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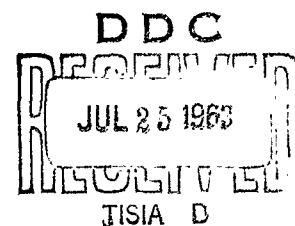
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MEMORANDUM REPORT NO. 1478
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A. D. Groves

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RDT & E Project No. 1M023201A098

BALLISTIC RESEARCH LABORATORIES

ABERDEEN PROVING GROUND, MARYLAND

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B A L L I S T I C R E S E A R C H L A B O R A T O R I E S

MEMORANDUM REPORT NO. 1478

ADGroves/djt
Aberdeen Proving Ground, Md.
April 1963

AREA OF INTERSECTION OF AN ELLIPSE AND A RECTANGLE

ABSTRACT

A method is given for computing the area of intersection of an ellipse and a rectangle whose sides are parallel to the axes of the ellipse. This method is presented in a form amenable to programming for high speed computation, but tables are included to facilitate hand computations. This method has been used in the evaluation of the effectiveness of small arms, but would have application in the evaluation of area kill weapons as well.

INTRODUCTION

A problem which has arisen in the course of devising mathematical methods for the evaluation of small arms is that of determining the area common to an ellipse and a rectangle, where the axes of the ellipse are parallel to the sides of the rectangle. In particular, this problem arises when a target (a man) is represented by a rectangle and consideration is given to firing at him with a multiple projectile round (such as a shotgun) where the projectiles are assumed to be uniformly, but randomly, distributed throughout an ellipse, so that the probability that any one of the projectiles hits the target is simply the fraction of the area of the ellipse which is common to that of the rectangle. The formulae which were generated to compute the area of overlap are felt to be of interest in other areas of weapons effectiveness, such as the evaluation of area kill weapons, and perhaps even of some interest from the viewpoint of basic mathematics. The method to be presented here lends itself well to high speed electronic computation, and will be presented with the programmer in mind.

This method is based on unpublished notes dated January 1960 by Alvin Eittreim (who recently retired from BRL) in which he derived the formulas for computing the area common to a circle with unit radius centered at the origin and a rectangle entirely within the first quadrant. He suggested, without providing the necessary mathematical transformations, that any rectangle could be considered simply by breaking it into sub-rectangles, each being that part of the original rectangle lying in one of the four quadrants, and then, for each part, considering an equivalent first-quadrant rectangle to compute the coverage. The present study follows this suggestion, providing the necessary transformations, as well as providing a more general result in that instead of being restricted to a unit circle, a general ellipse is considered.

In addition, the resulting formulas giving the area of intersection are somewhat simpler to use than were Eittreim's both in hand computation and machine computation. However, the general approach taken is the one he followed in his notes of January 1960.

METHOD

Let the ellipse be centered at the origin of the usual x, y rectangular coordinate system, so that its equation is

$$\left(\frac{x}{A}\right)^2 + \left(\frac{y}{B}\right)^2 = 1, \text{ where } A \text{ and } B \text{ are the semi-axes in the } x$$

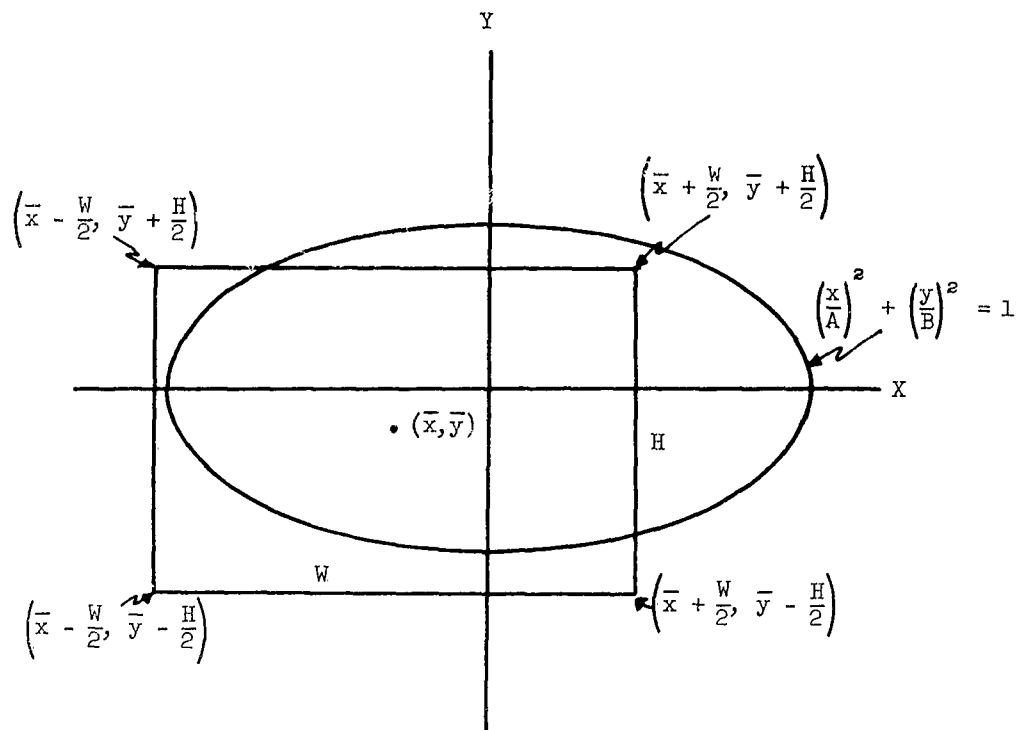
and y directions respectively, and let the rectangle have width W (in the x direction) and height H (in the y direction) and be centered at an arbitrary point whose coordinates are $(\bar{x}, \bar{y})$. Then the coordinates of the vertices of the rectangle are

$$\begin{aligned} &\left(\bar{x} - \frac{W}{2}, \bar{y} - \frac{H}{2}\right), \\ &\left(\bar{x} - \frac{W}{2}, \bar{y} + \frac{H}{2}\right), \\ &\left(\bar{x} + \frac{W}{2}, \bar{y} + \frac{H}{2}\right), \quad \text{and} \\ &\left(\bar{x} + \frac{W}{2}, \bar{y} - \frac{H}{2}\right). \end{aligned}$$

Figure 1 illustrates the general situation. The rectangle will now be broken into four rectangular areas, some of which may be zero. These, denoted A_i ($i=1, 2, 3, 4$), are simply the portions of the original rectangle which are in each of the four quadrants defined by the coordinate axes. Now, for each i , let S_i be the area of intersection of A_i and the ellipse. If S denotes the total area of intersection, which is the desired result, then

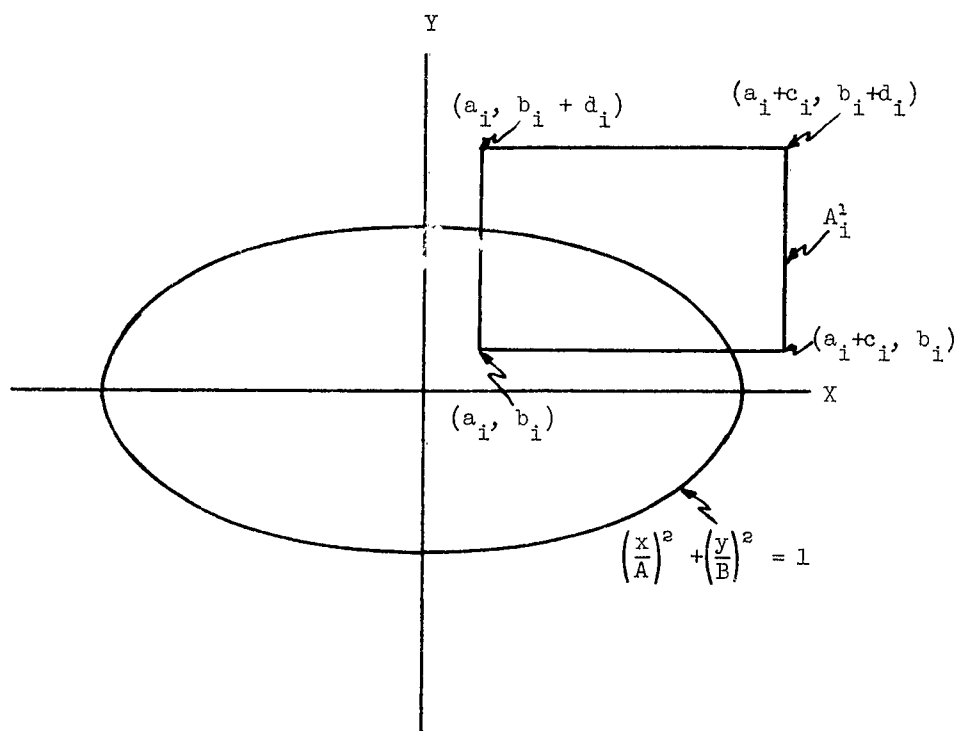
$$S = \sum_{i=1}^4 S_i.$$

Figure 1 General Situation



Thus the problem is reduced to computing the S_i . The basic scheme for computing an S_i assumes that the area A_i is entirely within the first quadrant. Thus it is required to obtain, for each area A_i , another area A_i^1 , wholly within the first quadrant, which has the same area of intersection with the ellipse as A_i , namely S_i . Each first quadrant rectangular area A_i^1 will be specified by four non-negative numbers (a_i, b_i, c_i, d_i) , where (a_i, b_i) are the coordinates of the vertex of A_i^1 closest to the origin, c_i is the width (in the x direction) of A_i^1 , and d_i is the height (in the y direction) of A_i^1 . This representation is illustrated in Figure 2, where the coordinates of the four vertices of A_i^1 are given. The next step is to represent the rectangular areas A_i^1 (or, more particularly, the four sets of numbers a_i, b_i, c_i, d_i) in terms of the coordinates of the vertices of the original rectangular areas A_i . The following definitions can be seen to be applicable simply by enumerating all cases. (There are nine possible cases, depending on the position of the original rectangular area. These are: 1, 2, 3, 4 - original rectangle completely in 1st, 2nd, 3rd, or 4th quadrant; 5 - original rectangle partly in 1st and partly in 2nd quadrants; 6 - original rectangle partly in 2nd and partly in 3rd quadrants; 7 - original rectangle partly in 3rd and partly in 4th quadrant; 8 - original rectangle partly in 4th quadrant and partly in 1st quadrant; and 9 - one vertex of original rectangle in each of the four quadrants.)

Figure 2 Representation of A_i^1



$$\begin{aligned}
A_1^1: \quad a_1 &= \max \left\{ 0, \bar{x} - \frac{W}{2} \right\} \\
b_1 &= \max \left\{ 0, \bar{y} - \frac{H}{2} \right\} \\
c_1 &= \max \left\{ 0, \bar{x} + \frac{W}{2} - a_1 \right\} \\
d_1 &= \max \left\{ 0, \bar{y} + \frac{H}{2} - b_1 \right\} \\
A_2^1: \quad a_2 &= \max \left\{ 0, -\bar{x} - \frac{W}{2} \right\} \\
b_2 &= \max \left\{ 0, -\bar{y} - \frac{H}{2} \right\} \\
c_2 &= \max \left\{ 0, -\bar{x} + \frac{W}{2} - a_2 \right\} \\
d_2 &= \max \left\{ 0, -\bar{y} + \frac{H}{2} - b_2 \right\} \\
A_3^1: \quad a_3 &= \max \left\{ 0, -\bar{x} - \frac{W}{2} \right\} \\
b_3 &= \max \left\{ 0, -\bar{y} - \frac{H}{2} \right\} \\
c_3 &= \max \left\{ 0, -\bar{x} + \frac{W}{2} - a_3 \right\} \\
d_3 &= \max \left\{ 0, -\bar{y} + \frac{H}{2} - b_3 \right\} \\
A_4^1: \quad a_4 &= \max \left\{ 0, \bar{x} - \frac{W}{2} \right\} \\
b_4 &= \max \left\{ 0, -\bar{y} - \frac{H}{2} \right\} \\
c_4 &= \max \left\{ 0, \bar{x} + \frac{W}{2} - a_4 \right\} \\
d_4 &= \max \left\{ 0, -\bar{y} + \frac{H}{2} - b_4 \right\}
\end{aligned}$$

For programming purposes, it may be desirable to express these numbers more generally, where the four numbers defining A_i^1 can be computed as a function of i . The following generalization, although somewhat artificial, works.

$$A_i^1: \quad a_i = \max \left\{ 0, (-1)^{\frac{1}{2}}(i^2-i) \bar{x} - \frac{W}{2} \right\}$$

$$b_i = \max \left\{ 0, (-1)^{\frac{1}{2}}(i^2+i-2) \bar{y} - \frac{H}{2} \right\}$$

$$c_i = \max \left\{ 0, (-1)^{\frac{1}{2}}(i^2-i) \bar{x} + \frac{W}{2} - a_i \right\}$$

$$d_i = \max \left\{ 0, (-1)^{\frac{1}{2}}(i^2+i-2) \bar{y} + \frac{H}{2} - b_i \right\}$$

(The quantity $\max \{0, M\}$ is defined to be either 0 or M, whichever is larger.)

Now the problem has been reduced to computing four areas of overlap (some or all of which may be zero), for each of which the rectangle is entirely within the first quadrant. For convenience of notation, the subscript i will be dropped, and a method will be given for computing

$S = S(a, b, c, d, A, B)$, where S is the area of intersection of the ellipse and a rectangle entirely within the first quadrant.

Let the four vertices of the rectangle be indexed in the following manner according to their coordinates:

$$V_1: (a, b)$$

$$V_2: (a, b+d)$$

$$V_3: (a+c, b+d)$$

$$V_4: (a+c, b)$$

If either $c=0$ or $d=0$, then $S=0$, since the rectangle either has zero width or zero length and hence no area. Thus the following formulae need be used only if neither c nor d is zero.

There are six cases to be considered, depending on which vertices are inside the ellipse. These are :

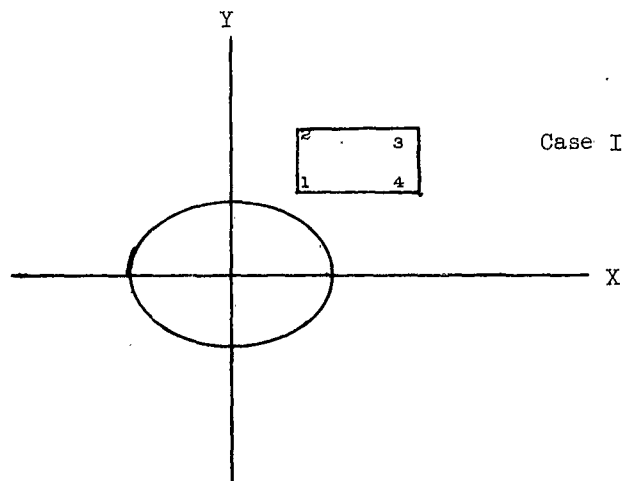
- Case I - No vertices inside the ellipse
- Case II - V_1 inside; V_2, V_3 and V_4 outside
- Case III - V_1 and V_4 inside; V_2 and V_3 outside
- Case IV - V_1 and V_2 inside; V_3 and V_4 outside
- Case V - V_1, V_2 and V_4 inside; V_3 outside
- Case VI - All vertices inside the ellipse.

Case I - This case is identified by the condition

$\left(\frac{a}{A}\right)^2 + \left(\frac{b}{B}\right)^2 \geq 1$, which indicates that V_1 , the vertex closest to the origin, is outside the ellipse. If V_1 is outside the ellipse, then all others will be also, and the area of overlap, denoted S_I , is obviously

$$S_I = 0$$

The following sketch illustrates this case:



Case II - In this case V_1 is inside the ellipse, but all other vertices are outside. The condition for V_1 to be inside the ellipse is

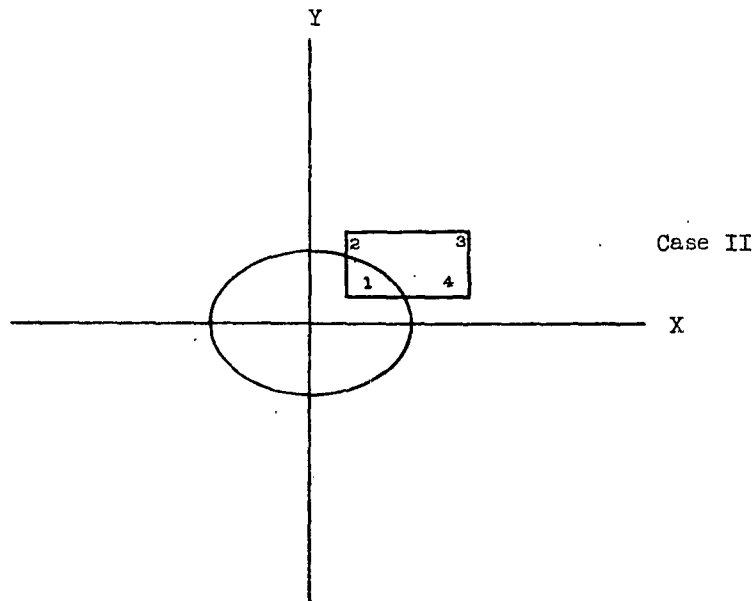
$$\left(\frac{a}{A}\right)^2 + \left(\frac{b}{B}\right)^2 < 1.$$

The vertex V_3 will obviously be outside the ellipse if V_2 and V_4 are. Thus two more conditions are required to identify Case II. These are

$$\left(\frac{a}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 \geq 1 \quad (V_2 \text{ outside}),$$

$$\left(\frac{a+c}{A}\right)^2 + \left(\frac{b}{B}\right)^2 \geq 1. \quad (V_4 \text{ outside})$$

The following sketch illustrates Case II:



The result for this case will be used as a basis for all other cases (except Case VI), so will be analyzed in detail. Let S_{II} be the desired area of intersection. Then

$$S_{II} = \int_{x=a}^{\frac{A}{B}\sqrt{B^2-b^2}} \int_{y=b}^{\frac{B}{A}\sqrt{A^2-x^2}} dy dx$$

which is easily integrated to give

$$S_{II} = \frac{AB}{2} \left[\sin^{-1} \sqrt{1-\left(\frac{b}{B}\right)^2} - \sin^{-1} \left(\frac{a}{A}\right) - \left(\frac{a}{A}\right) \sqrt{1-\left(\frac{a}{A}\right)^2} - \left(\frac{b}{B}\right) \sqrt{1-\left(\frac{b}{B}\right)^2} + 2\left(\frac{a}{A}\right)\left(\frac{b}{B}\right) \right]$$

For a further simplification, let

$$\theta = \sin^{-1} \sqrt{1-\left(\frac{b}{B}\right)^2} - \sin^{-1} \left(\frac{a}{A}\right)$$

$$\text{Then } \sin \theta = \sqrt{1-\left(\frac{b}{B}\right)^2} \sqrt{1-\left(\frac{a}{A}\right)^2} - \left(\frac{a}{A}\right)\left(\frac{b}{B}\right)$$

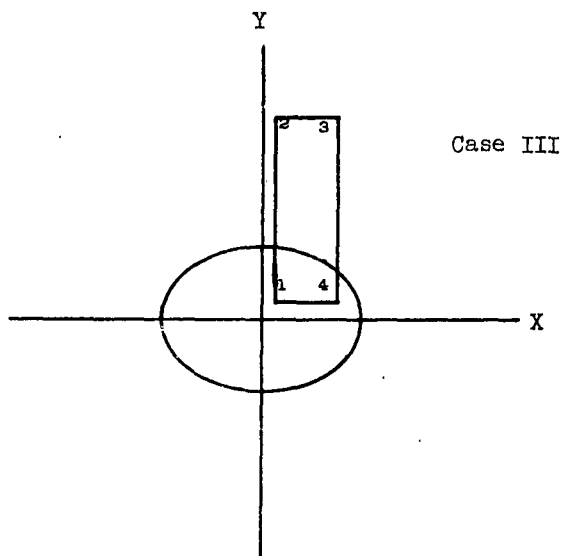
$$\text{or } \theta = \sin^{-1} \left\{ \sqrt{1-\left(\frac{b}{B}\right)^2} \sqrt{1-\left(\frac{a}{A}\right)^2} - \left(\frac{a}{A}\right)\left(\frac{b}{B}\right) \right\}$$

Thus

$$S_{II} = \frac{AB}{2} F \left(\frac{a}{A}, \frac{b}{B} \right)$$

$$\text{where } F(U,V) = \sin^{-1} \left[\sqrt{1-U^2} \sqrt{1-V^2} - UV \right] - U \sqrt{1-U^2} - V \sqrt{1-V^2} + 2UV$$

Case III - In this case V_4 (and thus V_1) are inside the ellipse, and V_2 (and thus V_3) are outside, as illustrated in the following diagram:

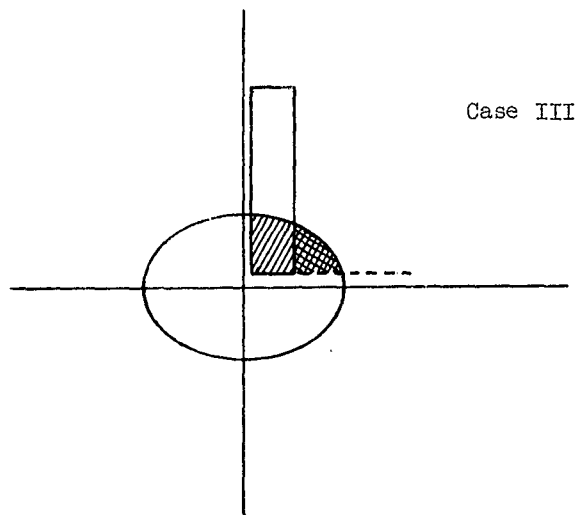


This situation is identified by the mathematical conditions

$$\left(\frac{a+c}{A}\right)^2 + \left(\frac{b}{B}\right)^2 < 1 \quad (V_4 \text{ inside})$$

and $\left(\frac{a}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 \geq 1 \quad (V_2 \text{ outside}).$

Now note that the area S_{III} can be considered as the difference between two areas of the type considered in Case II, as illustrated in the following diagram:



The total area (single crosshatched plus double crosshatched) is simply

$$\frac{AB}{2} F\left(\frac{a}{A}, \frac{b}{B}\right) \quad \text{according to the Case II result. The double cross-}$$

hatched area, again by Case II, is

$$\frac{AB}{2} F\left(\frac{a+c}{A}, \frac{b}{B}\right).$$

Thus the desired area S_{III} (single crosshatched) is given by

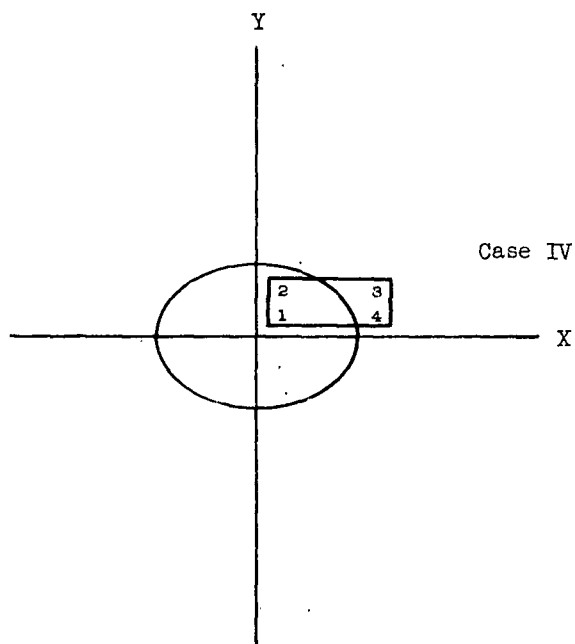
$$S_{III} = \frac{AB}{2} \left[F\left(\frac{a}{A}, \frac{b}{B}\right) - F\left(\frac{a+c}{A}, \frac{b}{B}\right) \right].$$

Case IV - Case IV is similar to Case III in that two vertices are inside the ellipse and two are outside, except that in Case IV, V_1 and V_2 are inside. The two conditions sufficient to identify this case are

$$\left(\frac{a}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 < 1 \quad (V_2 \text{ inside})$$

and $\left(\frac{a+c}{A}\right)^2 + \left(\frac{b}{B}\right)^2 \geq 1 \quad (V_4 \text{ outside}) .$

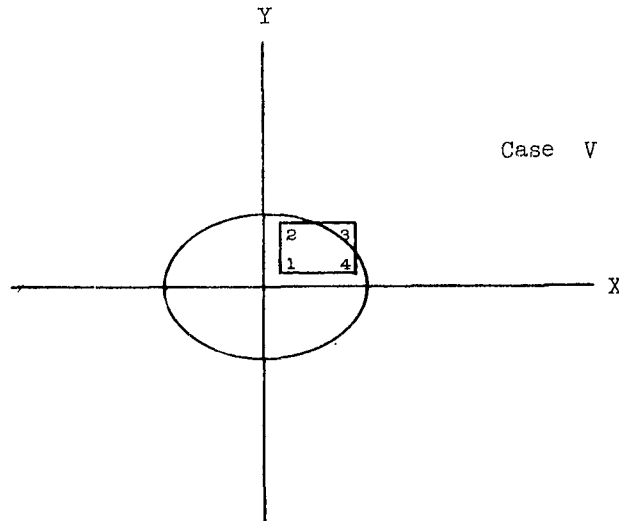
Of course, V_1 must be inside if V_2 is, and V_3 must be outside if V_4 is, so only two conditions are necessary to place all four vertices. The following sketch illustrates this case



In a manner similar to that discussed in Case III, the area S_{IV} can be considered to be the difference between two areas computed by the result given in Case II. Without further detail, then,

$$S_{IV} = \frac{AB}{2} \left[F\left(\frac{a}{A}, \frac{b}{B}\right) - F\left(\frac{a}{A}, \frac{b+d}{B}\right) \right] .$$

Case V - In Case V all of the vertices are inside the ellipse except V_3 , as illustrated in the following sketch



Three conditions are required to identify this case, namely

$$\left(\frac{a}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 < 1 \quad (V_2 \text{ inside})$$

$$\left(\frac{a+c}{A}\right)^2 + \left(\frac{b}{B}\right)^2 < 1 \quad (V_4 \text{ inside})$$

$$\text{and } \left(\frac{a+c}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 > 1 \quad (V_3 \text{ outside}) .$$

As in the previous two cases, S_V is computed by taking the differences between certain areas computed by the result given in Case II.

Thus

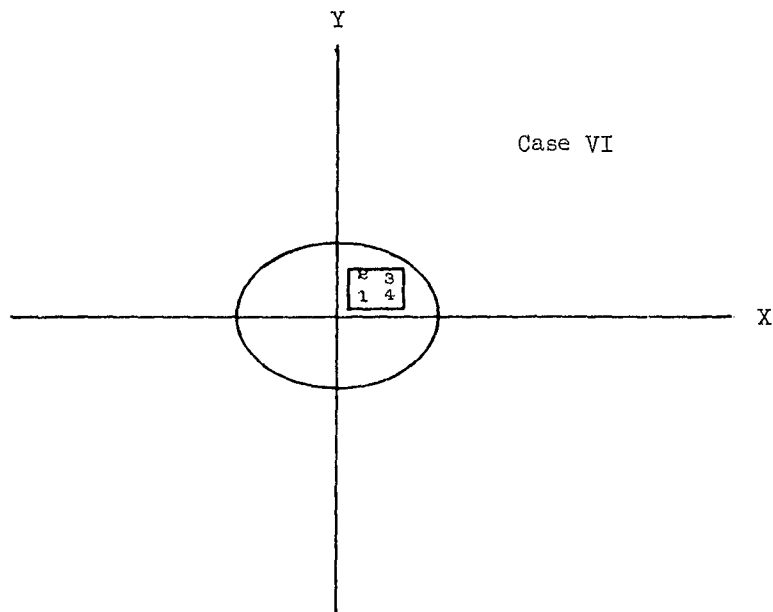
$$S_V = \frac{AB}{2} \left[F\left(\frac{a}{A}, \frac{b}{B}\right) - F\left(\frac{a+c}{A}, \frac{b}{B}\right) - F\left(\frac{a}{A}, \frac{b+d}{B}\right) \right]$$

Case VI - Here all vertices are inside the ellipse, and only one condition is required to identify the case, i.e., that condition indicating that V_3 is inside. This condition is

$$\left(\frac{a+c}{A}\right)^2 + \left(\frac{b+d}{B}\right)^2 \leq 1$$

In this case, illustrated in the following sketch, the area S_{VI} is simply the area of the rectangle. Thus

$$S_{VI} = cd$$



TABULATION OF $F(U,V)$

It is clear that the major part of the computation of S is the evaluation of the function $F(U,V)$, which may have to be made as many as twelve times in the course of computing a single S . For this reason a table is included giving values of $F(U,V)$ as both U and V vary from zero to one at .01 intervals.

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A. D. GROVES

F(u, v)											
U=0.00-.10 V=0.00-.50											
V	U 0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.00	1.57080	1.55080	1.53080	1.51081	1.49082	1.47084	1.45087	1.43091	1.41097	1.39104	1.37113
0.01	1.55080	1.53100	1.51120	1.49141	1.47162	1.45184	1.43207	1.41231	1.39257	1.37284	1.35313
0.02	1.53080	1.51120	1.49160	1.47201	1.45242	1.43284	1.41327	1.39371	1.37417	1.35464	1.33513
0.03	1.51081	1.49141	1.47201	1.45261	1.43323	1.41385	1.39448	1.37512	1.35578	1.33645	1.31714
0.04	1.49082	1.47162	1.45242	1.43323	1.41404	1.39486	1.37569	1.35653	1.33739	1.31826	1.29915
0.05	1.47084	1.45184	1.43284	1.41385	1.39486	1.37588	1.35691	1.33795	1.31901	1.30008	1.28117
0.06	1.45087	1.43207	1.41327	1.39448	1.37569	1.35691	1.33814	1.31938	1.30064	1.28191	1.26320
0.07	1.43091	1.41231	1.39371	1.37512	1.35653	1.33795	1.31938	1.30083	1.28228	1.26375	1.24524
0.08	1.41097	1.39257	1.37417	1.35578	1.33739	1.31901	1.30064	1.28228	1.26394	1.24561	1.22730
0.09	1.39104	1.37284	1.35464	1.33645	1.31826	1.30008	1.28191	1.26375	1.24561	1.22748	1.20937
0.10	1.37113	1.35313	1.33513	1.31714	1.29915	1.28117	1.26320	1.24524	1.22730	1.20937	1.19146
0.11	1.35124	1.33344	1.31564	1.29785	1.28006	1.26228	1.24451	1.22676	1.20901	1.19128	1.17357
0.12	1.33137	1.31377	1.29618	1.27858	1.26099	1.24342	1.22585	1.20829	1.19074	1.17322	1.15571
0.13	1.31154	1.29413	1.27673	1.25934	1.24195	1.22457	1.20720	1.18984	1.17250	1.15517	1.13786
0.14	1.29171	1.27451	1.25732	1.24012	1.22294	1.20576	1.18859	1.17143	1.15428	1.13716	1.12005
0.15	1.27193	1.25493	1.23793	1.22093	1.20395	1.18697	1.17000	1.15304	1.13610	1.11917	1.10226
0.16	1.25217	1.23537	1.21857	1.20178	1.18499	1.16821	1.15144	1.13468	1.11794	1.10121	1.08450
0.17	1.23244	1.21584	1.19924	1.18265	1.16606	1.14948	1.13291	1.11636	1.09981	1.08328	1.06678
0.18	1.21275	1.19635	1.17995	1.16356	1.14717	1.13079	1.11442	1.09806	1.08172	1.06539	1.04908
0.19	1.19310	1.17690	1.16070	1.14450	1.12832	1.11214	1.09597	1.07981	1.06367	1.04754	1.03143
0.20	1.17348	1.15748	1.14148	1.12549	1.10950	1.09352	1.07755	1.06159	1.04565	1.02972	1.01381
0.21	1.15390	1.13810	1.12231	1.10651	1.09073	1.07495	1.05918	1.04342	1.02767	1.01195	0.99624
0.22	1.13437	1.11877	1.10317	1.08758	1.07199	1.05641	1.04084	1.02529	1.00974	0.99422	0.97871
0.23	1.11488	1.09949	1.08409	1.06869	1.05331	1.03793	1.02256	1.00720	0.99186	0.97653	0.96122
0.24	1.09544	1.08025	1.06505	1.04985	1.03467	1.01949	1.00432	0.98916	0.97402	0.95889	0.94378
0.25	1.07605	1.06105	1.04606	1.03106	1.01608	1.00110	0.98613	0.97117	0.95623	0.94130	0.92639
0.26	1.05672	1.04172	1.02672	1.01172	0.99674	0.98176	0.96679	0.95183	0.93689	0.92196	0.90705
0.27	1.03743	1.02243	1.00743	0.99243	0.97745	0.96247	0.94750	0.93253	0.91758	0.90263	0.88769
0.28	1.01820	1.00320	0.98820	0.97320	0.95822	0.94324	0.92827	0.91330	0.89834	0.88338	0.86843
0.29	0.99903	0.98403	0.96903	0.95404	0.93906	0.92408	0.90911	0.89414	0.87918	0.86422	0.84927
0.30	0.97992	0.96492	0.94992	0.93493	0.91995	0.90497	0.88999	0.87502	0.86006	0.84510	0.83015
0.31	0.96087	0.94587	0.93087	0.91588	0.90089	0.88591	0.87093	0.85596	0.84099	0.82602	0.81106
0.32	0.94169	0.92669	0.91169	0.89670	0.88171	0.86673	0.85175	0.83678	0.82181	0.80684	0.79187
0.33	0.92298	0.90798	0.89298	0.87799	0.86299	0.84799	0.83299	0.81799	0.80299	0.78799	0.77299
0.34	0.90413	0.88913	0.87413	0.85913	0.84413	0.82913	0.81413	0.79913	0.78413	0.76913	0.75413
0.35	0.88536	0.87036	0.85536	0.84036	0.82536	0.81036	0.79536	0.78036	0.76536	0.75036	0.73536
0.36	0.86667	0.85167	0.83667	0.82167	0.80667	0.79167	0.77667	0.76167	0.74667	0.73167	0.71667
0.37	0.84805	0.83305	0.81805	0.80305	0.78805	0.77305	0.75805	0.74305	0.72805	0.71305	0.69805
0.38	0.82951	0.81451	0.79951	0.78451	0.76951	0.75451	0.73951	0.72451	0.70951	0.69451	0.67951
0.39	0.81105	0.79605	0.78105	0.76605	0.75105	0.73605	0.72105	0.70605	0.69105	0.67605	0.66105
0.40	0.79267	0.77767	0.76267	0.74767	0.73267	0.71767	0.70267	0.68767	0.67267	0.65767	0.64267
0.41	0.77439	0.75939	0.74439	0.72939	0.71439	0.69939	0.68439	0.66939	0.65439	0.63939	0.62439
0.42	0.75619	0.74119	0.72619	0.71119	0.69619	0.68119	0.66619	0.65119	0.63619	0.62119	0.60619
0.43	0.73809	0.72309	0.70809	0.69309	0.67809	0.66309	0.64809	0.63309	0.61809	0.60309	0.58809
0.44	0.72008	0.70508	0.69008	0.67508	0.66008	0.64508	0.63008	0.61508	0.60008	0.58508	0.57008
0.45	0.70217	0.68717	0.67217	0.65717	0.64217	0.62717	0.61217	0.59717	0.58217	0.56717	0.55217
0.46	0.68436	0.66936	0.65436	0.63936	0.62436	0.60936	0.59436	0.57936	0.56436	0.54936	0.53436
0.47	0.66665	0.65165	0.63665	0.62165	0.60665	0.59165	0.57665	0.56165	0.54665	0.53165	0.51665
0.48	0.64905	0.63405	0.61905	0.60405	0.58905	0.57405	0.55905	0.54405	0.52905	0.51405	0.49905
0.49	0.63156	0.61656	0.60156	0.58656	0.57156	0.55656	0.54156	0.52656	0.51156	0.49656	0.48156
0.50	0.61418	0.59918	0.58418	0.56918	0.55418	0.53918	0.52418	0.50918	0.49418	0.47918	0.46418

F(u,v)											
U=.00-.10 V=.50-1.00											
V	U	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
.50	0.61418	0.60419	0.59419	0.58419	0.57421	0.56423	0.55426	0.54430	0.53436	0.52443	0.51451
.51	0.59692	0.58712	0.57733	0.56753	0.55774	0.54796	0.53819	0.52844	0.51869	0.50897	0.49926
.52	0.57978	0.57018	0.56058	0.55099	0.54140	0.53182	0.52225	0.51269	0.50315	0.49362	0.48410
.53	0.56276	0.55336	0.54396	0.53457	0.52518	0.51580	0.50643	0.49707	0.48773	0.47840	0.46907
.54	0.54586	0.53666	0.52746	0.51827	0.50908	0.49990	0.49073	0.48157	0.47243	0.46330	0.45417
.55	0.52909	0.52009	0.51109	0.50210	0.49311	0.48413	0.47516	0.46621	0.45726	0.44833	0.43941
.56	0.51245	0.50366	0.49486	0.48606	0.47728	0.46850	0.45973	0.45097	0.44223	0.43350	0.42477
.57	0.49595	0.48735	0.47876	0.47016	0.46157	0.45299	0.44443	0.43587	0.42732	0.41880	0.41029
.58	0.47959	0.47119	0.46279	0.45440	0.44601	0.43763	0.42926	0.42090	0.41256	0.40423	0.39592
.59	0.46337	0.45517	0.44697	0.43878	0.43059	0.42241	0.41424	0.40608	0.39794	0.38981	0.38170
.60	0.44730	0.43930	0.43130	0.42330	0.41532	0.40734	0.39937	0.39141	0.38347	0.37554	0.36763
.61	0.43137	0.42357	0.41577	0.40798	0.40019	0.39241	0.38464	0.37689	0.36914	0.36141	0.35370
.62	0.41560	0.40800	0.40040	0.39281	0.38522	0.37764	0.37007	0.36251	0.35497	0.34744	0.33993
.63	0.39999	0.39259	0.38519	0.37780	0.37041	0.36303	0.35566	0.34830	0.34096	0.33363	0.32632
.64	0.38454	0.37734	0.37014	0.36295	0.35576	0.34858	0.34141	0.33425	0.32711	0.31998	0.31287
.65	0.36925	0.36225	0.35526	0.34826	0.34128	0.33430	0.32733	0.32037	0.31343	0.30650	0.29959
.66	0.35414	0.34734	0.34054	0.33375	0.32696	0.32018	0.31341	0.30666	0.29991	0.29319	0.28648
.67	0.33921	0.33261	0.32601	0.31941	0.31283	0.30625	0.29968	0.29312	0.28658	0.28005	0.27354
.68	0.32445	0.31805	0.31165	0.30526	0.29887	0.29249	0.28612	0.27976	0.27342	0.26709	0.26078
.69	0.30988	0.30368	0.29748	0.29129	0.28510	0.27892	0.27275	0.26659	0.26045	0.25432	0.24821
.70	0.29550	0.28950	0.28350	0.27751	0.27152	0.26554	0.25957	0.25361	0.24767	0.24174	0.23583
.71	0.28131	0.27552	0.26972	0.26392	0.25814	0.25236	0.24659	0.24083	0.23509	0.22936	0.22365
.72	0.26733	0.26173	0.25614	0.25054	0.24495	0.23937	0.23380	0.22825	0.22270	0.21718	0.21167
.73	0.25356	0.24816	0.24276	0.23737	0.23198	0.22660	0.22123	0.21587	0.21053	0.20520	0.19989
.74	0.24000	0.23480	0.22960	0.22441	0.21922	0.21404	0.20887	0.20371	0.19857	0.19344	0.18833
.75	0.22666	0.22166	0.21666	0.21166	0.20668	0.20170	0.19673	0.19177	0.18683	0.18190	0.17699
.76	0.21354	0.20874	0.20394	0.19915	0.19436	0.18958	0.18481	0.18006	0.17531	0.17058	0.16588
.77	0.20066	0.19606	0.19146	0.18687	0.18228	0.17770	0.17313	0.16858	0.16403	0.15950	0.15500
.78	0.18802	0.18362	0.17923	0.17484	0.17044	0.16606	0.16169	0.15734	0.15299	0.14867	0.14436
.79	0.17563	0.17143	0.16724	0.16304	0.15885	0.15467	0.15050	0.14635	0.14220	0.13808	0.13397
.80	0.16350	0.15950	0.15550	0.15151	0.14752	0.14354	0.13957	0.13562	0.13167	0.12774	0.12383
.81	0.15164	0.14784	0.14404	0.14025	0.13646	0.13268	0.12891	0.12515	0.12141	0.11768	0.11397
.82	0.14005	0.13645	0.13285	0.12926	0.12567	0.12209	0.11852	0.11496	0.11142	0.10789	0.10438
.83	0.12875	0.12535	0.12195	0.11855	0.11517	0.11179	0.10842	0.10506	0.10172	0.09839	0.09508
.84	0.11774	0.11454	0.11134	0.10815	0.10496	0.10178	0.09861	0.09545	0.09231	0.08918	0.08607
.85	0.10705	0.10405	0.10105	0.09805	0.09507	0.09209	0.08912	0.08616	0.08322	0.08029	0.07738
.86	0.09667	0.09387	0.09108	0.08828	0.08550	0.08272	0.07995	0.07719	0.07444	0.07172	0.06901
.87	0.08664	0.08404	0.08144	0.07885	0.07626	0.07368	0.07111	0.06855	0.06601	0.06348	0.06097
.88	0.07696	0.07456	0.07216	0.06977	0.06738	0.06500	0.06263	0.06027	0.05793	0.05560	0.05329
.89	0.06765	0.06545	0.06325	0.06106	0.05887	0.05669	0.05452	0.05236	0.05022	0.04809	0.04598
.90	0.05873	0.05673	0.05473	0.05273	0.05075	0.04877	0.04680	0.04484	0.04290	0.04097	0.03906
.91	0.05022	0.04842	0.04662	0.04483	0.04304	0.04126	0.03949	0.03773	0.03599	0.03426	0.03255
.92	0.04215	0.04055	0.03895	0.03736	0.03577	0.03419	0.03262	0.03107	0.02952	0.02799	0.02648
.93	0.03455	0.03315	0.03176	0.03036	0.02897	0.02759	0.02623	0.02487	0.02352	0.02220	0.02089
.94	0.02746	0.02626	0.02506	0.02387	0.02268	0.02150	0.02033	0.01918	0.01803	0.01691	0.01580
.95	0.02092	0.01992	0.01893	0.01793	0.01694	0.01596	0.01500	0.01404	0.01309	0.01217	0.01126
.96	0.01499	0.01419	0.01340	0.01260	0.01182	0.01104	0.01027	0.00951	0.00876	0.00804	0.00733
.97	0.00975	0.00915	0.00856	0.00796	0.00738	0.00680	0.00623	0.00567	0.00512	0.00460	0.00409
.98	0.00532	0.00492	0.00452	0.00413	0.00374	0.00336	0.00299	0.00263	0.00229	0.00196	0.00163
.99	0.00188	0.00168	0.00149	0.00129	0.00110	0.00092	0.00075	0.00060	0.00045	0.00033	0.00022
1.00	0.00000										

F(u,v)											
U=.10-.20 V=.00-.50											
	U 0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
.00	1.37113	1.35124	1.33137	1.31153	1.29171	1.27193	1.25217	1.23244	1.21275	1.19310	1.17348
.01	1.35313	1.33344	1.31377	1.29413	1.27451	1.25493	1.23537	1.21584	1.19635	1.17690	1.15748
.02	1.33513	1.31564	1.29618	1.27673	1.25732	1.23793	1.21857	1.19924	1.17995	1.16070	1.14148
.03	1.31714	1.29785	1.27858	1.25934	1.24012	1.22093	1.20178	1.18265	1.16356	1.14450	1.12549
.04	1.29915	1.28006	1.26099	1.24195	1.22294	1.20395	1.18499	1.16606	1.14717	1.12832	1.10950
.05	1.28117	1.26228	1.24342	1.22457	1.20576	1.18697	1.16821	1.14948	1.13079	1.11214	1.09352
.06	1.26320	1.24451	1.22585	1.20720	1.18859	1.17000	1.15144	1.13291	1.11442	1.09597	1.07755
.07	1.24524	1.22676	1.20829	1.18984	1.17143	1.15304	1.13468	1.11636	1.09806	1.07981	1.06159
.08	1.22730	1.20901	1.19074	1.17250	1.15428	1.13610	1.11794	1.09981	1.08172	1.06367	1.04565
.09	1.20937	1.19128	1.17322	1.15517	1.13716	1.11917	1.10121	1.08328	1.06539	1.04754	1.02972
.10	1.19146	1.17357	1.15571	1.13786	1.12005	1.10226	1.08450	1.06678	1.04908	1.03143	1.01381
.11	1.17357	1.15589	1.13822	1.12058	1.10296	1.08537	1.06781	1.05029	1.03279	1.01534	0.99792
.12	1.15571	1.13822	1.12075	1.10331	1.08589	1.06850	1.05114	1.03382	1.01653	0.99927	0.98206
.13	1.13786	1.12058	1.10331	1.08606	1.06885	1.05166	1.03450	1.01738	1.00028	0.98323	0.96621
.14	1.12005	1.10296	1.08589	1.06885	1.05183	1.03484	1.01788	1.00096	0.98407	0.96721	0.95040
.15	1.10226	1.08537	1.06850	1.05166	1.03484	1.01805	1.00130	0.98457	0.96788	0.95122	0.93461
.16	1.08450	1.06781	1.05114	1.03450	1.01788	1.00130	0.98474	0.96821	0.95172	0.93527	0.91885
.17	1.06678	1.05029	1.03382	1.01738	1.00096	0.98457	0.96821	0.95189	0.93559	0.91934	0.90312
.18	1.04908	1.03279	1.01653	1.00028	0.98407	0.96788	0.95172	0.93559	0.91950	0.90345	0.88743
.19	1.03143	1.01534	0.99927	0.98323	0.96721	0.95122	0.93527	0.91934	0.90345	0.88759	0.87178
.20	1.01381	0.99792	0.98206	0.96621	0.95040	0.93461	0.91885	0.90312	0.88743	0.87178	0.85616
.21	0.99624	0.98055	0.96488	0.94924	0.93362	0.91803	0.90247	0.88695	0.87146	0.85600	0.84059
.22	0.97871	0.96322	0.94775	0.93231	0.91689	0.90150	0.88614	0.87082	0.85553	0.84027	0.82505
.23	0.96122	0.94593	0.93066	0.91542	0.90020	0.88501	0.86986	0.85473	0.83964	0.82458	0.80957
.24	0.94378	0.92869	0.91362	0.89858	0.88356	0.86857	0.85362	0.83869	0.82380	0.80894	0.79413
.25	0.92639	0.91150	0.89663	0.88179	0.86697	0.85218	0.83743	0.82270	0.80801	0.79335	0.77874
.26	0.90905	0.89436	0.87969	0.86505	0.85043	0.83584	0.82129	0.80676	0.79227	0.77781	0.76340
.27	0.89176	0.87728	0.86281	0.84837	0.83395	0.81956	0.80520	0.79088	0.77658	0.76233	0.74811
.28	0.87454	0.86025	0.84598	0.83174	0.81752	0.80333	0.78917	0.77505	0.76096	0.74690	0.73289
.29	0.85737	0.84328	0.82921	0.81517	0.80115	0.78716	0.77320	0.75928	0.74539	0.73153	0.71771
.30	0.84026	0.82637	0.81250	0.79866	0.78484	0.77105	0.75729	0.74357	0.72988	0.71622	0.70260
.31	0.82321	0.80952	0.79585	0.78221	0.76859	0.75500	0.74145	0.72792	0.71443	0.70097	0.68756
.32	0.80623	0.79274	0.77927	0.76583	0.75241	0.73902	0.72566	0.71234	0.69905	0.68579	0.67258
.33	0.78931	0.77602	0.76276	0.74951	0.73630	0.72311	0.70995	0.69682	0.68373	0.67068	0.65766
.34	0.77247	0.75938	0.74631	0.73327	0.72025	0.70726	0.69431	0.68138	0.66849	0.65563	0.64282
.35	0.75570	0.74281	0.72994	0.71710	0.70428	0.69149	0.67873	0.66601	0.65332	0.64066	0.62805
.36	0.73900	0.72631	0.71364	0.70100	0.68838	0.67579	0.66324	0.65071	0.63822	0.62576	0.61335
.37	0.72238	0.70989	0.69742	0.68498	0.67256	0.66017	0.64782	0.63549	0.62320	0.61094	0.59873
.38	0.70584	0.69355	0.68128	0.66904	0.65682	0.64463	0.63248	0.62035	0.60826	0.59620	0.58419
.39	0.68938	0.67729	0.66522	0.65318	0.64116	0.62918	0.61722	0.60529	0.59340	0.58155	0.56973
.40	0.67301	0.66112	0.64925	0.63741	0.62559	0.61380	0.60204	0.59032	0.57863	0.56697	0.55536
.41	0.65672	0.64503	0.63336	0.62172	0.61010	0.59852	0.58696	0.57543	0.56394	0.55249	0.54107
.42	0.64052	0.62904	0.61757	0.60613	0.59471	0.58332	0.57196	0.56064	0.54934	0.53809	0.52687
.43	0.62442	0.61313	0.60186	0.59062	0.57940	0.56822	0.55706	0.54593	0.53484	0.52379	0.51277
.44	0.60841	0.59732	0.58626	0.57521	0.56420	0.55321	0.54225	0.53132	0.52043	0.50958	0.49876
.45	0.59250	0.58161	0.57075	0.55990	0.54909	0.53830	0.52754	0.51681	0.50612	0.49547	0.48485
.46	0.57669	0.56600	0.55534	0.54469	0.53408	0.52349	0.51293	0.50240	0.49191	0.48146	0.47104
.47	0.56099	0.55050	0.54003	0.52959	0.51917	0.50878	0.49842	0.48810	0.47781	0.46755	0.45734
.48	0.54539	0.53510	0.52483	0.51459	0.50437	0.49418	0.48402	0.47390	0.46381	0.45375	0.44374
.49	0.52990	0.51981	0.50974	0.49970	0.48968	0.47969	0.46973	0.45981	0.44992	0.44006	0.43025
.50	0.51452	0.50463	0.49476	0.48492	0.47510	0.46531	0.45556	0.44583	0.43614	0.42648	0.41687

F(U,V)												
U=.10-.20 V=.50-.99												
V	U	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	U
.50	0.51452	0.50463	0.49476	0.48492	0.47510	0.46531	0.45556	0.44583	0.43614	0.42648	0.41684	0.40714
.51	0.49926	0.48957	0.47990	0.47026	0.46064	0.45105	0.44149	0.43197	0.42248	0.41302	0.40357	0.39407
.52	0.48411	0.47462	0.46516	0.45571	0.44630	0.43691	0.42755	0.41822	0.40893	0.39968	0.39044	0.38121
.53	0.46909	0.45980	0.45053	0.44129	0.43207	0.42289	0.41373	0.40460	0.39551	0.38646	0.37744	0.36844
.54	0.45419	0.44510	0.43604	0.42699	0.41798	0.40899	0.40003	0.39110	0.38221	0.37336	0.36454	0.35574
.55	0.43943	0.43054	0.42167	0.41283	0.40401	0.39522	0.38646	0.37774	0.36905	0.36039	0.35176	0.34314
.56	0.42479	0.41610	0.40743	0.39879	0.39017	0.38158	0.37303	0.36450	0.35601	0.34755	0.33914	0.33074
.57	0.41029	0.40180	0.39333	0.38489	0.37647	0.36808	0.35972	0.35140	0.34311	0.33485	0.32664	0.31844
.58	0.39592	0.38763	0.37937	0.37112	0.36291	0.35472	0.34656	0.33843	0.33034	0.32229	0.31427	0.30627
.59	0.38170	0.37361	0.36555	0.35750	0.34949	0.34150	0.33354	0.32561	0.31772	0.30987	0.30205	0.29425
.60	0.36763	0.35974	0.35187	0.34403	0.33621	0.32842	0.32067	0.31294	0.30525	0.29759	0.28998	0.28239
.61	0.35370	0.34602	0.33835	0.33071	0.32309	0.31550	0.30794	0.30042	0.29292	0.28547	0.27805	0.27064
.62	0.33993	0.33244	0.32498	0.31753	0.31012	0.30273	0.29537	0.28805	0.28075	0.27350	0.26628	0.25907
.63	0.32632	0.31903	0.31177	0.30452	0.29731	0.29012	0.28296	0.27583	0.26874	0.26169	0.25467	0.24767
.64	0.31287	0.30578	0.29872	0.29167	0.28466	0.27767	0.27071	0.26378	0.25689	0.25004	0.24322	0.23641
.65	0.29959	0.29270	0.28583	0.27899	0.27217	0.26538	0.25863	0.25190	0.24521	0.23855	0.23194	0.22534
.66	0.28648	0.27979	0.27312	0.26648	0.25986	0.25327	0.24671	0.24019	0.23370	0.22724	0.22083	0.21443
.67	0.27354	0.26705	0.26058	0.25414	0.24772	0.24133	0.23498	0.22865	0.22236	0.21610	0.20989	0.20369
.68	0.26078	0.25449	0.24823	0.24198	0.23577	0.22958	0.22342	0.21729	0.21120	0.20515	0.19913	0.19313
.69	0.24821	0.24212	0.23606	0.23001	0.22400	0.21801	0.21205	0.20612	0.20023	0.19438	0.18856	0.18274
.70	0.23583	0.22994	0.22408	0.21823	0.21242	0.20663	0.20087	0.19514	0.18945	0.18380	0.17818	0.17259
.71	0.22365	0.21796	0.21229	0.20665	0.20103	0.19544	0.18989	0.18436	0.17887	0.17341	0.16800	0.16261
.72	0.21167	0.20618	0.20071	0.19527	0.18985	0.18446	0.17910	0.17378	0.16849	0.16323	0.15802	0.15282
.73	0.19989	0.19460	0.18934	0.18409	0.17888	0.17369	0.16853	0.16340	0.15831	0.15326	0.14824	0.14324
.74	0.18833	0.18324	0.17817	0.17313	0.16811	0.16313	0.15817	0.15324	0.14835	0.14350	0.13868	0.13387
.75	0.17699	0.17210	0.16723	0.16239	0.15757	0.15278	0.14803	0.14330	0.13861	0.13395	0.12934	0.12474
.76	0.16588	0.16119	0.15652	0.15188	0.14726	0.14267	0.13811	0.13359	0.12910	0.12464	0.12022	0.11581
.77	0.15500	0.15051	0.14604	0.14160	0.13718	0.13279	0.12843	0.12411	0.11981	0.11556	0.11134	0.10714
.78	0.14436	0.14007	0.13580	0.13156	0.12734	0.12315	0.11899	0.11487	0.11078	0.10672	0.10271	0.09871
.79	0.13397	0.12988	0.12581	0.12177	0.11775	0.11376	0.10980	0.10588	0.10199	0.09813	0.09432	0.09051
.80	0.12383	0.11995	0.11608	0.11224	0.10842	0.10463	0.10087	0.09715	0.09345	0.08980	0.08618	0.08259
.81	0.11397	0.11028	0.10661	0.10297	0.09935	0.09576	0.09221	0.08868	0.08519	0.08173	0.07832	0.07491
.82	0.10438	0.10089	0.09742	0.09398	0.09056	0.08718	0.08382	0.08049	0.07720	0.07395	0.07073	0.06754
.83	0.09508	0.09179	0.08852	0.08528	0.08206	0.07887	0.07572	0.07259	0.06950	0.06644	0.06343	0.06043
.84	0.08607	0.08299	0.07992	0.07687	0.07386	0.07087	0.06791	0.06499	0.06209	0.05924	0.05642	0.05361
.85	0.07738	0.07449	0.07162	0.06878	0.06596	0.06317	0.06042	0.05769	0.05500	0.05234	0.04973	0.04714
.86	0.06901	0.06632	0.06365	0.06101	0.05839	0.05580	0.05324	0.05072	0.04823	0.04577	0.04336	0.04095
.87	0.06097	0.05848	0.05602	0.05357	0.05116	0.04877	0.04641	0.04408	0.04179	0.03954	0.03732	0.03511
.88	0.05329	0.05100	0.04873	0.04649	0.04427	0.04209	0.03993	0.03780	0.03571	0.03366	0.03164	0.02962
.89	0.04598	0.04389	0.04182	0.03978	0.03776	0.03578	0.03382	0.03189	0.03000	0.02815	0.02633	0.02451
.90	0.03906	0.03717	0.03530	0.03346	0.03164	0.02985	0.02810	0.02637	0.02468	0.02302	0.02139	0.01977
.91	0.03255	0.03086	0.02920	0.02755	0.02594	0.02435	0.02279	0.02126	0.01977	0.01832	0.01690	0.01549
.92	0.02648	0.02500	0.02353	0.02209	0.02067	0.01928	0.01792	0.01660	0.01530	0.01405	0.01283	0.01161
.93	0.02089	0.01960	0.01833	0.01709	0.01587	0.01468	0.01352	0.01240	0.01131	0.01025	0.00924	0.00824
.94	0.01580	0.01471	0.01364	0.01260	0.01158	0.01059	0.00963	0.00871	0.00782	0.00696	0.00614	0.00534
.95	0.01126	0.01037	0.00950	0.00866	0.00784	0.00705	0.00629	0.00557	0.00488	0.00422	0.00361	0.00301
.96	0.00733	0.00664	0.00597	0.00533	0.00471	0.00412	0.00356	0.00304	0.00255	0.00209	0.00168	0.00128
.97	0.00409	0.00360	0.00313	0.00269	0.00227	0.00188	0.00152	0.00120	0.00091	0.00065	0.00044	0.00024
.98	0.00165	0.00136	0.00109	0.00085	0.00063	0.00045	0.00029	0.00016	0.00007	0.00002	0.00000	0.00000
.99	0.00022	0.00013	0.00006	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

F(u,v)											
U=.20-.30 V=.00-.50											
V	U 0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
.00	1.17348	1.15390	1.13437	1.11488	1.09544	1.07605	1.05672	1.03743	1.01820	0.99903	0.97992
.01	1.15748	1.13810	1.11877	1.09949	1.08025	1.06105	1.04192	1.02283	1.00380	0.98483	0.96592
.02	1.14148	1.12231	1.10317	1.08409	1.06505	1.04606	1.02712	1.00823	0.98940	0.97063	0.95192
.03	1.12549	1.10651	1.08758	1.06869	1.04985	1.03106	1.01232	0.99364	0.97501	0.95644	0.93793
.04	1.10950	1.09073	1.07199	1.05331	1.03467	1.01608	0.99754	0.97905	0.96062	0.94225	0.92394
.05	1.09352	1.07495	1.05641	1.03793	1.01949	1.00110	0.98276	0.96447	0.94624	0.92807	0.90996
.06	1.07755	1.05918	1.04084	1.02256	1.00432	0.98613	0.96799	0.94990	0.93187	0.91390	0.89599
.07	1.06159	1.04342	1.02529	1.00720	0.98916	0.97117	0.95323	0.93535	0.91752	0.89975	0.88204
.08	1.04565	1.02767	1.00974	0.99186	0.97402	0.95623	0.93849	0.92080	0.90317	0.88560	0.86809
.09	1.02972	1.01195	0.99422	0.97653	0.95889	0.94130	0.92376	0.90627	0.88885	0.87148	0.85417
.10	1.01381	0.99624	0.97871	0.96122	0.94378	0.92639	0.90905	0.89176	0.87454	0.85737	0.84026
.11	0.99792	0.98055	0.96322	0.94593	0.92869	0.91150	0.89436	0.87728	0.86025	0.84328	0.82637
.12	0.98206	0.96488	0.94775	0.93066	0.91362	0.89663	0.87969	0.86281	0.84598	0.82921	0.81250
.13	0.96621	0.94924	0.93231	0.91542	0.89858	0.88179	0.86505	0.84837	0.83174	0.81517	0.79866
.14	0.95040	0.93362	0.91689	0.90020	0.88356	0.86697	0.85043	0.83395	0.81752	0.80115	0.78484
.15	0.93461	0.91803	0.90150	0.88501	0.86857	0.85218	0.83584	0.81956	0.80333	0.78716	0.77105
.16	0.91885	0.90247	0.88614	0.86986	0.85362	0.83743	0.82129	0.80520	0.78917	0.77320	0.75729
.17	0.90312	0.88695	0.87082	0.85473	0.83869	0.82270	0.80676	0.79088	0.77505	0.75928	0.74357
.18	0.88743	0.87146	0.85553	0.83964	0.82380	0.80801	0.79227	0.77658	0.76096	0.74539	0.72988
.19	0.87178	0.85600	0.84027	0.82458	0.80894	0.79335	0.77781	0.76233	0.74690	0.73153	0.71622
.20	0.85616	0.84059	0.82505	0.80957	0.79413	0.77874	0.76340	0.74811	0.73289	0.71771	0.70260
.21	0.84059	0.82521	0.80988	0.79459	0.77935	0.76416	0.74902	0.73394	0.71891	0.70394	0.68903
.22	0.82505	0.80988	0.79475	0.77966	0.76462	0.74963	0.73469	0.71981	0.70498	0.69021	0.67550
.23	0.80957	0.79459	0.77966	0.76477	0.74993	0.73514	0.72040	0.70572	0.69109	0.67652	0.66201
.24	0.79413	0.77935	0.76462	0.74993	0.73529	0.72070	0.70616	0.69168	0.67725	0.66288	0.64857
.25	0.77874	0.76416	0.74963	0.73514	0.72070	0.70631	0.69197	0.67769	0.66346	0.64929	0.63518
.26	0.76340	0.74902	0.73469	0.72040	0.70616	0.69197	0.67784	0.66375	0.64972	0.63575	0.62184
.27	0.74811	0.73394	0.71981	0.70572	0.69168	0.67769	0.66375	0.64987	0.63604	0.62227	0.60856
.28	0.73289	0.71891	0.70498	0.69109	0.67725	0.66346	0.64972	0.63604	0.62241	0.60884	0.59533
.29	0.71771	0.70394	0.69021	0.67652	0.66288	0.64929	0.63575	0.62227	0.60884	0.59547	0.58216
.30	0.70260	0.68903	0.67550	0.66201	0.64857	0.63518	0.62184	0.60856	0.59533	0.58216	0.56905
.31	0.68756	0.67418	0.66085	0.64756	0.63432	0.62113	0.60799	0.59491	0.58188	0.56891	0.55600
.32	0.67258	0.65940	0.64627	0.63318	0.62014	0.60715	0.59421	0.58133	0.56850	0.55573	0.54302
.33	0.65766	0.64469	0.63175	0.61887	0.60603	0.59324	0.58050	0.56781	0.55518	0.54261	0.53010
.34	0.64282	0.63004	0.61731	0.60462	0.59198	0.57939	0.56685	0.55437	0.54194	0.52957	0.51726
.35	0.62805	0.61547	0.60294	0.59045	0.57801	0.56562	0.55328	0.54100	0.52877	0.51660	0.50449
.36	0.61335	0.60097	0.58864	0.57635	0.56411	0.55192	0.53979	0.52770	0.51567	0.50370	0.49179
.37	0.59873	0.58655	0.57442	0.56233	0.55029	0.53830	0.52637	0.51448	0.50265	0.49088	0.47917
.38	0.58419	0.57221	0.56028	0.54839	0.53655	0.52476	0.51302	0.50134	0.48971	0.47814	0.46663
.39	0.56973	0.55795	0.54622	0.53454	0.52290	0.51131	0.49977	0.48828	0.47685	0.46548	0.45417
.40	0.55536	0.54378	0.53225	0.52076	0.50932	0.49793	0.48659	0.47531	0.46408	0.45291	0.44180
.41	0.54107	0.52969	0.51836	0.50708	0.49584	0.48465	0.47351	0.46242	0.45139	0.44042	0.42951
.42	0.52687	0.51570	0.50457	0.49348	0.48244	0.47145	0.46051	0.44963	0.43880	0.42803	0.41732
.43	0.51277	0.50179	0.49086	0.47998	0.46914	0.45835	0.44761	0.43692	0.42629	0.41572	0.40521
.44	0.49876	0.48799	0.47725	0.46657	0.45593	0.44534	0.43480	0.42431	0.41388	0.40351	0.39320
.45	0.48485	0.47428	0.46374	0.45326	0.44282	0.43243	0.42209	0.41180	0.40157	0.39140	0.38129
.46	0.47104	0.46067	0.45033	0.44005	0.42981	0.41962	0.40948	0.39939	0.38936	0.37939	0.36948
.47	0.45734	0.44716	0.43703	0.42694	0.41690	0.40691	0.39697	0.38709	0.37726	0.36749	0.35778
.48	0.44374	0.43376	0.42383	0.41394	0.40410	0.39431	0.38457	0.37489	0.36526	0.35569	0.34618
.49	0.43025	0.42047	0.41074	0.40105	0.39141	0.38182	0.37228	0.36280	0.35337	0.34400	0.33469
.50	0.41687	0.40729	0.39776	0.38827	0.37883	0.36944	0.36010	0.35082	0.34159	0.33242	0.32331

F(u,v)											
U=.20-.30 V=.50-.97											
V	U 0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
.50	0.41687	0.40729	0.39776	0.38827	0.37883	0.36944	0.36010	0.35082	0.34159	0.33242	0.32329
.51	0.40361	0.39423	0.38490	0.37561	0.36637	0.35718	0.34804	0.33896	0.32993	0.32096	0.31203
.52	0.39046	0.38129	0.37215	0.36307	0.35403	0.34504	0.33610	0.32721	0.31838	0.30961	0.30089
.53	0.37744	0.36846	0.35953	0.35065	0.34181	0.33302	0.32428	0.31559	0.30696	0.29839	0.28987
.54	0.36454	0.35577	0.34704	0.33835	0.32971	0.32112	0.31258	0.30409	0.29567	0.28730	0.27897
.55	0.35177	0.34320	0.33467	0.32618	0.31774	0.30935	0.30101	0.29273	0.28450	0.27633	0.26822
.56	0.33914	0.33076	0.32243	0.31414	0.30590	0.29771	0.28957	0.28149	0.27346	0.26549	0.25758
.57	0.32664	0.31846	0.31033	0.30224	0.29420	0.28621	0.27827	0.27039	0.26256	0.25479	0.24708
.58	0.31427	0.30630	0.29837	0.29048	0.28264	0.27485	0.26711	0.25942	0.25180	0.24423	0.23670
.59	0.30205	0.29428	0.28655	0.27886	0.27122	0.26363	0.25609	0.24860	0.24118	0.23381	0.22648
.60	0.28998	0.28240	0.27487	0.26738	0.25994	0.25255	0.24521	0.23793	0.23070	0.22353	0.21642
.61	0.27805	0.27068	0.26335	0.25606	0.24882	0.24163	0.23449	0.22741	0.22038	0.21341	0.20650
.62	0.26628	0.25911	0.25198	0.24489	0.23785	0.23086	0.22392	0.21704	0.21021	0.20344	0.19673
.63	0.25467	0.24770	0.24076	0.23388	0.22704	0.22025	0.21351	0.20682	0.20019	0.19362	0.18711
.64	0.24322	0.23645	0.22971	0.22303	0.21639	0.20980	0.20326	0.19677	0.19034	0.18397	0.17766
.65	0.23194	0.22536	0.21883	0.21234	0.20590	0.19951	0.19317	0.18689	0.18066	0.17449	0.16836
.66	0.22083	0.21445	0.20812	0.20183	0.19559	0.18940	0.18326	0.17718	0.17115	0.16518	0.15927
.67	0.20989	0.20371	0.19758	0.19149	0.18545	0.17946	0.17353	0.16764	0.16181	0.15604	0.15033
.68	0.19913	0.19316	0.18723	0.18134	0.17550	0.16971	0.16397	0.15828	0.15266	0.14708	0.14158
.69	0.18856	0.18279	0.17705	0.17137	0.16573	0.16014	0.15460	0.14911	0.14368	0.13831	0.13300
.70	0.17818	0.17261	0.16707	0.16159	0.15615	0.15076	0.14542	0.14013	0.13490	0.12973	0.12462
.71	0.16800	0.16262	0.15729	0.15200	0.14676	0.14157	0.13643	0.13135	0.12632	0.12135	0.11644
.72	0.15802	0.15284	0.14771	0.14262	0.13758	0.13259	0.12765	0.12277	0.11794	0.11317	0.10846
.73	0.14824	0.14327	0.13833	0.13345	0.12861	0.12382	0.11908	0.11439	0.10976	0.10519	0.10068
.74	0.13868	0.13390	0.12917	0.12449	0.11985	0.11526	0.11072	0.10623	0.10180	0.09743	0.09312
.75	0.12934	0.12476	0.12023	0.11574	0.11130	0.10691	0.10258	0.09829	0.09406	0.08989	0.08578
.76	0.12022	0.11585	0.11152	0.10723	0.10299	0.09880	0.09466	0.09058	0.08655	0.08258	0.07867
.77	0.11134	0.10717	0.10304	0.09895	0.09491	0.09092	0.08698	0.08310	0.07927	0.07550	0.07179
.78	0.10271	0.09873	0.09480	0.09091	0.08707	0.08328	0.07954	0.07586	0.07223	0.06866	0.06515
.79	0.09432	0.09054	0.08681	0.08312	0.07948	0.07589	0.07235	0.06887	0.06544	0.06207	0.05876
.80	0.08618	0.08261	0.07908	0.07559	0.07215	0.06876	0.06542	0.06214	0.05891	0.05574	0.05263
.81	0.07832	0.07494	0.07161	0.06832	0.06508	0.06189	0.05876	0.05567	0.05264	0.04967	0.04676
.82	0.07073	0.06755	0.06442	0.06134	0.05830	0.05531	0.05237	0.04948	0.04665	0.04388	0.04117
.83	0.06343	0.06045	0.05752	0.05463	0.05179	0.04900	0.04626	0.04358	0.04095	0.03838	0.03587
.84	0.05642	0.05365	0.05092	0.04823	0.04559	0.04300	0.04046	0.03798	0.03555	0.03318	0.03087
.85	0.04973	0.04715	0.04462	0.04213	0.03969	0.03730	0.03497	0.03268	0.03045	0.02828	0.02617
.86	0.04336	0.04098	0.03865	0.03636	0.03412	0.03193	0.02979	0.02771	0.02568	0.02371	0.02180
.87	0.03732	0.03515	0.03301	0.03093	0.02889	0.02690	0.02496	0.02307	0.02124	0.01947	0.01776
.88	0.03164	0.02967	0.02773	0.02585	0.02401	0.02222	0.02048	0.01879	0.01716	0.01559	0.01408
.89	0.02633	0.02455	0.02282	0.02113	0.01949	0.01790	0.01637	0.01488	0.01345	0.01208	0.01077
.90	0.02141	0.01983	0.01830	0.01681	0.01537	0.01398	0.01265	0.01136	0.01013	0.00896	0.00785
.91	0.01690	0.01553	0.01419	0.01291	0.01167	0.01048	0.00934	0.00825	0.00722	0.00625	0.00534
.92	0.01283	0.01166	0.01053	0.00944	0.00840	0.00741	0.00647	0.00559	0.00476	0.00399	0.00328
.93	0.00924	0.00826	0.00733	0.00644	0.00560	0.00481	0.00407	0.00339	0.00276	0.00219	0.00168
.94	0.00614	0.00537	0.00464	0.00395	0.00331	0.00272	0.00218	0.00170	0.00127	0.00090	0.00059
.95	0.00361	0.00303	0.00250	0.00201	0.00157	0.00118	0.00084	0.00056	0.00033	0.00016	0.00005
.96	0.00168	0.00130	0.00097	0.00068	0.00044	0.00025	0.00011	0.00003	0.00000		
.97	0.00044	0.00026	0.00013	0.00004	0.00000						

F(U,V)

U=.30-.40
V=.00-.50

	U 0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
V											
.00	0.97992	0.96087	0.94189	0.92298	0.90413	0.88536	0.86667	0.84805	0.82951	0.81105	0.79267
.01	0.96592	0.94708	0.92829	0.90958	0.89094	0.87236	0.85387	0.83545	0.81711	0.79885	0.78067
.02	0.95192	0.93328	0.91470	0.89618	0.87774	0.85937	0.84107	0.82285	0.80471	0.78665	0.76868
.03	0.93793	0.91948	0.90110	0.88279	0.86454	0.84637	0.82827	0.81025	0.79231	0.77446	0.75668
.04	0.92394	0.90570	0.88751	0.86940	0.85136	0.83338	0.81549	0.79767	0.77993	0.76227	0.74469
.05	0.90996	0.89192	0.87393	0.85602	0.83818	0.82040	0.80271	0.78509	0.76755	0.75009	0.73272
.06	0.89599	0.87815	0.86037	0.84265	0.82501	0.80743	0.78994	0.77252	0.75518	0.73792	0.72075
.07	0.88204	0.86439	0.84681	0.82929	0.81185	0.79448	0.77718	0.75996	0.74282	0.72576	0.70879
.08	0.86809	0.85065	0.83326	0.81595	0.79871	0.78153	0.76444	0.74742	0.73048	0.71362	0.69684
.09	0.85417	0.83692	0.81974	0.80262	0.78558	0.76861	0.75171	0.73489	0.71815	0.70149	0.68492
.10	0.84026	0.82321	0.80623	0.78931	0.77247	0.75570	0.73900	0.72238	0.70584	0.68938	0.67301
.11	0.82637	0.80952	0.79274	0.77602	0.75938	0.74281	0.72631	0.70989	0.69355	0.67729	0.66112
.12	0.81250	0.79585	0.77927	0.76276	0.74631	0.72994	0.71364	0.69742	0.68128	0.66522	0.64925
.13	0.79866	0.78221	0.76583	0.74951	0.73327	0.71710	0.70100	0.68498	0.66904	0.65318	0.63741
.14	0.78484	0.76859	0.75241	0.73630	0.72025	0.70428	0.68838	0.67256	0.65682	0.64116	0.62559
.15	0.77105	0.75500	0.73902	0.72311	0.70726	0.69149	0.67579	0.66017	0.64463	0.62918	0.61380
.16	0.75729	0.74145	0.72566	0.70995	0.69431	0.67873	0.66324	0.64782	0.63248	0.61722	0.60204
.17	0.74357	0.72792	0.71234	0.69682	0.68138	0.66601	0.65071	0.63549	0.62035	0.60529	0.59032
.18	0.72988	0.71443	0.69905	0.68373	0.66849	0.65332	0.63822	0.62320	0.60826	0.59340	0.57863
.19	0.71622	0.70097	0.68579	0.67068	0.65563	0.64066	0.62576	0.61094	0.59620	0.58155	0.56697
.20	0.70260	0.68756	0.67258	0.65766	0.64282	0.62805	0.61335	0.59873	0.58419	0.56973	0.55536
.21	0.68903	0.67418	0.65940	0.64469	0.63004	0.61547	0.60097	0.58655	0.57221	0.55795	0.54378
.22	0.67550	0.66085	0.64627	0.63175	0.61731	0.60294	0.58864	0.57442	0.56028	0.54622	0.53225
.23	0.66201	0.64756	0.63318	0.61887	0.60462	0.59045	0.57635	0.56233	0.54839	0.53454	0.52076
.24	0.64857	0.63432	0.62014	0.60603	0.59198	0.57801	0.56411	0.55029	0.53655	0.52290	0.50932
.25	0.63518	0.62113	0.60715	0.59324	0.57939	0.56562	0.55192	0.53830	0.52476	0.51131	0.49793
.26	0.62184	0.60799	0.59421	0.58050	0.56685	0.55328	0.53979	0.52637	0.51302	0.49977	0.48659
.27	0.60856	0.59491	0.58133	0.56781	0.55437	0.54100	0.52770	0.51448	0.50134	0.48828	0.47531
.28	0.59533	0.58188	0.56850	0.55518	0.54194	0.52877	0.51567	0.50265	0.48971	0.47685	0.46408
.29	0.58216	0.56891	0.55573	0.54261	0.52957	0.51660	0.50370	0.49088	0.47814	0.46548	0.45291
.30	0.56905	0.55600	0.54302	0.53010	0.51726	0.50449	0.49179	0.47917	0.46663	0.45417	0.44180
.31	0.55600	0.54315	0.53037	0.51766	0.50501	0.49244	0.47994	0.46752	0.45518	0.44293	0.43075
.32	0.54302	0.53037	0.51779	0.50528	0.49283	0.48046	0.46816	0.45594	0.44380	0.43174	0.41977
.33	0.53010	0.51766	0.50528	0.49296	0.48072	0.46855	0.45645	0.44443	0.43249	0.42063	0.40886
.34	0.51726	0.50501	0.49283	0.48072	0.46867	0.45670	0.44480	0.43298	0.42124	0.40959	0.39801
.35	0.50449	0.49244	0.48046	0.46855	0.45670	0.44493	0.43323	0.42161	0.41007	0.39861	0.38724
.36	0.49179	0.47994	0.46816	0.45645	0.44480	0.43323	0.42173	0.41031	0.39897	0.38772	0.37654
.37	0.47917	0.46752	0.45594	0.44443	0.43298	0.42161	0.41031	0.39909	0.38795	0.37690	0.36592
.38	0.46663	0.45518	0.44380	0.43249	0.42124	0.41007	0.39897	0.38795	0.37701	0.36616	0.35538
.39	0.45417	0.44293	0.43174	0.42063	0.40959	0.39861	0.38772	0.37690	0.36616	0.35550	0.34492
.40	0.44180	0.43075	0.41977	0.40886	0.39801	0.38724	0.37654	0.36592	0.35538	0.34492	0.33455
.41	0.42951	0.41867	0.40788	0.39717	0.38653	0.37595	0.36546	0.35504	0.34470	0.33444	0.32426
.42	0.41732	0.40667	0.39609	0.38557	0.37513	0.36476	0.35446	0.34424	0.33410	0.32404	0.31407
.43	0.40521	0.39477	0.38438	0.37407	0.36383	0.35365	0.34356	0.33354	0.32360	0.31374	0.30396
.44	0.39320	0.38296	0.37278	0.36266	0.35262	0.34265	0.33275	0.32293	0.31319	0.30353	0.29396
.45	0.38129	0.37125	0.36127	0.35135	0.34151	0.33173	0.32204	0.31242	0.30288	0.29344	0.28405
.46	0.36948	0.35964	0.34986	0.34014	0.33050	0.32092	0.31143	0.30201	0.29267	0.28341	0.27424
.47	0.35778	0.34813	0.33855	0.32904	0.31959	0.31022	0.30092	0.29170	0.28256	0.27350	0.26453
.48	0.34618	0.33673	0.32735	0.31804	0.30879	0.29962	0.29052	0.28150	0.27256	0.26370	0.25493
.49	0.33469	0.32544	0.31626	0.30715	0.29810	0.28913	0.28023	0.27141	0.26267	0.25401	0.24544
.50	0.32331	0.31426	0.30528	0.29637	0.28752	0.27875	0.27005	0.26143	0.25289	0.24444	0.23606

F(U,V)												
U=.30-.40 V=.50-.95												
	U	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
V												
.50		0.32331	0.31426	0.30528	0.29637	0.28752	0.27875	0.27005	0.26143	0.25289	0.24444	0.23606
.51		0.31205	0.30320	0.29442	0.28571	0.27706	0.26849	0.25999	0.25157	0.24323	0.23497	0.22680
.52		0.30090	0.29226	0.28368	0.27516	0.26672	0.25835	0.25005	0.24183	0.23369	0.22563	0.21766
.53		0.28988	0.28144	0.27305	0.26474	0.25650	0.24832	0.24023	0.23221	0.22427	0.21641	0.20863
.54		0.27899	0.27074	0.26256	0.25444	0.24640	0.23843	0.23053	0.22271	0.21497	0.20731	0.19974
.55		0.26822	0.26017	0.25219	0.24427	0.23643	0.22866	0.22096	0.21334	0.20580	0.19834	0.19097
.56		0.25758	0.24973	0.24195	0.23424	0.22659	0.21902	0.21152	0.20410	0.19676	0.18951	0.18233
.57		0.24708	0.23943	0.23185	0.22434	0.21689	0.20952	0.20222	0.19500	0.18786	0.18080	0.17383
.58		0.23672	0.22927	0.22189	0.21457	0.20733	0.20016	0.19306	0.18604	0.17910	0.17224	0.16547
.59		0.22650	0.21925	0.21207	0.20495	0.19791	0.19094	0.18404	0.17722	0.17048	0.16382	0.15725
.60		0.21642	0.20937	0.20239	0.19548	0.18863	0.18186	0.17516	0.16854	0.16200	0.15555	0.14917
.61		0.20650	0.19965	0.19287	0.18615	0.17951	0.17294	0.16644	0.16002	0.15368	0.14742	0.14125
.62		0.19673	0.19008	0.18350	0.17698	0.17054	0.16417	0.15787	0.15165	0.14551	0.13945	0.13348
.63		0.18711	0.18067	0.17429	0.16797	0.16173	0.15555	0.14946	0.14344	0.13750	0.13164	0.12587
.64		0.17766	0.17142	0.16524	0.15912	0.15308	0.14710	0.14121	0.13539	0.12965	0.12399	0.11842
.65		0.16838	0.16233	0.15635	0.15044	0.14459	0.13882	0.13312	0.12750	0.12196	0.11651	0.11113
.66		0.15927	0.15342	0.14764	0.14192	0.13628	0.13071	0.12521	0.11979	0.11445	0.10919	0.10402
.67		0.15033	0.14468	0.13910	0.13359	0.12814	0.12277	0.11747	0.11225	0.10711	0.10206	0.09708
.68		0.14158	0.13613	0.13075	0.12543	0.12019	0.11502	0.10992	0.10490	0.09996	0.09510	0.09033
.69		0.13300	0.12776	0.12258	0.11746	0.11242	0.10745	0.10255	0.09773	0.09299	0.08833	0.08376
.70		0.12462	0.11958	0.11460	0.10968	0.10484	0.10007	0.09537	0.09075	0.08621	0.08175	0.07738
.71		0.11644	0.11159	0.10681	0.10210	0.09745	0.09288	0.08838	0.08396	0.07962	0.07537	0.07119
.72		0.10846	0.10381	0.09923	0.09472	0.09027	0.08590	0.08160	0.07738	0.07324	0.06918	0.06521
.73		0.10068	0.09624	0.09185	0.08754	0.08330	0.07912	0.07503	0.07101	0.06707	0.06321	0.05944
.74		0.09312	0.08888	0.08469	0.08058	0.07654	0.07256	0.06867	0.06485	0.06111	0.05745	0.05387
.75		0.08578	0.08173	0.07775	0.07384	0.06999	0.06622	0.06253	0.05891	0.05536	0.05191	0.04853
.76		0.07867	0.07482	0.07104	0.06732	0.06368	0.06011	0.05661	0.05319	0.04985	0.04659	0.04342
.77		0.07179	0.06814	0.06456	0.06104	0.05760	0.05423	0.05093	0.04771	0.04457	0.04151	0.03854
.78		0.06515	0.06170	0.05832	0.05501	0.05176	0.04859	0.04549	0.04247	0.03953	0.03667	0.03390
.79		0.05876	0.05551	0.05233	0.04922	0.04617	0.04320	0.04030	0.03748	0.03474	0.03208	0.02951
.80		0.05263	0.04958	0.04660	0.04368	0.04084	0.03807	0.03537	0.03275	0.03021	0.02775	0.02538
.81		0.04676	0.04391	0.04113	0.03842	0.03577	0.03320	0.03071	0.02829	0.02594	0.02369	0.02151
.82		0.04117	0.03853	0.03594	0.03343	0.03099	0.02861	0.02632	0.02410	0.02196	0.01990	0.01792
.83		0.03587	0.03342	0.03104	0.02873	0.02648	0.02431	0.02221	0.02019	0.01825	0.01640	0.01462
.84		0.03087	0.02862	0.02644	0.02432	0.02228	0.02031	0.01841	0.01659	0.01485	0.01319	0.01162
.85		0.02617	0.02412	0.02214	0.02023	0.01838	0.01661	0.01492	0.01329	0.01175	0.01030	0.00892
.86		0.02180	0.01995	0.01817	0.01646	0.01481	0.01324	0.01174	0.01032	0.00898	0.00772	0.00655
.87		0.01776	0.01612	0.01454	0.01302	0.01158	0.01021	0.00891	0.00769	0.00655	0.00549	0.00452
.88		0.01408	0.01264	0.01125	0.00994	0.00870	0.00752	0.00643	0.00541	0.00447	0.00361	0.00283
.89		0.01077	0.00952	0.00834	0.00723	0.00618	0.00521	0.00432	0.00350	0.00276	0.00210	0.00152
.90		0.00785	0.00680	0.00582	0.00491	0.00406	0.00329	0.00260	0.00198	0.00143	0.00098	0.00060
.91		0.00534	0.00450	0.00372	0.00300	0.00236	0.00179	0.00129	0.00087	0.00053	0.00027	0.00010
.92		0.00328	0.00263	0.00205	0.00153	0.00109	0.00072	0.00042	0.00020	0.00006	0.00000	
.93		0.00168	0.00123	0.00085	0.00054	0.00029	0.00012	0.00002				
.94		0.00059	0.00034	0.00016	0.00004	0.00000						
.95		0.00005	0.00000									

F(u,v)											
U=.40-.50 V=.00-.45											
V	u 0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
.00	0.79267	0.77439	0.75619	0.73809	0.72008	0.70217	0.68436	0.66665	0.64905	0.63156	0.61418
.01	0.78067	0.76259	0.74459	0.72669	0.70888	0.69117	0.67356	0.65605	0.63865	0.62136	0.60419
.02	0.76868	0.75079	0.73299	0.71529	0.69768	0.68017	0.66276	0.64546	0.62826	0.61117	0.59419
.03	0.75668	0.73900	0.72140	0.70390	0.68649	0.66918	0.65197	0.63486	0.61786	0.60097	0.58419
.04	0.74469	0.72721	0.70981	0.69251	0.67530	0.65819	0.64118	0.62427	0.60747	0.59078	0.57421
.05	0.73272	0.71543	0.69823	0.68113	0.66412	0.64721	0.63040	0.61369	0.59709	0.58060	0.56423
.06	0.72075	0.70366	0.68666	0.66976	0.65295	0.63624	0.61963	0.60312	0.58672	0.57043	0.55426
.07	0.70879	0.69190	0.67511	0.65840	0.64179	0.62528	0.60887	0.59257	0.57637	0.56028	0.54430
.08	0.69684	0.68016	0.66356	0.64706	0.63065	0.61434	0.59813	0.58202	0.56602	0.55013	0.53436
.09	0.68492	0.66843	0.65203	0.63573	0.61952	0.60341	0.58740	0.57150	0.55570	0.54001	0.52443
.10	0.67301	0.65672	0.64052	0.62442	0.60841	0.59250	0.57669	0.56099	0.54539	0.52990	0.51452
.11	0.66112	0.64503	0.62904	0.61313	0.59732	0.58161	0.56600	0.55050	0.53510	0.51981	0.50463
.12	0.64925	0.63336	0.61757	0.60186	0.58626	0.57075	0.55534	0.54003	0.52483	0.50974	0.49476
.13	0.63741	0.62172	0.60613	0.59062	0.57521	0.55990	0.54469	0.52959	0.51459	0.49970	0.48492
.14	0.62559	0.61010	0.59471	0.57940	0.56420	0.54909	0.53408	0.51917	0.50437	0.48968	0.47510
.15	0.61380	0.59852	0.58332	0.56822	0.55321	0.53830	0.52349	0.50878	0.49418	0.47969	0.46531
.16	0.60204	0.58696	0.57196	0.55706	0.54225	0.52754	0.51293	0.49842	0.48402	0.46973	0.45556
.17	0.59032	0.57543	0.56064	0.54593	0.53132	0.51681	0.50240	0.48810	0.47390	0.45981	0.44583
.18	0.57863	0.56394	0.54934	0.53484	0.52043	0.50612	0.49191	0.47781	0.46381	0.44992	0.43614
.19	0.56697	0.55249	0.53809	0.52379	0.50958	0.49547	0.48146	0.46755	0.45375	0.44006	0.42648
.20	0.55536	0.54107	0.52687	0.51277	0.49876	0.48485	0.47104	0.45734	0.44374	0.43025	0.41687
.21	0.54378	0.52969	0.51570	0.50179	0.48799	0.47428	0.46067	0.44716	0.43376	0.42047	0.40729
.22	0.53225	0.51836	0.50457	0.49086	0.47725	0.46374	0.45033	0.43703	0.42383	0.41074	0.39776
.23	0.52076	0.50708	0.49348	0.47998	0.46657	0.45326	0.44005	0.42694	0.41394	0.40105	0.38827
.24	0.50932	0.49584	0.48244	0.46914	0.45593	0.44282	0.42981	0.41690	0.40410	0.39141	0.37883
.25	0.49793	0.48465	0.47145	0.45835	0.44534	0.43243	0.41962	0.40691	0.39431	0.38182	0.36944
.26	0.48659	0.47351	0.46051	0.44761	0.43480	0.42209	0.40948	0.39697	0.38457	0.37228	0.36010
.27	0.47531	0.46242	0.44963	0.43692	0.42431	0.41180	0.39939	0.38709	0.37489	0.36280	0.35082
.28	0.46408	0.45139	0.43880	0.42629	0.41388	0.40157	0.38936	0.37726	0.36526	0.35337	0.34159
.29	0.45291	0.44042	0.42803	0.41572	0.40351	0.39140	0.37939	0.36749	0.35569	0.34400	0.33242
.30	0.44180	0.42951	0.41732	0.40521	0.39320	0.38129	0.36948	0.35778	0.34618	0.33469	0.32331
.31	0.43075	0.41867	0.40667	0.39477	0.38296	0.37125	0.35964	0.34813	0.33673	0.32544	0.31426
.32	0.41977	0.40788	0.39609	0.38438	0.37278	0.36127	0.34986	0.33855	0.32735	0.31626	0.30528
.33	0.40886	0.39717	0.38557	0.37407	0.36266	0.35135	0.34014	0.32904	0.31804	0.30715	0.29637
.34	0.39801	0.38653	0.37513	0.36383	0.35262	0.34151	0.33050	0.31959	0.30879	0.29810	0.28752
.35	0.38724	0.37595	0.36476	0.35365	0.34265	0.33173	0.32092	0.31022	0.29962	0.28913	0.27875
.36	0.37654	0.36546	0.35446	0.34356	0.33275	0.32204	0.31143	0.30092	0.29052	0.28023	0.27005
.37	0.36592	0.35504	0.34424	0.33354	0.32293	0.31242	0.30201	0.29170	0.28150	0.27141	0.26143
.38	0.35538	0.34470	0.33410	0.32360	0.31319	0.30288	0.29267	0.28256	0.27256	0.26267	0.25289
.39	0.34492	0.33444	0.32404	0.31374	0.30353	0.29342	0.28341	0.27350	0.26370	0.25401	0.24444
.40	0.33455	0.32426	0.31407	0.30396	0.29396	0.28405	0.27424	0.26453	0.25493	0.24544	0.23606
.41	0.32426	0.31418	0.30418	0.29428	0.28447	0.27476	0.26515	0.25564	0.24624	0.23695	0.22778
.42	0.31407	0.30418	0.29439	0.28468	0.27507	0.26556	0.25615	0.24685	0.23765	0.22856	0.21958
.43	0.30396	0.29428	0.28468	0.27518	0.26577	0.25646	0.24725	0.23814	0.22914	0.22025	0.21148
.44	0.29396	0.28447	0.27507	0.26577	0.25656	0.24745	0.23844	0.22953	0.22074	0.21204	0.20347
.45	0.28405	0.27476	0.26556	0.25646	0.24745	0.23854	0.22973	0.22102	0.21242	0.20393	0.19556

F(U,V)											
U=0.40-.50 V=0.45-.91											
V	U 0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
.45	0.28405	0.27476	0.26556	0.25646	0.24745	0.23854	0.22973	0.22102	0.21242	0.20393	0.19556
.46	0.27424	0.26515	0.25615	0.24725	0.23844	0.22973	0.22112	0.21261	0.20421	0.19592	0.18775
.47	0.26453	0.25564	0.24685	0.23814	0.22953	0.22102	0.21261	0.20431	0.19611	0.18802	0.18004
.48	0.25493	0.24624	0.23765	0.22914	0.22074	0.21242	0.20421	0.19611	0.18811	0.18022	0.17244
.49	0.24544	0.23695	0.22856	0.22025	0.21204	0.20393	0.19592	0.18802	0.18022	0.17253	0.16495
.50	0.23606	0.22778	0.21958	0.21148	0.20347	0.19556	0.18775	0.18004	0.17244	0.16495	0.15757
.51	0.22680	0.21871	0.21072	0.20281	0.19500	0.18729	0.17968	0.17218	0.16478	0.15749	0.15031
.52	0.21766	0.20977	0.20197	0.19427	0.18666	0.17915	0.17174	0.16443	0.15724	0.15015	0.14317
.53	0.20863	0.20095	0.19335	0.18585	0.17844	0.17113	0.16392	0.15681	0.14981	0.14292	0.13615
.54	0.19974	0.19225	0.18485	0.17755	0.17034	0.16323	0.15622	0.14932	0.14252	0.13583	0.12925
.55	0.19097	0.18368	0.17649	0.16938	0.16237	0.15546	0.14865	0.14195	0.13535	0.12886	0.12248
.56	0.18233	0.17525	0.16825	0.16135	0.15454	0.14783	0.14122	0.13471	0.12831	0.12202	0.11584
.57	0.17383	0.16694	0.16015	0.15344	0.14684	0.14032	0.13392	0.12761	0.12141	0.11532	0.10934
.58	0.16547	0.15878	0.15218	0.14568	0.13927	0.13296	0.12675	0.12065	0.11465	0.10876	0.10298
.59	0.15725	0.15076	0.14436	0.13806	0.13185	0.12574	0.11973	0.11383	0.10803	0.10234	0.09676
.60	0.14917	0.14289	0.13669	0.13059	0.12458	0.11867	0.11286	0.10715	0.10155	0.09606	0.09068
.61	0.14125	0.13516	0.12917	0.12326	0.11745	0.11174	0.10613	0.10063	0.09523	0.08994	0.08476
.62	0.13348	0.12759	0.12180	0.11609	0.11048	0.10497	0.09956	0.09426	0.08906	0.08397	0.07899
.63	0.12587	0.12018	0.11458	0.10908	0.10367	0.09836	0.09315	0.08804	0.08304	0.07815	0.07338
.64	0.11842	0.11293	0.10753	0.10223	0.09702	0.09191	0.08690	0.08199	0.07719	0.07250	0.06793
.65	0.11113	0.10585	0.10065	0.09555	0.09054	0.08563	0.08082	0.07611	0.07151	0.06702	0.06264
.66	0.10402	0.09893	0.09394	0.08903	0.08422	0.07951	0.07490	0.07040	0.06600	0.06171	0.05753
.67	0.09708	0.09220	0.08740	0.08270	0.07809	0.07358	0.06917	0.06486	0.06066	0.05657	0.05259
.68	0.09033	0.08564	0.08104	0.07654	0.07213	0.06782	0.06361	0.05951	0.05551	0.05162	0.04784
.69	0.08376	0.07927	0.07487	0.07057	0.06636	0.06225	0.05824	0.05433	0.05054	0.04685	0.04327
.70	0.07738	0.07309	0.06889	0.06479	0.06078	0.05687	0.05306	0.04935	0.04576	0.04227	0.03889
.71	0.07119	0.06711	0.06311	0.05921	0.05540	0.05169	0.04808	0.04457	0.04117	0.03788	0.03470
.72	0.06521	0.06132	0.05753	0.05382	0.05021	0.04670	0.04329	0.03999	0.03679	0.03370	0.03072
.73	0.05944	0.05575	0.05215	0.04865	0.04524	0.04193	0.03872	0.03561	0.03261	0.02972	0.02695
.74	0.05387	0.05039	0.04699	0.04369	0.04048	0.03737	0.03436	0.03145	0.02865	0.02596	0.02339
.75	0.04853	0.04525	0.04205	0.03895	0.03594	0.03303	0.03022	0.02751	0.02491	0.02242	0.02004
.76	0.04342	0.04033	0.03734	0.03443	0.03162	0.02891	0.02630	0.02380	0.02140	0.01911	0.01693
.77	0.03854	0.03565	0.03286	0.03015	0.02754	0.02503	0.02262	0.02032	0.01812	0.01603	0.01405
.78	0.03390	0.03121	0.02862	0.02611	0.02370	0.02139	0.01918	0.01708	0.01508	0.01319	0.01141
.79	0.02951	0.02702	0.02463	0.02232	0.02012	0.01800	0.01600	0.01409	0.01229	0.01060	0.00902
.80	0.02538	0.02309	0.02090	0.01879	0.01678	0.01487	0.01306	0.01136	0.00976	0.00827	0.00689
.81	0.02151	0.01943	0.01743	0.01553	0.01372	0.01201	0.01040	0.00889	0.00749	0.00620	0.00502
.82	0.01792	0.01604	0.01424	0.01254	0.01093	0.00942	0.00801	0.00670	0.00550	0.00441	0.00344
.83	0.01462	0.01294	0.01134	0.00984	0.00843	0.00712	0.00591	0.00480	0.00380	0.00291	0.00213
.84	0.01162	0.01013	0.00874	0.00743	0.00622	0.00511	0.00410	0.00320	0.00240	0.00171	0.00113
.85	0.00892	0.00764	0.00644	0.00534	0.00433	0.00342	0.00261	0.00190	0.00130	0.00081	0.00043
.86	0.00655	0.00546	0.00447	0.00356	0.00276	0.00205	0.00144	0.00093	0.00053	0.00024	0.00006
.87	0.00452	0.00363	0.00283	0.00213	0.00152	0.00101	0.00060	0.00030	0.00010	0.00001	
.88	0.00283	0.00215	0.00155	0.00105	0.00064	0.00033	0.00012	0.00001			
.89	0.00152	0.00104	0.00064	0.00034	0.00013						
.90	0.00060	0.00032	0.00012	0.00002							
.91	0.00010	0.00001									

F(U,V)											
U=.50-.60 V=.00-.45											
V	U	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.60
.00	0.61418	0.59692	0.57978	0.56276	0.54586	0.52909	0.51245	0.49595	0.47959	0.46337	0.44730
.01	0.60419	0.58712	0.57018	0.55336	0.53666	0.52009	0.50366	0.48735	0.47119	0.45517	0.43930
.02	0.59419	0.57733	0.56058	0.54396	0.52746	0.51109	0.49486	0.47876	0.46279	0.44697	0.43130
.03	0.58419	0.56753	0.55099	0.53457	0.51827	0.50210	0.48606	0.47016	0.45440	0.43878	0.42330
.04	0.57421	0.55774	0.54140	0.52518	0.50908	0.49311	0.47728	0.46157	0.44601	0.43059	0.41532
.05	0.56423	0.54796	0.53182	0.51580	0.49990	0.48413	0.46850	0.45299	0.43763	0.42241	0.40734
.06	0.55426	0.53819	0.52225	0.50643	0.49073	0.47516	0.45973	0.44443	0.42926	0.41424	0.39937
.07	0.54430	0.52844	0.51269	0.49707	0.48157	0.46621	0.45097	0.43587	0.42090	0.40608	0.39141
.08	0.53436	0.51869	0.50315	0.48773	0.47243	0.45726	0.44223	0.42732	0.41256	0.39794	0.38347
.09	0.52443	0.50897	0.49362	0.47840	0.46330	0.44833	0.43350	0.41880	0.40423	0.38981	0.37554
.10	0.51452	0.49926	0.48411	0.46909	0.45419	0.43943	0.42479	0.41029	0.39592	0.38170	0.36763
.11	0.50463	0.48957	0.47462	0.45980	0.44510	0.43054	0.41610	0.40180	0.38763	0.37361	0.35974
.12	0.49476	0.47990	0.46516	0.45053	0.43604	0.42167	0.40743	0.39333	0.37937	0.36555	0.35187
.13	0.48492	0.47026	0.45571	0.44129	0.42699	0.41283	0.39879	0.38489	0.37112	0.35750	0.34403
.14	0.47510	0.46064	0.44630	0.43207	0.41798	0.40401	0.39017	0.37647	0.36291	0.34949	0.33621
.15	0.46531	0.45105	0.43691	0.42289	0.40899	0.39522	0.38158	0.36808	0.35472	0.34150	0.32842
.16	0.45556	0.44149	0.42755	0.41373	0.40003	0.38646	0.37303	0.35972	0.34656	0.33354	0.32067
.17	0.44583	0.43197	0.41822	0.40460	0.39110	0.37774	0.36450	0.35140	0.33843	0.32561	0.31294
.18	0.43614	0.42248	0.40893	0.39551	0.38221	0.36905	0.35601	0.34311	0.33034	0.31772	0.30525
.19	0.42648	0.41302	0.39968	0.38646	0.37336	0.36039	0.34755	0.33485	0.32229	0.30987	0.29759
.20	0.41687	0.40361	0.39046	0.37744	0.36454	0.35177	0.33914	0.32664	0.31427	0.30205	0.28998
.21	0.40729	0.39423	0.38129	0.36846	0.35577	0.34320	0.33076	0.31846	0.30630	0.29428	0.28240
.22	0.39776	0.38490	0.37215	0.35953	0.34704	0.33467	0.32243	0.31033	0.29837	0.28655	0.27487
.23	0.38827	0.37561	0.36307	0.35065	0.33835	0.32618	0.31414	0.30224	0.29048	0.27886	0.26738
.24	0.37883	0.36637	0.35403	0.34181	0.32971	0.31774	0.30590	0.29420	0.28264	0.27122	0.25994
.25	0.36944	0.35718	0.34504	0.33302	0.32112	0.30935	0.29771	0.28621	0.27485	0.26363	0.25255
.26	0.36010	0.34804	0.33610	0.32428	0.31258	0.30101	0.28957	0.27827	0.26711	0.25609	0.24521
.27	0.35082	0.33896	0.32721	0.31559	0.30409	0.29273	0.28149	0.27039	0.25942	0.24860	0.23793
.28	0.34159	0.32993	0.31838	0.30696	0.29567	0.28450	0.27346	0.26256	0.25180	0.24118	0.23070
.29	0.33242	0.32096	0.30961	0.29839	0.28730	0.27633	0.26549	0.25479	0.24423	0.23381	0.22353
.30	0.32331	0.31205	0.30090	0.28988	0.27899	0.26822	0.25758	0.24708	0.23672	0.22650	0.21642
.31	0.31426	0.30320	0.29226	0.28144	0.27074	0.26017	0.24973	0.23943	0.22927	0.21925	0.20937
.32	0.30528	0.29442	0.28368	0.27305	0.26256	0.25219	0.24195	0.23185	0.22189	0.21207	0.20239
.33	0.29637	0.28571	0.27516	0.26474	0.25444	0.24427	0.23424	0.22434	0.21457	0.20495	0.19548
.34	0.28752	0.27706	0.26672	0.25650	0.24640	0.23643	0.22659	0.21689	0.20733	0.19791	0.18863
.35	0.27875	0.26849	0.25835	0.24832	0.23843	0.22866	0.21902	0.20952	0.20016	0.19094	0.18186
.36	0.27005	0.25999	0.25005	0.24023	0.23053	0.22096	0.21152	0.20222	0.19306	0.18404	0.17516
.37	0.26143	0.25157	0.24183	0.23221	0.22271	0.21334	0.20410	0.19500	0.18604	0.17722	0.16854
.38	0.25289	0.24323	0.23369	0.22427	0.21497	0.20580	0.19676	0.18786	0.17910	0.17048	0.16200
.39	0.24444	0.23497	0.22563	0.21641	0.20731	0.19834	0.18951	0.18080	0.17224	0.16382	0.15555
.40	0.23606	0.22680	0.21766	0.20863	0.19974	0.19097	0.18233	0.17383	0.16547	0.15725	0.14917
.41	0.22778	0.21871	0.20977	0.20095	0.19225	0.18368	0.17525	0.16694	0.15878	0.15076	0.14289
.42	0.21958	0.21072	0.20197	0.19335	0.18485	0.17649	0.16825	0.16015	0.15218	0.14436	0.13669
.43	0.21148	0.20281	0.19427	0.18585	0.17755	0.16938	0.16135	0.15344	0.14568	0.13806	0.13059
.44	0.20347	0.19500	0.18666	0.17844	0.17034	0.16237	0.15454	0.14684	0.13927	0.13185	0.12458
.45	0.19556	0.18729	0.17915	0.17113	0.16323	0.15546	0.14783	0.14032	0.13296	0.12574	0.11867

F(U,V)												
U=.50-.60 V=.45-.86												
V	U	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60
.45	0.19556	0.18729	0.17915	0.17113	0.16323	0.15546	0.14783	0.14032	0.13296	0.12574	0.11867	
.46	0.18775	0.17968	0.17174	0.16392	0.15622	0.14865	0.14122	0.13392	0.12675	0.11973	0.11286	
.47	0.18004	0.17218	0.16443	0.15681	0.14932	0.14195	0.13471	0.12761	0.12065	0.11383	0.10715	
.48	0.17244	0.16478	0.15724	0.14981	0.14252	0.13535	0.12831	0.12141	0.11465	0.10803	0.10155	
.49	0.16495	0.15749	0.15015	0.14292	0.13583	0.12886	0.12202	0.11532	0.10876	0.10234	0.09606	
.50	0.15757	0.15031	0.14317	0.13615	0.12925	0.12248	0.11584	0.10934	0.10298	0.09676	0.09068	
.51	0.15031	0.14325	0.13631	0.12948	0.12279	0.11622	0.10978	0.10348	0.09732	0.09130	0.08542	
.52	0.14317	0.13631	0.12956	0.12294	0.11644	0.11007	0.10384	0.09774	0.09177	0.08595	0.08028	
.53	0.13615	0.12948	0.12294	0.11652	0.11022	0.10405	0.09802	0.09211	0.08635	0.08073	0.07526	
.54	0.12925	0.12279	0.11644	0.11022	0.10412	0.09816	0.09232	0.08662	0.08105	0.07563	0.07036	
.55	0.12248	0.11622	0.11007	0.10405	0.09816	0.09239	0.08675	0.08125	0.07589	0.07066	0.06559	
.56	0.11584	0.10978	0.10384	0.09802	0.09232	0.08675	0.08131	0.07601	0.07085	0.06583	0.06095	
.57	0.10934	0.10348	0.09774	0.09211	0.08662	0.08125	0.07601	0.07091	0.06595	0.06113	0.05645	
.58	0.10298	0.09732	0.09177	0.08635	0.08105	0.07589	0.07085	0.06595	0.06118	0.05656	0.05209	
.59	0.09676	0.09130	0.08595	0.08073	0.07563	0.07066	0.06583	0.06113	0.05656	0.05214	0.04787	
.60	0.09068	0.08542	0.08028	0.07526	0.07036	0.06559	0.06095	0.05645	0.05209	0.04787	0.04379	
.61	0.08476	0.07970	0.07475	0.06993	0.06523	0.06067	0.05623	0.05193	0.04776	0.04374	0.03987	
.62	0.07899	0.07413	0.06938	0.06476	0.06026	0.05590	0.05166	0.04756	0.04359	0.03977	0.03610	
.63	0.07338	0.06871	0.06417	0.05975	0.05545	0.05128	0.04725	0.04334	0.03958	0.03596	0.03249	
.64	0.06793	0.06346	0.05912	0.05490	0.05080	0.04683	0.04300	0.03929	0.03573	0.03231	0.02904	
.65	0.06264	0.05838	0.05424	0.05022	0.04632	0.04255	0.03891	0.03541	0.03205	0.02883	0.02575	
.66	0.05753	0.05347	0.04952	0.04570	0.04201	0.03844	0.03500	0.03170	0.02854	0.02552	0.02264	
.67	0.05259	0.04873	0.04499	0.04137	0.03787	0.03450	0.03126	0.02816	0.02520	0.02238	0.01970	
.68	0.04784	0.04418	0.04063	0.03721	0.03391	0.03074	0.02771	0.02481	0.02204	0.01942	0.01695	
.69	0.04327	0.03981	0.03646	0.03324	0.03014	0.02717	0.02434	0.02164	0.01907	0.01665	0.01438	
.70	0.03889	0.03563	0.03248	0.02946	0.02656	0.02379	0.02116	0.01866	0.01629	0.01407	0.01200	
.71	0.03470	0.03164	0.02870	0.02588	0.02318	0.02061	0.01817	0.01587	0.01371	0.01169	0.00981	
.72	0.03072	0.02786	0.02512	0.02249	0.02000	0.01763	0.01539	0.01329	0.01133	0.00951	0.00783	
.73	0.02695	0.02428	0.02174	0.01932	0.01702	0.01485	0.01282	0.01091	0.00915	0.00753	0.00606	
.74	0.02339	0.02092	0.01858	0.01636	0.01426	0.01229	0.01046	0.00875	0.00719	0.00577	0.00450	
.75	0.02004	0.01778	0.01564	0.01362	0.01172	0.00995	0.00831	0.00681	0.00545	0.00423	0.00315	
.76	0.01693	0.01487	0.01292	0.01110	0.00941	0.00784	0.00640	0.00510	0.00394	0.00291	0.00204	
.77	0.01405	0.01219	0.01044	0.00882	0.00733	0.00596	0.00472	0.00362	0.00266	0.00183	0.00116	
.78	0.01141	0.00975	0.00821	0.00678	0.00549	0.00432	0.00328	0.00238	0.00162	0.00100	0.00052	
.79	0.00902	0.00756	0.00622	0.00499	0.00390	0.00293	0.00209	0.00139	0.00083	0.00041	0.00013	
.80	0.00689	0.00563	0.00448	0.00346	0.00256	0.00180	0.00116	0.00066	0.00029	0.00007	0.00000	
.81	0.00502	0.00396	0.00302	0.00220	0.00150	0.00093	0.00049	0.00019	0.00003			
.82	0.00344	0.00257	0.00183	0.00121	0.00071	0.00034	0.00011	0.00000				
.83	0.00213	0.00147	0.00093	0.00051	0.00021	0.00004						
.84	0.00113	0.00067	0.00032	0.00010	0.00000							
.85	0.00043	0.00017	0.00003									
.86	0.00006	0.00000										

F(u,v)

U=.60-.70
V=.00-.40

V	U 0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70
.00	0.44730	0.43137	0.41560	0.39999	0.38454	0.36925	0.35414	0.33921	0.32445	0.30988	0.29550
.01	0.43930	0.42357	0.40800	0.39259	0.37734	0.36225	0.34734	0.33261	0.31805	0.30368	0.28950
.02	0.43130	0.41577	0.40040	0.38519	0.37014	0.35526	0.34054	0.32601	0.31165	0.29748	0.28350
.03	0.42330	0.40798	0.39281	0.37780	0.36295	0.34826	0.33375	0.31941	0.30526	0.29129	0.27751
.04	0.41532	0.40019	0.38522	0.37041	0.35576	0.34128	0.32696	0.31283	0.29887	0.28510	0.27152
.05	0.40734	0.39241	0.37764	0.36303	0.34858	0.33430	0.32018	0.30625	0.29249	0.27892	0.26554
.06	0.39937	0.38464	0.37007	0.35566	0.34141	0.32733	0.31341	0.29968	0.28612	0.27275	0.25957
.07	0.39141	0.37689	0.36251	0.34830	0.33425	0.32037	0.30666	0.29312	0.27976	0.26659	0.25361
.08	0.38347	0.36914	0.35497	0.34096	0.32711	0.31343	0.29991	0.28658	0.27342	0.26045	0.24767
.09	0.37554	0.36141	0.34744	0.33363	0.31998	0.30650	0.29319	0.28005	0.26709	0.25432	0.24174
.10	0.36763	0.35370	0.33993	0.32632	0.31287	0.29959	0.28648	0.27354	0.26078	0.24821	0.23583
.11	0.35974	0.34602	0.33244	0.31903	0.30578	0.29270	0.27979	0.26705	0.25449	0.24212	0.22994
.12	0.35187	0.33835	0.32498	0.31177	0.29872	0.28583	0.27312	0.26058	0.24823	0.23606	0.22408
.13	0.34403	0.33071	0.31753	0.30452	0.29167	0.27899	0.26648	0.25414	0.24198	0.23001	0.21823
.14	0.33621	0.32309	0.31012	0.29731	0.28466	0.27217	0.25986	0.24772	0.23577	0.22400	0.21242
.15	0.32842	0.31550	0.30273	0.29012	0.27767	0.26538	0.25327	0.24133	0.22958	0.21801	0.20663
.16	0.32067	0.30794	0.29537	0.28296	0.27071	0.25863	0.24671	0.23498	0.22342	0.21205	0.20087
.17	0.31294	0.30042	0.28805	0.27583	0.26378	0.25190	0.24019	0.22865	0.21729	0.20612	0.19514
.18	0.30525	0.29292	0.28075	0.26874	0.25689	0.24521	0.23370	0.22236	0.21120	0.20023	0.18945
.19	0.29759	0.28547	0.27350	0.26169	0.25004	0.23855	0.22724	0.21610	0.20515	0.19438	0.18380
.20	0.28998	0.27805	0.26628	0.25467	0.24322	0.23194	0.22083	0.20989	0.19913	0.18856	0.17818
.21	0.28240	0.27068	0.25911	0.24770	0.23645	0.22536	0.21445	0.20371	0.19316	0.18279	0.17261
.22	0.27487	0.26335	0.25198	0.24076	0.22971	0.21883	0.20812	0.19758	0.18723	0.17705	0.16707
.23	0.26738	0.25606	0.24489	0.23388	0.22303	0.21234	0.20183	0.19149	0.18134	0.17137	0.16159
.24	0.25994	0.24882	0.23785	0.22704	0.21639	0.20590	0.19559	0.18545	0.17550	0.16573	0.15615
.25	0.25255	0.24163	0.23086	0.22025	0.20980	0.19951	0.18940	0.17946	0.16971	0.16014	0.15076
.26	0.24521	0.23449	0.22392	0.21351	0.20326	0.19317	0.18326	0.17353	0.16397	0.15460	0.14542
.27	0.23793	0.22741	0.21704	0.20682	0.19677	0.18689	0.17718	0.16764	0.15828	0.14911	0.14013
.28	0.23070	0.22038	0.21021	0.20019	0.19034	0.18066	0.17115	0.16181	0.15266	0.14368	0.13490
.29	0.22353	0.21341	0.20344	0.19362	0.18397	0.17449	0.16518	0.15604	0.14708	0.13831	0.12973
.30	0.21642	0.20650	0.19673	0.18711	0.17766	0.16838	0.15927	0.15033	0.14158	0.13300	0.12462
.31	0.20937	0.19965	0.19008	0.18067	0.17142	0.16233	0.15342	0.14468	0.13613	0.12776	0.11958
.32	0.20239	0.19287	0.18350	0.17429	0.16524	0.15635	0.14764	0.13910	0.13075	0.12258	0.11460
.33	0.19548	0.18615	0.17698	0.16797	0.15912	0.15044	0.14192	0.13359	0.12543	0.11746	0.10968
.34	0.18863	0.17951	0.17054	0.16173	0.15308	0.14459	0.13628	0.12814	0.12019	0.11242	0.10484
.35	0.18186	0.17294	0.16417	0.15555	0.14710	0.13882	0.13071	0.12277	0.11502	0.10745	0.10007
.36	0.17516	0.16644	0.15787	0.14946	0.14121	0.13312	0.12521	0.11747	0.10992	0.10255	0.09537
.37	0.16854	0.16002	0.15165	0.14344	0.13539	0.12750	0.11979	0.11225	0.10490	0.09773	0.09075
.38	0.16200	0.15368	0.14551	0.13750	0.12965	0.12196	0.11445	0.10711	0.09996	0.09299	0.08621
.39	0.15555	0.14742	0.13945	0.13164	0.12399	0.11651	0.10919	0.10206	0.09510	0.08833	0.08175
.40	0.14917	0.14125	0.13348	0.12587	0.11842	0.11113	0.10402	0.09708	0.09033	0.08376	0.07738

F(U,V)												
U=.60-.70 V=.40-.80												
V	U	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70
.40		0.14917	0.14125	0.13348	0.12587	0.11842	0.11113	0.10402	0.09708	0.09033	0.08376	0.07738
.41		0.14289	0.13516	0.12759	0.12018	0.11293	0.10585	0.09893	0.09220	0.08564	0.07927	0.07309
.42		0.13669	0.12917	0.12180	0.11458	0.10753	0.10065	0.09394	0.08740	0.08104	0.07487	0.06889
.43		0.13059	0.12326	0.11609	0.10908	0.10223	0.09555	0.08903	0.08270	0.07654	0.07057	0.06479
.44		0.12458	0.11745	0.11048	0.10367	0.09702	0.09054	0.08422	0.07809	0.07213	0.06636	0.06078
.45		0.11867	0.11174	0.10497	0.09836	0.09191	0.08563	0.07951	0.07358	0.06782	0.06225	0.05687
.46		0.11286	0.10613	0.09956	0.09315	0.08690	0.08082	0.07490	0.06917	0.06361	0.05824	0.05306
.47		0.10715	0.10063	0.09426	0.08804	0.08199	0.07611	0.07040	0.06486	0.05951	0.05433	0.04935
.48		0.10155	0.09523	0.08906	0.08304	0.07719	0.07151	0.06600	0.06066	0.05551	0.05054	0.04576
.49		0.09606	0.08994	0.08397	0.07815	0.07250	0.06702	0.06171	0.05657	0.05162	0.04685	0.04227
.50		0.09068	0.08476	0.07899	0.07338	0.06793	0.06264	0.05753	0.05259	0.04784	0.04327	0.03889
.51		0.08542	0.07970	0.07413	0.06871	0.06346	0.05838	0.05347	0.04873	0.04418	0.03981	0.03563
.52		0.08028	0.07475	0.06938	0.06417	0.05912	0.05424	0.04952	0.04499	0.04063	0.03646	0.03248
.53		0.07526	0.06993	0.06476	0.05975	0.05490	0.05022	0.04570	0.04137	0.03721	0.03324	0.02946
.54		0.07036	0.06523	0.06026	0.05545	0.05080	0.04632	0.04201	0.03787	0.03391	0.03014	0.02656
.55		0.06559	0.06067	0.05590	0.05128	0.04683	0.04255	0.03844	0.03450	0.03074	0.02717	0.02379
.56		0.06095	0.05623	0.05166	0.04725	0.04300	0.03891	0.03500	0.03126	0.02771	0.02434	0.02116
.57		0.05645	0.05193	0.04756	0.04334	0.03929	0.03541	0.03170	0.02816	0.02481	0.02164	0.01866
.58		0.05209	0.04776	0.04359	0.03958	0.03573	0.03205	0.02854	0.02520	0.02204	0.01907	0.01629
.59		0.04787	0.04374	0.03977	0.03596	0.03231	0.02883	0.02552	0.02238	0.01942	0.01665	0.01407
.60		0.04379	0.03987	0.03610	0.03249	0.02904	0.02575	0.02264	0.01970	0.01695	0.01438	0.01200
.61		0.03987	0.03615	0.03258	0.02916	0.02591	0.02283	0.01992	0.01718	0.01462	0.01225	0.01007
.62		0.03610	0.03258	0.02920	0.02599	0.02294	0.02006	0.01735	0.01481	0.01245	0.01028	0.00830
.63		0.03249	0.02916	0.02599	0.02298	0.02013	0.01745	0.01493	0.01260	0.01044	0.00847	0.00669
.64		0.02904	0.02591	0.02294	0.02013	0.01748	0.01500	0.01268	0.01055	0.00859	0.00682	0.00524
.65		0.02575	0.02283	0.02006	0.01745	0.01500	0.01271	0.01060	0.00866	0.00691	0.00534	0.00396
.66		0.02264	0.01992	0.01735	0.01493	0.01268	0.01060	0.00869	0.00695	0.00540	0.00402	0.00284
.67		0.01970	0.01718	0.01481	0.01260	0.01055	0.00866	0.00695	0.00541	0.00406	0.00289	0.00191
.68		0.01695	0.01462	0.01245	0.01044	0.00859	0.00691	0.00540	0.00406	0.00290	0.00193	0.00115
.69		0.01438	0.01225	0.01028	0.00847	0.00682	0.00534	0.00402	0.00289	0.00193	0.00116	0.00058
.70		0.01200	0.01007	0.00830	0.00669	0.00524	0.00396	0.00284	0.00191	0.00115	0.00058	0.00020
.71		0.00981	0.00809	0.00652	0.00511	0.00386	0.00277	0.00186	0.00112	0.00057	0.00020	0.00002
.72		0.00783	0.00631	0.00494	0.00372	0.00267	0.00179	0.00108	0.00054	0.00019	0.00002	
.73		0.00606	0.00473	0.00356	0.00255	0.00170	0.00102	0.00050	0.00017	0.00001		
.74		0.00450	0.00337	0.00240	0.00159	0.00094	0.00046	0.00014	0.00001			
.75		0.00315	0.00223	0.00146	0.00085	0.00040	0.00011	0.00000				
.76		0.00204	0.00137	0.00075	0.00033	0.00008						
.77		0.00116	0.00064	0.00027	0.00005							
.78		0.00052	0.00020	0.00003								
.79		0.00013	0.00001									
.80		0.00000										

F(u,v)											
U=.70-.80 V=.00-.35											
V	U 0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
.00	0.29550	0.28131	0.26733	0.25356	0.24000	0.22666	0.21354	0.20066	0.18802	0.17563	0.16350
.01	0.28950	0.27552	0.26173	0.24816	0.23480	0.22166	0.20874	0.19606	0.18362	0.17143	0.15950
.02	0.28350	0.26972	0.25614	0.24276	0.22960	0.21666	0.20394	0.19146	0.17923	0.16724	0.15550
.03	0.27751	0.26392	0.25054	0.23737	0.22441	0.21166	0.19915	0.18687	0.17483	0.16304	0.15151
.04	0.27152	0.25814	0.24495	0.23198	0.21922	0.20668	0.19436	0.18228	0.17044	0.15885	0.14752
.05	0.26554	0.25236	0.23937	0.22660	0.21404	0.20170	0.18958	0.17770	0.16606	0.15467	0.14354
.06	0.25957	0.24659	0.23380	0.22123	0.20887	0.19673	0.18481	0.17313	0.16169	0.15050	0.13957
.07	0.25361	0.24083	0.22825	0.21587	0.20371	0.19177	0.18006	0.16858	0.15734	0.14635	0.13562
.08	0.24767	0.23509	0.22270	0.21053	0.19857	0.18683	0.17531	0.16403	0.15299	0.14220	0.13167
.09	0.24174	0.22936	0.21718	0.20520	0.19344	0.18190	0.17058	0.15950	0.14867	0.13808	0.12774
.10	0.23583	0.22365	0.21167	0.19989	0.18833	0.17699	0.16588	0.15500	0.14436	0.13397	0.12383
.11	0.22994	0.21796	0.20618	0.19460	0.18324	0.17210	0.16119	0.15051	0.14007	0.12988	0.11995
.12	0.22408	0.21229	0.20071	0.18934	0.17817	0.16723	0.15652	0.14604	0.13580	0.12581	0.11608
.13	0.21823	0.20665	0.19527	0.18409	0.17313	0.16239	0.15188	0.14160	0.13156	0.12177	0.11224
.14	0.21242	0.20103	0.18985	0.17888	0.16811	0.15757	0.14726	0.13718	0.12734	0.11775	0.10842
.15	0.20663	0.19544	0.18446	0.17369	0.16313	0.15278	0.14267	0.13279	0.12315	0.11376	0.10463
.16	0.20087	0.18989	0.17910	0.16853	0.15817	0.14803	0.13811	0.12843	0.11899	0.10980	0.10087
.17	0.19514	0.18436	0.17378	0.16340	0.15324	0.14330	0.13359	0.12411	0.11487	0.10588	0.09715
.18	0.18945	0.17887	0.16849	0.15831	0.14835	0.13861	0.12910	0.11981	0.11078	0.10199	0.09345
.19	0.18380	0.17341	0.16323	0.15326	0.14350	0.13395	0.12464	0.11556	0.10672	0.09813	0.08980
.20	0.17818	0.16800	0.15802	0.14824	0.13868	0.12934	0.12022	0.11134	0.10271	0.09432	0.08618
.21	0.17261	0.16262	0.15284	0.14327	0.13390	0.12476	0.11585	0.10717	0.09873	0.09054	0.08261
.22	0.16707	0.15729	0.14771	0.13833	0.12917	0.12023	0.11152	0.10304	0.09480	0.08681	0.07908
.23	0.16159	0.15200	0.14262	0.13345	0.12449	0.11574	0.10723	0.09895	0.09091	0.08312	0.07559
.24	0.15615	0.14676	0.13758	0.12861	0.11985	0.11130	0.10299	0.09491	0.08707	0.07948	0.07215
.25	0.15076	0.14157	0.13259	0.12382	0.11526	0.10691	0.09880	0.09092	0.08328	0.07589	0.06876
.26	0.14542	0.13643	0.12765	0.11908	0.11072	0.10258	0.09466	0.08698	0.07954	0.07235	0.06542
.27	0.14013	0.13135	0.12277	0.11439	0.10623	0.09829	0.09058	0.08310	0.07586	0.06887	0.06214
.28	0.13490	0.12632	0.11794	0.10976	0.10180	0.09406	0.08655	0.07927	0.07223	0.06544	0.05891
.29	0.12973	0.12135	0.11317	0.10519	0.09743	0.08989	0.08258	0.07550	0.06866	0.06207	0.05574
.30	0.12462	0.11644	0.10846	0.10068	0.09312	0.08578	0.07867	0.07179	0.06515	0.05876	0.05263
.31	0.11958	0.11159	0.10381	0.09624	0.08888	0.08173	0.07482	0.06814	0.06170	0.05551	0.04958
.32	0.11460	0.10681	0.09923	0.09185	0.08469	0.07775	0.07104	0.06456	0.05832	0.05233	0.04660
.33	0.10968	0.10210	0.09472	0.08754	0.08058	0.07384	0.06732	0.06104	0.05501	0.04922	0.04368
.34	0.10484	0.09745	0.09027	0.08330	0.07654	0.06999	0.06368	0.05760	0.05176	0.04617	0.04084
.35	0.10007	0.09288	0.08590	0.07912	0.07256	0.06622	0.06011	0.05423	0.04859	0.04320	0.03807

F(u,v)											
U=.70-.80 V=.35-.71											
V	U 0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
.35	0.10007	0.09288	0.08590	0.07912	0.07256	0.06622	0.06011	0.05423	0.04859	0.04320	0.03807
.36	0.09537	0.08838	0.08160	0.07503	0.06867	0.06253	0.05661	0.05093	0.04549	0.04030	0.03537
.37	0.09075	0.08396	0.07738	0.07101	0.06485	0.05891	0.05319	0.04771	0.04247	0.03748	0.03275
.38	0.08621	0.07962	0.07324	0.06707	0.06111	0.05536	0.04985	0.04457	0.03953	0.03474	0.03021
.39	0.08175	0.07537	0.06918	0.06321	0.05745	0.05191	0.04659	0.04151	0.03667	0.03208	0.02775
.40	0.07738	0.07119	0.06521	0.05944	0.05387	0.04853	0.04342	0.03854	0.03390	0.02951	0.02538
.41	0.07309	0.06711	0.06132	0.05575	0.05039	0.04525	0.04033	0.03565	0.03121	0.02702	0.02309
.42	0.06889	0.06311	0.05753	0.05215	0.04699	0.04205	0.03734	0.03286	0.02862	0.02463	0.02090
.43	0.06479	0.05921	0.05382	0.04865	0.04369	0.03895	0.03443	0.03015	0.02611	0.02232	0.01879
.44	0.06078	0.05540	0.05021	0.04524	0.04048	0.03594	0.03162	0.02754	0.02370	0.02012	0.01678
.45	0.05687	0.05169	0.04670	0.04193	0.03737	0.03303	0.02891	0.02503	0.02139	0.01800	0.01487
.46	0.05306	0.04808	0.04329	0.03872	0.03436	0.03022	0.02630	0.02262	0.01918	0.01600	0.01306
.47	0.04935	0.04457	0.03999	0.03561	0.03145	0.02751	0.02380	0.02032	0.01708	0.01409	0.01136
.48	0.04576	0.04117	0.03679	0.03261	0.02865	0.02491	0.02140	0.01812	0.01508	0.01229	0.00976
.49	0.04227	0.03788	0.03370	0.02972	0.02596	0.02242	0.01911	0.01603	0.01319	0.01060	0.00827
.50	0.03889	0.03470	0.03072	0.02695	0.02339	0.02004	0.01693	0.01405	0.01141	0.00902	0.00689
.51	0.03563	0.03164	0.02786	0.02428	0.02092	0.01778	0.01487	0.01219	0.00975	0.00756	0.00563
.52	0.03248	0.02870	0.02512	0.02174	0.01858	0.01564	0.01292	0.01044	0.00821	0.00622	0.00448
.53	0.02946	0.02588	0.02249	0.01932	0.01636	0.01362	0.01110	0.00882	0.00678	0.00499	0.00346
.54	0.02656	0.02318	0.02000	0.01702	0.01426	0.01172	0.00941	0.00733	0.00549	0.00390	0.00256
.55	0.02379	0.02061	0.01763	0.01485	0.01229	0.00995	0.00784	0.00596	0.00432	0.00293	0.00180
.56	0.02116	0.01817	0.01539	0.01282	0.01046	0.00831	0.00640	0.00472	0.00328	0.00209	0.00116
.57	0.01866	0.01587	0.01329	0.01091	0.00875	0.00681	0.00510	0.00362	0.00238	0.00139	0.00066
.58	0.01629	0.01371	0.01133	0.00915	0.00719	0.00545	0.00394	0.00266	0.00162	0.00083	0.00029
.59	0.01407	0.01169	0.00951	0.00753	0.00577	0.00423	0.00291	0.00183	0.00100	0.00041	0.00007
.60	0.01200	0.00981	0.00783	0.00606	0.00450	0.00315	0.00204	0.00116	0.00052	0.00013	0.00000
.61	0.01007	0.00809	0.00631	0.00473	0.00337	0.00223	0.00132	0.00064	0.00020	0.00001	
.62	0.00830	0.00652	0.00494	0.00356	0.00240	0.00146	0.00075	0.00027	0.00003		
.63	0.00669	0.00511	0.00372	0.00255	0.00159	0.00085	0.00033	0.00005			
.64	0.00524	0.00386	0.00267	0.00170	0.00094	0.00040	0.00008				
.65	0.00396	0.00277	0.00179	0.00102	0.00046	0.00011					
.66	0.00284	0.00186	0.00108	0.00050	0.00014	0.00000					
.67	0.00191	0.00112	0.00054	0.00017	0.00001						
.68	0.00115	0.00057	0.00019	0.00001							
.69	0.00058	0.00020	0.00002								
.70	0.00020	0.00002									
.71	0.00002										

F(u,v)											
U=.80-.90 V=.00-.30											
V	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
.00	0.16350	0.15164	0.14005	0.12875	0.11774	0.10705	0.09667	0.08664	0.07696	0.06765	0.05873
.01	0.15950	0.14784	0.13645	0.12535	0.11454	0.10405	0.09387	0.08404	0.07456	0.06545	0.05673
.02	0.15550	0.14404	0.13285	0.12195	0.11134	0.10105	0.09108	0.08144	0.07216	0.06325	0.05473
.03	0.15151	0.14025	0.12926	0.11855	0.10815	0.09805	0.08828	0.07885	0.06977	0.06106	0.05273
.04	0.14752	0.13646	0.12567	0.11517	0.10496	0.09507	0.08550	0.07626	0.06738	0.05887	0.05075
.05	0.14354	0.13268	0.12209	0.11179	0.10178	0.09209	0.08272	0.07368	0.06500	0.05669	0.04877
.06	0.13957	0.12891	0.11852	0.10842	0.09861	0.08912	0.07995	0.07111	0.06263	0.05452	0.04680
.07	0.13562	0.12515	0.11496	0.10506	0.09545	0.08616	0.07719	0.06855	0.06027	0.05236	0.04484
.08	0.13167	0.12141	0.11142	0.10172	0.09231	0.08322	0.07444	0.06601	0.05793	0.05022	0.04290
.09	0.12774	0.11768	0.10789	0.09839	0.08918	0.08029	0.07172	0.06348	0.05560	0.04809	0.04097
.10	0.12383	0.11397	0.10438	0.09508	0.08607	0.07738	0.06901	0.06097	0.05329	0.04598	0.03906
.11	0.11995	0.11028	0.10089	0.09179	0.08299	0.07449	0.06632	0.05848	0.05100	0.04389	0.03717
.12	0.11608	0.10661	0.09742	0.08852	0.07992	0.07162	0.06365	0.05602	0.04873	0.04182	0.03530
.13	0.11224	0.10297	0.09398	0.08528	0.07687	0.06878	0.06101	0.05357	0.04649	0.03978	0.03346
.14	0.10842	0.09935	0.09056	0.08206	0.07386	0.06596	0.05839	0.05116	0.04427	0.03776	0.03164
.15	0.10463	0.09576	0.08718	0.07887	0.07087	0.06317	0.05580	0.04877	0.04209	0.03578	0.02985
.16	0.10087	0.09221	0.08382	0.07572	0.06791	0.06042	0.05324	0.04641	0.03993	0.03382	0.02810
.17	0.09715	0.08868	0.08049	0.07259	0.06499	0.05769	0.05072	0.04408	0.03780	0.03189	0.02637
.18	0.09345	0.08519	0.07720	0.06950	0.06209	0.05500	0.04823	0.04179	0.03571	0.03000	0.02468
.19	0.08980	0.08173	0.07395	0.06644	0.05924	0.05234	0.04577	0.03954	0.03366	0.02815	0.02302
.20	0.08618	0.07832	0.07073	0.06343	0.05642	0.04973	0.04336	0.03732	0.03164	0.02633	0.02141
.21	0.08261	0.07494	0.06755	0.06045	0.05365	0.04715	0.04098	0.03515	0.02967	0.02455	0.01983
.22	0.07908	0.07161	0.06442	0.05752	0.05092	0.04462	0.03865	0.03301	0.02773	0.02282	0.01830
.23	0.07559	0.06832	0.06134	0.05463	0.04823	0.04213	0.03636	0.03093	0.02585	0.02113	0.01681
.24	0.07215	0.06508	0.05830	0.05179	0.04559	0.03969	0.03412	0.02889	0.02401	0.01949	0.01537
.25	0.06876	0.06189	0.05531	0.04900	0.04300	0.03730	0.03193	0.02690	0.02222	0.01790	0.01398
.26	0.06542	0.05876	0.05237	0.04626	0.04046	0.03497	0.02979	0.02496	0.02048	0.01637	0.01265
.27	0.06214	0.05567	0.04948	0.04358	0.03798	0.03268	0.02771	0.02307	0.01879	0.01488	0.01136
.28	0.05891	0.05264	0.04665	0.04095	0.03555	0.03045	0.02568	0.02124	0.01716	0.01345	0.01013
.29	0.05574	0.04967	0.04388	0.03838	0.03318	0.02828	0.02371	0.01947	0.01559	0.01208	0.00896
.30	0.05263	0.04676	0.04117	0.03587	0.03087	0.02617	0.02180	0.01776	0.01408	0.01077	0.00785

F(U,V)											
U=.80-.90 V=.30-.60											
V	U 0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
.30	0.05263	0.04676	0.04117	0.03587	0.03087	0.02617	0.02180	0.01776	0.01408	0.01077	0.00785
.31	0.04958	0.04391	0.03853	0.03342	0.02862	0.02412	0.01995	0.01612	0.01264	0.00952	0.00680
.32	0.04660	0.04113	0.03594	0.03104	0.02644	0.02214	0.01817	0.01454	0.01125	0.00834	0.00582
.33	0.04368	0.03842	0.03343	0.02873	0.02432	0.02023	0.01646	0.01302	0.00994	0.00723	0.00491
.34	0.04084	0.03577	0.03099	0.02648	0.02228	0.01838	0.01481	0.01158	0.00870	0.00618	0.00406
.35	0.03807	0.03320	0.02861	0.02431	0.02031	0.01661	0.01324	0.01021	0.00752	0.00521	0.00329
.36	0.03537	0.03071	0.02632	0.02221	0.01841	0.01492	0.01174	0.00891	0.00643	0.00432	0.00260
.37	0.03275	0.02829	0.02410	0.02019	0.01659	0.01329	0.01032	0.00769	0.00541	0.00350	0.00198
.38	0.03021	0.02594	0.02196	0.01825	0.01485	0.01175	0.00898	0.00655	0.00447	0.00276	0.00143
.39	0.02775	0.02369	0.01990	0.01640	0.01319	0.01030	0.00772	0.00549	0.00361	0.00210	0.00098
.40	0.02538	0.02151	0.01792	0.01462	0.01162	0.00892	0.00655	0.00452	0.00283	0.00152	0.00060
.41	0.02309	0.01943	0.01604	0.01294	0.01013	0.00764	0.00546	0.00363	0.00215	0.00104	0.00032
.42	0.02090	0.01743	0.01424	0.01134	0.00874	0.00644	0.00447	0.00283	0.00155	0.00064	0.00012
.43	0.01879	0.01553	0.01254	0.00984	0.00743	0.00534	0.00356	0.00213	0.00105	0.00034	0.00002
.44	0.01678	0.01372	0.01093	0.00843	0.00622	0.00433	0.00276	0.00152	0.00064	0.00013	
.45	0.01487	0.01201	0.00942	0.00712	0.00511	0.00342	0.00205	0.00101	0.00033	0.00002	
.46	0.01306	0.01040	0.00801	0.00591	0.00410	0.00261	0.00144	0.00060	0.00012		
.47	0.01136	0.00889	0.00670	0.00480	0.00320	0.00190	0.00093	0.00030	0.00001		
.48	0.00976	0.00749	0.00550	0.00380	0.00240	0.00130	0.00053	0.00010			
.49	0.00827	0.00620	0.00441	0.00291	0.00171	0.00081	0.00024	0.00001			
.50	0.00689	0.00502	0.00344	0.00213	0.00113	0.00043	0.00006				
.51	0.00563	0.00396	0.00257	0.00147	0.00067	0.00017	0.00000				
.52	0.00448	0.00302	0.00183	0.00093	0.00032	0.00003					
.53	0.00346	0.00220	0.00121	0.00051	0.00010						
.54	0.00256	0.00150	0.00071	0.00021	0.00000						
.55	0.00180	0.00093	0.00034	0.00004							
.56	0.00116	0.00049	0.00011								
.57	0.00066	0.00019	0.00000								
.58	0.00029	0.00003									
.59	0.00007										
.60	0.00000										

F(U,V)											
U=.90-1.00 V=.00-.43											
V	U 0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
.00	0.05873	0.05022	0.04215	0.03455	0.02746	0.02092	0.01499	0.00975	0.00532	0.00188	0.00000
.01	0.05673	0.04842	0.04055	0.03315	0.02626	0.01992	0.01419	0.00915	0.00492	0.00168	
.02	0.05473	0.04662	0.03895	0.03176	0.02506	0.01893	0.01340	0.00856	0.00452	0.00149	
.03	0.05273	0.04483	0.03736	0.03036	0.02387	0.01793	0.01260	0.00796	0.00413	0.00129	
.04	0.05075	0.04304	0.03577	0.02897	0.02268	0.01694	0.01182	0.00738	0.00374	0.00110	
.05	0.04877	0.04126	0.03419	0.02759	0.02150	0.01596	0.01104	0.00680	0.00336	0.00092	
.06	0.04680	0.03949	0.03262	0.02623	0.02033	0.01500	0.01027	0.00623	0.00299	0.00075	
.07	0.04484	0.03773	0.03107	0.02487	0.01918	0.01404	0.00951	0.00567	0.00263	0.00060	
.08	0.04290	0.03599	0.02952	0.02352	0.01803	0.01309	0.00876	0.00512	0.00229	0.00045	
.09	0.04097	0.03426	0.02799	0.02220	0.01691	0.01217	0.00804	0.00460	0.00196	0.00033	
.10	0.03906	0.03255	0.02648	0.02089	0.01580	0.01126	0.00733	0.00409	0.00165	0.00022	
.11	0.03717	0.03086	0.02500	0.01960	0.01471	0.01037	0.00664	0.00360	0.00136	0.00013	
.12	0.03530	0.02920	0.02353	0.01833	0.01364	0.00950	0.00597	0.00313	0.00109	0.00006	
.13	0.03346	0.02755	0.02209	0.01709	0.01260	0.00866	0.00533	0.00269	0.00085	0.00002	
.14	0.03164	0.02594	0.02067	0.01587	0.01158	0.00784	0.00471	0.00227	0.00063	0.00000	
.15	0.02985	0.02435	0.01928	0.01468	0.01059	0.00705	0.00412	0.00188	0.00045		
.16	0.02810	0.02279	0.01792	0.01352	0.00963	0.00629	0.00356	0.00152	0.00029		
.17	0.02637	0.02126	0.01660	0.01240	0.00871	0.00557	0.00304	0.00120	0.00016		
.18	0.02468	0.01977	0.01530	0.01131	0.00782	0.00488	0.00255	0.00091	0.00007		
.19	0.02302	0.01832	0.01405	0.01025	0.00696	0.00422	0.00209	0.00065	0.00002		
.20	0.02141	0.01690	0.01283	0.00924	0.00614	0.00361	0.00168	0.00044			
.21	0.01983	0.01553	0.01166	0.00826	0.00537	0.00303	0.00130	0.00026			
.22	0.01830	0.01419	0.01053	0.00733	0.00464	0.00250	0.00097	0.00013			
.23	0.01681	0.01291	0.00944	0.00644	0.00395	0.00201	0.00068	0.00004			
.24	0.01537	0.01167	0.00840	0.00560	0.00331	0.00157	0.00044	0.00000			
.25	0.01398	0.01048	0.00741	0.00481	0.00272	0.00118	0.00025				
.26	0.01265	0.00934	0.00647	0.00407	0.00218	0.00084	0.00011				
.27	0.01136	0.00825	0.00559	0.00339	0.00170	0.00056	0.00003				
.28	0.01013	0.00722	0.00476	0.00276	0.00127	0.00033	0.00000				
.29	0.00896	0.00625	0.00399	0.00219	0.00090	0.00016					
.30	0.00785	0.00534	0.00328	0.00168	0.00059						
.31	0.00680	0.00450	0.00263	0.00123	0.00034	0.00000					
.32	0.00582	0.00372	0.00205	0.00085	0.00016						
.33	0.00491	0.00300	0.00153	0.00054	0.00004						
.34	0.00406	0.00236	0.00109	0.00029	0.00000						
.35	0.00329	0.00179	0.00072	0.00012							
.36	0.00260	0.00129	0.00042	0.00002							
.37	0.00198	0.00087	0.00020								
.38	0.00143	0.00053	0.00006								
.39	0.00098	0.00027	0.00000								
.40	0.00060	0.00010									
.41	0.00032	0.00001									
.42	0.00012										
.43	0.00002										

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AD Ballistic Research Laboratories, APG AREA OF INTERSECTION OF AN ELLIPSE AND A RECTANGLE A. D. Groves ERL Memorandum Report No. 1478 April 1963 RTT & E Project No. 1M023201A098 UNCLASSIFIED Report A method is given for computing the area of intersection of an ellipse and a rectangle whose sides are parallel to the axes of the ellipse. This method is presented in a form amenable to programming for high speed computation, but tables are included to facilitate hand computations. This method has been used in the evaluation of the effectiveness of small arms, but would have application in the evaluation of area kill weapons as well.	UNCLASSIFIED Small arms - Effectiveness Probability - Geometry Techniques	AD Ballistic Research Laboratories, APG AREA OF INTERSECTION OF AN ELLIPSE AND A RECTANGLE A. D. Groves ERL Memorandum Report No. 1478 April 1963 RTT & E Project No. 1M023201A098 UNCLASSIFIED Report A method is given for computing the area of intersection of an ellipse and a rectangle whose sides are parallel to the axes of the ellipse. This method is presented in a form amenable to programming for high speed computation, but tables are included to facilitate hand computations. This method has been used in the evaluation of the effectiveness of small arms, but would have application in the evaluation of area kill weapons as well.	UNCLASSIFIED Small arms - Effectiveness Probability - Geometry Techniques
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