | 0·00000 |
| 0·05 | 0·00063 | 0·00046 | 0·00030 | 0·00016 | 0·00006 | 0·00000 |
| 0·06 | 0·00083 | 0·00060 | 0·00039 | 0·00021 | 0·00008 | 0·00000 |
| 0·07 | 0·00104 | 0·00075 | 0·00049 | 0·00027 | 0·00009 | 0·00000 |
| 0·08 | 0·00126 | 0·00091 | 0·00059 | 0·00032 | 0·00012 | 0·00000 |
| 0·09 | 0·00150 | 0·00108 | 0·00070 | 0·00038 | 0·00014 | 0·00000 |
| 0·10 | 0·00174 | 0·00125 | 0·00082 | 0·00045 | 0·00016 | 0·00000 |
| 0·11 | 0·00200 | 0·00144 | 0·00094 | 0·00051 | 0·00018 | 0·00000 |
| 0·12 | 0·00226 | 0·00163 | 0·00106 | 0·00058 | 0·00021 | 0·00000 |
| 0·13 | 0·00254 | 0·00183 | 0·00119 | 0·00065 | 0·00023 | 0·00000 |
| 0·14 | 0·00282 | 0·00203 | 0·00132 | 0·00072 | 0·00026 | 0·00000 |
| 0·15 | 0·00311 | 0·00224 | 0·00146 | 0·00080 | 0·00028 | 0·00000 |
| 0·16 | 0·00340 | 0·00245 | 0·00160 | 0·00088 | 0·00031 | 0·00000 |
| 0·17 | 0·00370 | 0·00266 | 0·00174 | 0·00095 | 0·00034 | 0·00000 |
| 0·18 | 0·00401 | 0·00289 | 0·00188 | 0·00103 | 0·00037 | 0·00000 |
| 0·19 | 0·00432 | 0·00311 | 0·00203 | 0·00111 | 0·00040 | 0·00000 |
| 0·20 | 0·00464 | 0·00334 | 0·00218 | 0·00119 | 0·00042 | 0·00000 |
| 0·21 | 0·00496 | 0·00357 | 0·00233 | 0·00128 | 0·00045 | 0·00000 |
| 0·22 | 0·00528 | 0·00380 | 0·00248 | 0·00136 | 0·00048 | 0·00000 |
| 0·23 | 0·00561 | 0·00404 | 0·00264 | 0·00144 | 0·00051 | 0·00000 |
| 0·24 | 0·00594 | 0·00427 | 0·00279 | 0·00153 | 0·00054 | 0·00000 |
| 0·25 | 0·00627 | 0·00451 | 0·00295 | 0·00161 | 0·00057 | 0·00000 |
| 0·26 | 0·00660 | 0·00475 | 0·00311 | 0·00170 | 0·00060 | 0·00000 |
| 0·27 | 0·00694 | 0·00500 | 0·00326 | 0·00179 | 0·00064 | 0·00000 |
| 0·28 | 0·00728 | 0·00524 | 0·00342 | 0·00187 | 0·00067 | 0·00000 |
| 0·29 | 0·00761 | 0·00548 | 0·00358 | 0·00196 | 0·00070 | 0·00000 |
| 0·30 | 0·00795 | 0·00573 | 0·00374 | 0·00205 | 0·00073 | 0·00000 |
| 0·31 | 0·00829 | 0·00597 | 0·00390 | 0·00214 | 0·00076 | 0·00000 |
| 0·32 | 0·00863 | 0·00622 | 0·00406 | 0·00222 | 0·00079 | 0·00000 |
| 0·33 | 0·00897 | 0·00646 | 0·00422 | 0·00231 | 0·00082 | 0·00000 |
| 0·34 | 0·00931 | 0·00670 | 0·00438 | 0·00240 | 0·00085 | 0·00000 |
| 0·35 | 0·00965 | 0·00695 | 0·00454 | 0·00249 | 0·00088 | 0·00000 |
| 0·36 | 0·00998 | 0·00719 | 0·00470 | 0·00257 | 0·00092 | 0·00000 |
| 0·37 | 0·01032 | 0·00743 | 0·00486 | 0·00266 | 0·00095 | 0·00000 |
| 0·38 | 0·01065 | 0·00767 | 0·00502 | 0·00275 | 0·00098 | 0·00000 |
| 0·39 | 0·01098 | 0·00791 | 0·00517 | 0·00283 | 0·00101 | 0·00000 |
| 0·40 | 0·01131 | 0·00815 | 0·00533 | 0·00292 | 0·00104 | 0·00000 |
| 0·41 | 0·01163 | 0·00838 | 0·00548 | 0·00300 | 0·00107 | 0·00000 |
| 0·42 | 0·01196 | 0·00861 | 0·00563 | 0·00309 | 0·00110 | 0·00000 |
| 0·43 | 0·01227 | 0·00884 | 0·00578 | 0·00317 | 0·00113 | 0·00000 |
| 0·44 | 0·01259 | 0·00907 | 0·00593 | 0·90325 | 0·00116 | 0·00000 |
| 0·45 | 0·01290 | 0·00929 | 0·00608 | 0·00333 | 0·00119 | 0·00000 |
| 0·46 | 0·01320 | 0·00952 | 0·00622 | 0·00341 | 0·00121 | 0·00000 |
| 0·47 | 0·01351 | 0·00973 | 0·00637 | 0·00349 | 0·00124 | 0·00000 |
| 0·48 | 0·01380 | 0·00995 | 0·00651 | 0·00357 | 0·00127 | 0·00000 |
| 0·49 | 0·01409 | 0·01016 | 0·00665 | 0·00364 | 0·00130 | 0·00000 |
| 0·50 | 0·01438 | 0·01036 | 0·00678 | 0·00372 | 0·00132 | 0·00000 |

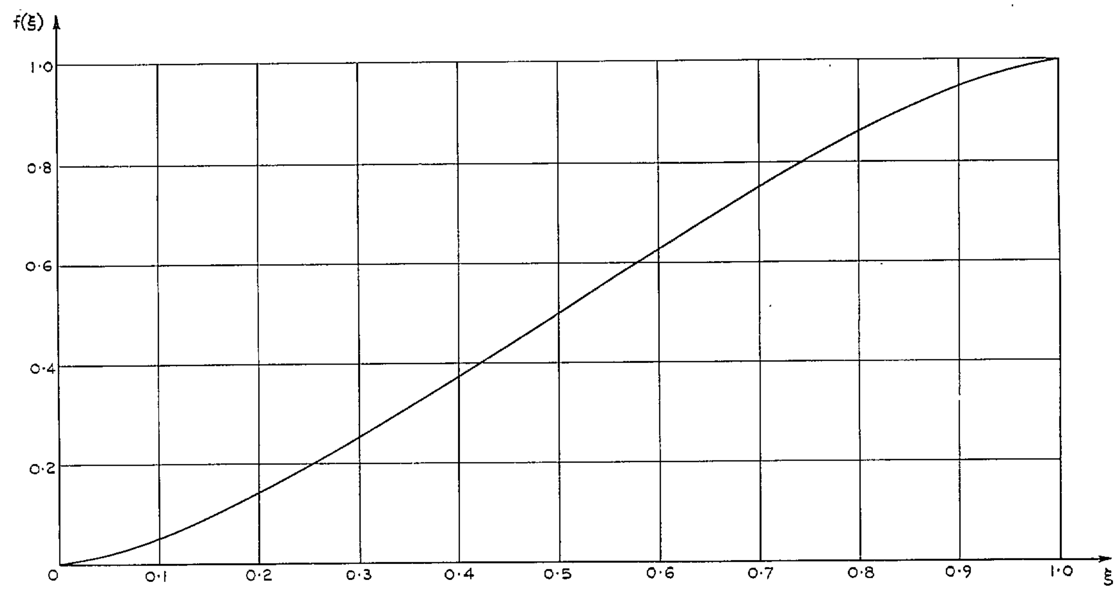


FIG. 1. The function $f(\xi)$ occurring in the von Kármán optimum.

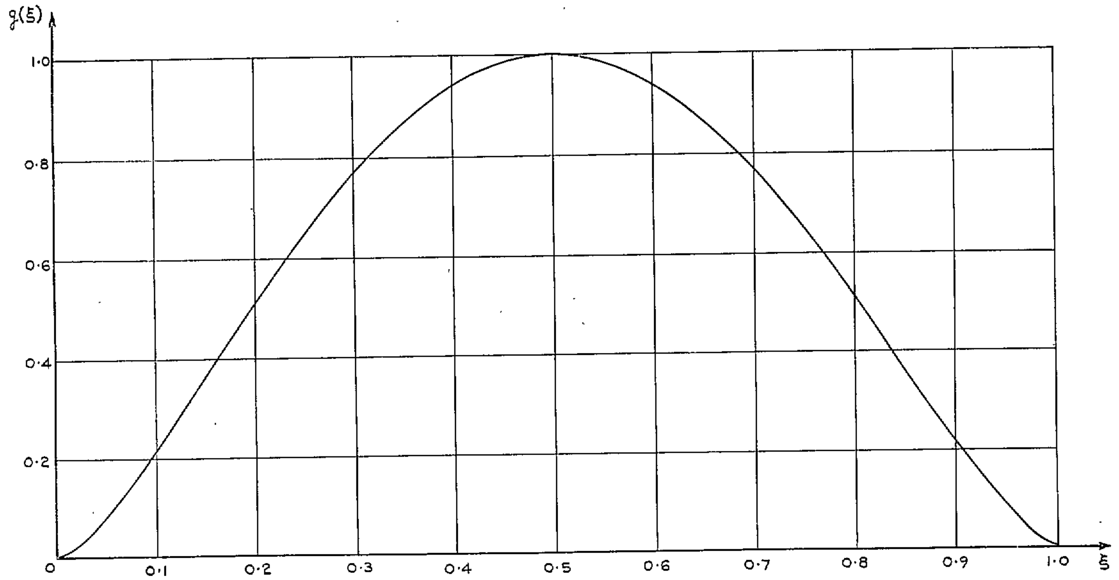


FIG. 2. The function $g(\xi)$ occurring in the Sears-Haack optimum.

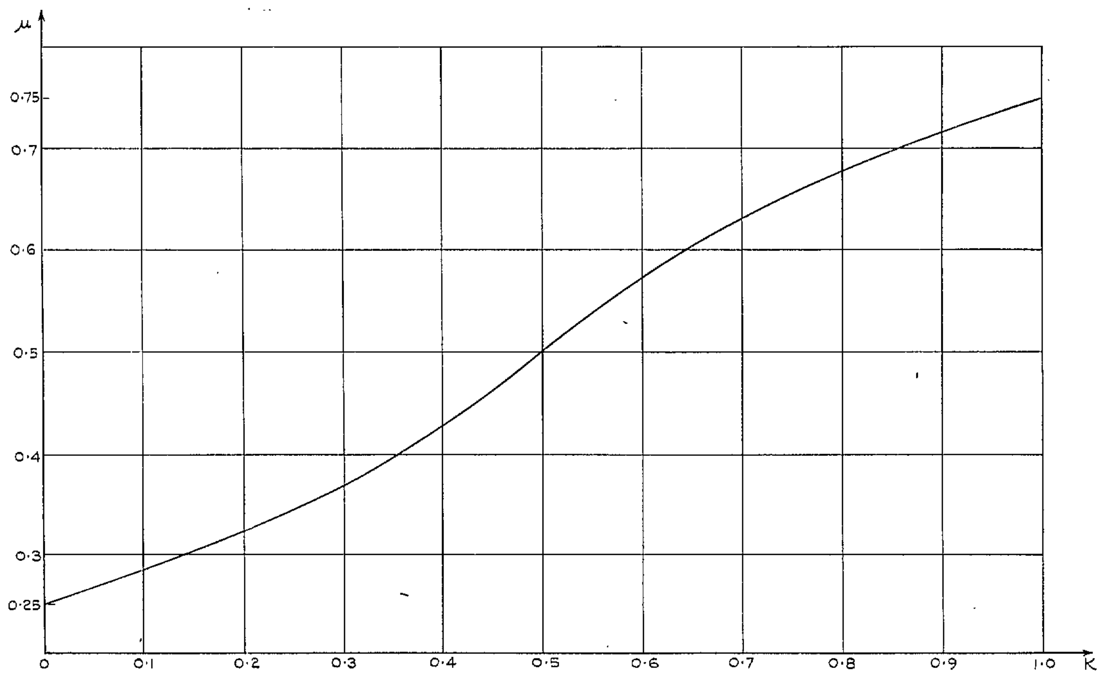


FIG. 3. The location $\mu$ of the maximum of the Adams optimum.

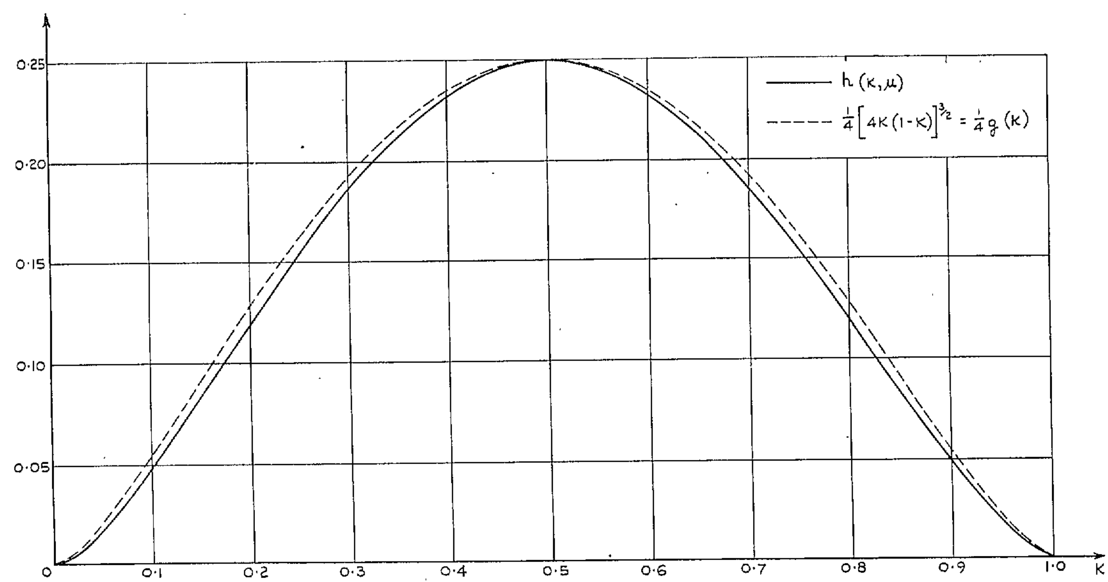


FIG. 4. The value $h(\kappa, \mu)$ determining the maximum of the Adams optimum.

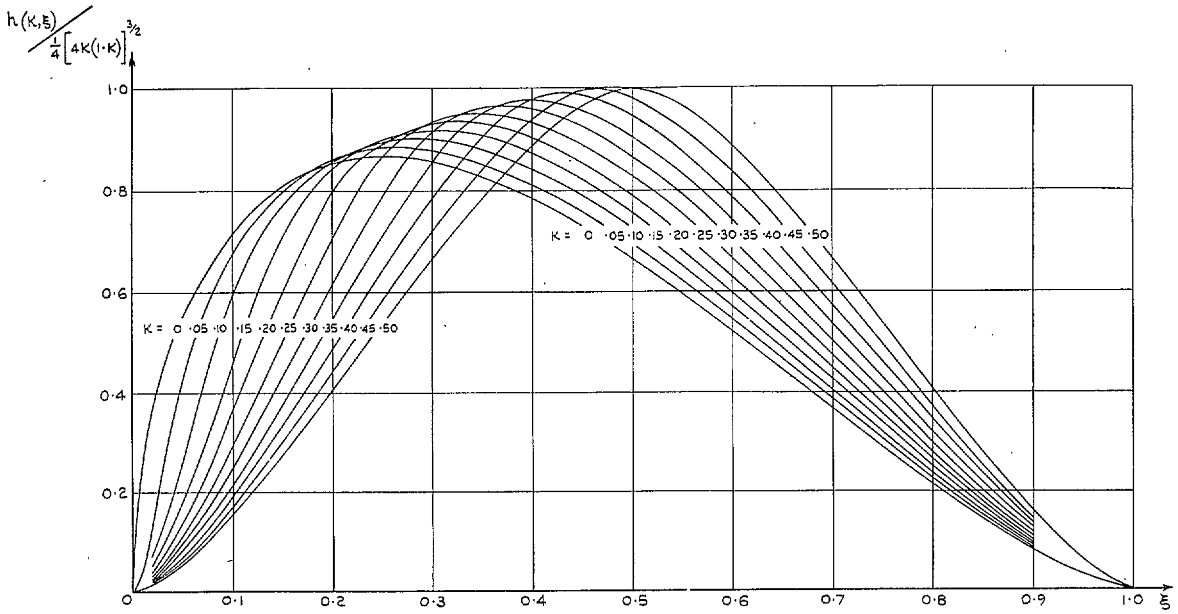


FIG. 5. The function $h(\kappa, \xi)$ occurring in the Adams optimum.

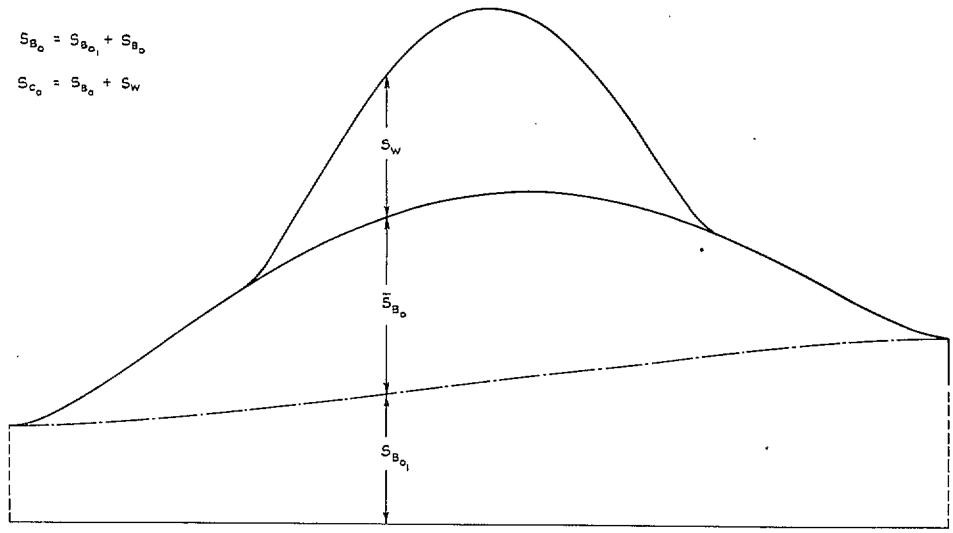


FIG. 6a. Example: area distribution of basic combination.

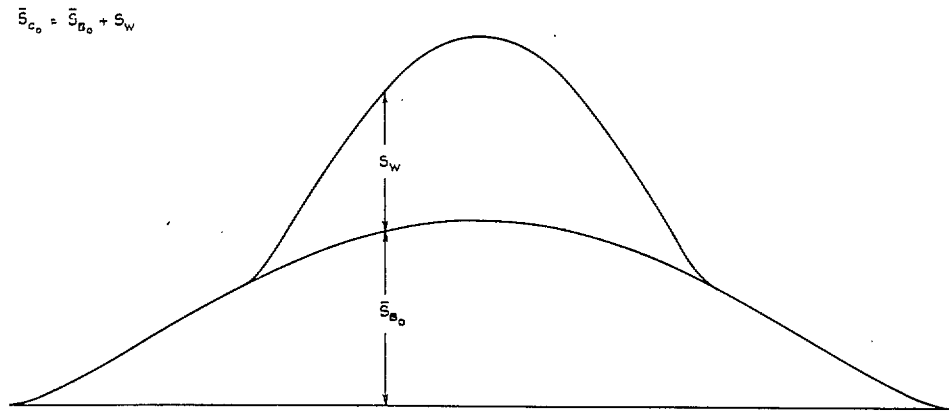


FIG. 6b. Example: residual area distribution of basic combination.

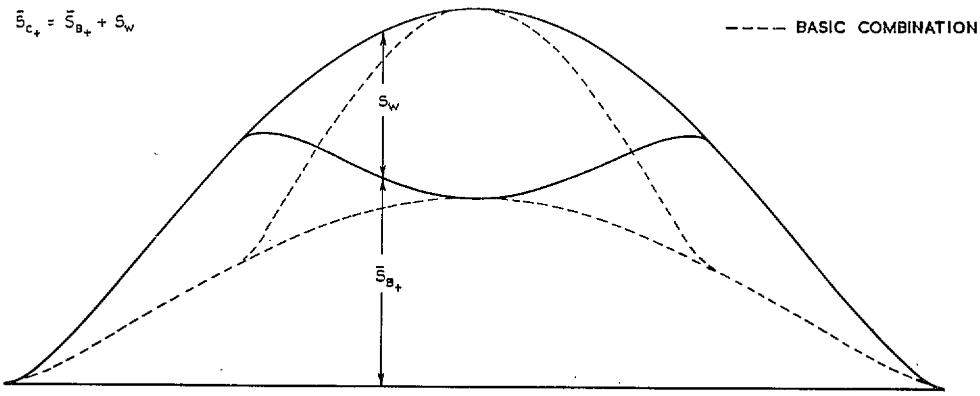


FIG. 7. Example: residual area distribution of optimum combination with increased volume.

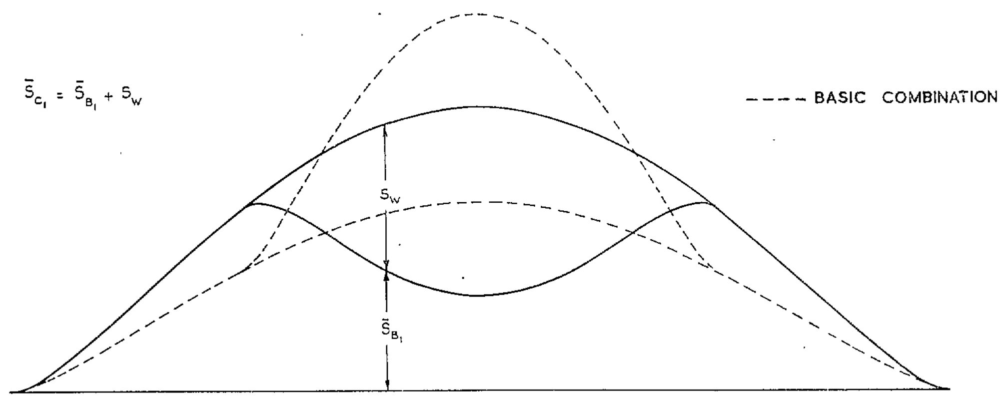


FIG. 8a. Example: residual area distributions of combinations with same volume; combination incorporating body with full waisting.

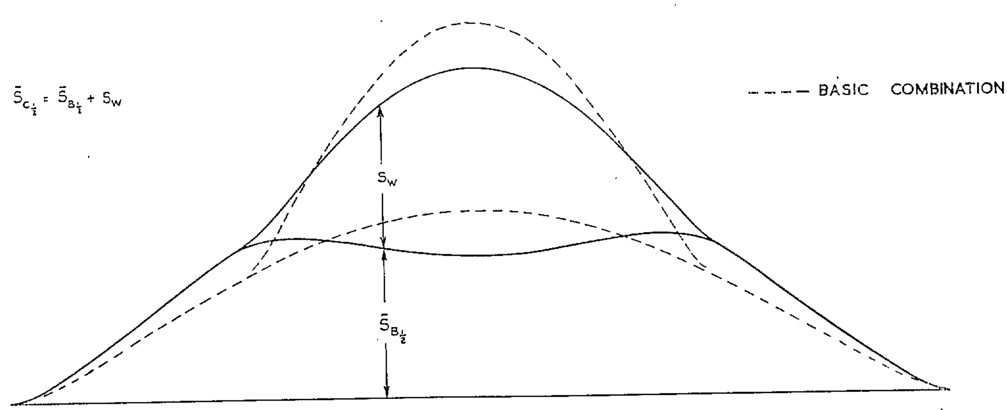


FIG. 8b. Example: residual area distributions of combinations with same volume; combination incorporating body with half of full waisting.



(84969) Wt. 67/1876 K.5 11/62 Hw.

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