# CHAPTER I

Let us consider the non linear regression curve as

$$E(y) = \alpha + \delta x + \beta \rho^{x} ,$$

where y's are normally distributed about the mean $\alpha + \delta x + \beta \rho^{x}$ and with a common variance $\sigma^{2}$. Further let the observations be equally spaced. Then the joint distribution of y's can be written as

$$p(y_1 \ldots y_n) = (1/(2\pi)^{n/2}\sigma^{n}) \exp - \frac{1}{2\sigma^2}\sum(y_i - \alpha - \delta x - \beta\rho^{x})^2 \quad \ldots(1.1)$$

Taking the logarithm of the likelihood and differentiating with respect to $\alpha, \delta, \beta$ and $\rho$ in turn we have the normal equations:

$$\begin{aligned}
-an \quad & -h\sum x \quad & -b\sum r^{x} \quad & + Y \quad = 0 \\
-a\sum x \quad & -h\sum x^{2} \quad & -b\sum xr^{x} \quad & + Y_1 \quad = 0 \\
-a\sum r^{x} \quad & -h\sum xr^{x} \quad & -b\sum r^{2x} \quad & + Y_2 \quad = 0 \\
-ab\sum xr^{x-1} \quad & -hb\sum x^{2}r^{x-1} \quad & -b^{2}\sum xr^{2x-1} \quad & + bY_3 \quad = 0
\end{aligned} \qquad \ldots(1.2)$$

where a, h, b and r are the estimates of $\alpha$, $\delta$, $\beta$ and $\rho$ respectively and

$$\begin{aligned}
Y &= \sum y \\
Y_1 &= \sum xy \\
Y_2 &= \sum r^{x}y \\
Y_3 &= \sum xr^{x-1}y
\end{aligned} \qquad \ldots(1.3)$$

We can see from the above normal equation that it is difficult to estimate the parameters explicitly. Hence, we shall follow the method, as described by Fisher [ 8 ], of calculating the information matrix. The information matrix can be formed by differentiating the normal equations (1.2) with respect to a, h, b and r in turn, putting each y equal to its expected value and changing all signs. Then we have

$$[I]=\begin{bmatrix} n & \sum x & \sum r^{x} & b\sum xr^{x-1} \\ \sum x & \sum x^{2} & \sum xr^{x} & b\sum x^{2}r^{x-1} \\ \sum r^{x} & \sum xr^{x} & \sum r^{2x} & b\sum xr^{2x-1} \\ b\sum xr^{x-1} & b\sum x^{2}r^{x-1} & b\sum xr^{2x-1} & b^{2}\sum x^{2}r^{2x-2} \end{bmatrix} \quad \ldots(1.4)$$

It will be noted that the first, second and third column in the block of normal equations is the first, second and third column of terms in the information matrix multiplied by (-a), (-h), and (-b) respectively.

By taking the inverse of the information matrix we find that the covariance matrix has the form

$$V = \frac{1}{[I]} = \begin{bmatrix} F_{aa} & F_{ah} & F_{ab} & F_{ar}/b \\ F_{ah} & F_{hh} & F_{hb} & F_{hr}/b \\ F_{ab} & F_{hb} & F_{bb} & F_{br}/b \\ F_{ar}/b & F_{hr}/b & F_{br}/b & F_{rr}/b^2 \end{bmatrix} \quad \ldots \quad (1.5)$$

where $F_{aa}$, $F_{ah}$, $F_{ab}$, $F_{ar}$, $F_{hh}$, $F_{hb}$, $F_{hr}$, $F_{bb}$, $F_{br}$ and $F_{rr}$ are functions of r, being, in fact, the elements of the reciprocal of the matrix

$$\begin{bmatrix} n & \sum x & \sum r^x & \sum x r^{x-1} \\ \sum x & \sum x^2 & \sum x r^x & \sum x^2 r^{x-1} \\ \sum r^x & \sum x r^x & \sum r^{2x} & \sum x r^{2x-1} \\ \sum x r^{x-1} & \sum x^2 r^{x-1} & \sum x r^{2x-1} & \sum x^2 r^{2x-2} \end{bmatrix} \quad \ldots \quad (1.6)$$

Starting with the preliminary estimates a', h', b' and r', insert these in the left hand side of normal equations (1.2) which instead of yielding exactly zero, now take the small values A', H', B' and R' respectively. Efficient estimates a, h, b and r are now found by adding to the preliminary estimates, the respective increments $\delta a$, $\delta h$, $\delta b$ and $\delta r$, where

$$\begin{aligned}
\delta a &= F_{aa}A' + F_{ah}H' + F_{ab}B + F_{ar}R'/b, \\
\delta h &= F_{ah}A' + F_{hh}H' + F_{hb}B' + F_{hr}R'/b, \\
\delta b &= F_{ab}A' + F_{hb}H' + F_{bb}B' + F_{br}R'/b, \\
b\,\delta r &= F_{ar}A' + F_{hr}H' + F_{br}B' + F_{rr}R'/b.
\end{aligned} \qquad \ldots \quad (1.7)$$

In consequence of the relation, noted above, between columns of the block of normal equations and columns of the information matrix, the expressions for the increment simplify to

$$\begin{aligned}
\delta a &= -a' + F_{aa}Y + F_{ah}Y_1 + F_{ab}Y_2 + F_{ar}Y_3 , \\
\delta h &= -h' + F_{ah}Y + F_{hh}Y_1 + F_{hb}Y_2 + F_{hr}Y_3 , \\
\delta b &= -b' + F_{ba}Y + F_{bh}Y_1 + F_{bb}Y_2 + F_{br}Y_3 , \\
b\,\delta r &= \qquad F_{ar}Y + F_{hr}Y_1 + F_{br}Y_2 + F_{rr}Y_3 ,
\end{aligned} \qquad \ldots \quad (1.8)$$

Hence efficient estimates are :

$$\begin{aligned}
a &= a' + \delta a = F_{aa}Y + F_{ah}Y_1 + F_{ab}Y_2 + F_{ar}Y_3 \\
h &= h' + \delta h = F_{ah}Y + F_{hh}Y_1 + F_{hb}Y_2 + F_{hr}Y_3 \\
b &= b' + \delta b = F_{ba}Y + F_{bh}Y_1 + F_{bb}Y_2 + F_{br}Y_3 \\
r &= r' + \delta r,
\end{aligned} \qquad \ldots \quad (1.9)$$

where $\delta r = (R_{ar}Y + F_{hr}Y_1 + F_{br}Y_2 + F_{rr}Y_3)/b$.

We now see that the preliminary estimates of $\alpha$, $\delta$, and $\beta$ are not required which can be clearly seen from (1.9). What is required is the preliminary estimate of $\rho$ only. The estimates of $\alpha$, and $\delta$ and $\beta$ are then given explicitly in terms of functions of the preliminary estimate of $\rho$ and, of course, of the observations.

If the values of x are equally spaced, it becomes practicable to tabulate the covariance matrix and thus to eliminate a large portion of the arithmetical labour usually required.

In this chapter tables are provided of the covariance matrix for 5, 6, 7, 8, 9 and 10 equally spaced values of x for $\rho = 0.20\ (.01)\ 0.79$.

Finally, we have to determine the sum of squares of deviations from the fitted regression curve $\Sigma(y - y_e)^2$. Since the parameters have been efficiently estimated this will be equal to $\Sigma y^2 - \Sigma y_e^2$

where $\Sigma y_e^2 = aY + bY_1 + bY_2 + (b\ \delta r)\ Y_3$ ... (1.10)

In using this method caution is to be needed when the deviations from the regression curve are expected to be very

small, because the residual sum of squares then appears as a small difference between two large quantities and a relatively small error in $\sum y_e^2$ , will produce a relatively large error in $\sum(y - y_e)^2$ . In such cases it is advisable to calculate each expected value, $y_e$, and hence to obtain the residuals and the sum of their squares.

2. Practical Procedure:

The preliminary estimate for $\rho$ can be obtained graphi-cally or can be found from the following formulae for n = 5 and 6 respectively.

(i) $r = (y_4 - y_3 - y_2 + y_1)/(y_3 - y_2 - y_1 + y_0)$.

(ii) $r = (y_5 - 0.1y_4 - 1.3y_3 - 1.1y_2 + 1.5y_1)/$

$(y_4 - 0.1y_3 - 1.3y_2 - 1.1y_1 + 1.5y_0)$ .

Then taking this value to one place of decimal and referring to the table for the particular value of r and n, we find the corresponding $F_{aa}$, $F_{ah}$, $F_{ab}$, $F_{ar}$, $F_{hh}$, $F_{hb}$, $F_{hr}$, $F_{bb}$, $F_{br}$ and $F_{rr}$ which give the covariance matrix and hence find by multiplying the covariance matrix by the column vector $(Y, Y_1, Y_2, Y_3)$ , we get estimates a, h, b and b $\delta r$;

we thus get $\delta r$ and hence a new estimate of $\rho$. Iterating in this way till convergence of r is obtained, we get estimates of a,h,b and r.

If the preliminary estimate is not good then we have to go two or three cycles of iteration. So it is advantageous to start with a farily good preliminary estimate of r. We are, however, of the opinion that the best practical method is to draw a free-hand graph through the points and to determine r from four conveniently phosen points in the graph. The efficiencies with different methods are described in remaining chapters.

3. Examples:

(i) To illustrate the method and the use of the tables we shall consider first a theoretical example. Following are the values of y corresponding to the curve $y=20+2x-5(0.6)^x$.

| x : | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| y : | 15.000 | 19.000 | 22.200 | 24.920 | 27.352 |

The preliminary estimate can be found graphically or from the formula 2 (i). We find r = 0.6. By taking r=0.6 we can calculate Y = 108.472, $Y_1$=247.568, $Y_2$=43.3195392 and $Y_2$=96.185728.

The covariance matrix is now copied from the table with n=5 and r = 0.6.

$$\begin{bmatrix} 1559.3319397 & -258.9070663 & -1551.9350739 & -392.9653130 \\ & 43.1511974 & 257.7821999 & 64.8361130 \\ & & 1545.5337830 & 390.5577927 \\ & & & 100.3850336 \end{bmatrix} \begin{bmatrix} 108.472 \\ 247.568 \\ 43.3195392 \\ 96.1857280 \end{bmatrix}.$$

Multiplying in turn, each column of the matrix by the column vector on the right we find

$$\begin{aligned} a &= 19.9826 \\ h &= 2.0032 \\ b &= 4.9807 \quad \text{and} \\ b\,\delta r &= 0.0045 \end{aligned}$$

Therefore $r = -.000903$ or $\delta n$

$r = 0.6 - .000903$

$= 5.999097$ .5991$^x$

Therefore $y_e = 19.9826 + 2.0032x - 4.9807\,(0.5999)^x$.

We can see that the two curves are the same except for some error which is due to the high values in the covariance matrix.

(ii) The following data are taken from Biometrics 1951 page 253, given by Stevens [ 3 ].

| x : | 0 | I | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| y : | 50.0 | 90.0 | 111.0 | 125.7 | 136.0 | 143.2 |

The preliminary estimate can be found from the formula 3(ii). We find r = 0.49. Therefore let us start with a preliminary estimate of r = 0.5, We get Y = 655.9000, $Y_1$=1949.1000,

$Y_2$=151.4375, and $Y_3$=408.0250.

Thus the covariance matrix for r = 0.5 and n = 6 is

$$\begin{bmatrix} 109.6187897 & -19.7290621 & -107.8939314 & -41.6451082 \\ & 3.5871029 & 19.4492500 & 7.3760352 \\ & & 107.1618938 & 40.6034813 \\ & & & 16.6433802 \end{bmatrix} \begin{bmatrix} 655.9000 \\ 1949.1000 \\ 151.4375 \\ 408.0250 \end{bmatrix}$$

Hence $a = 113.6167$

$h = 6.2830$

$b = -63.5316$

and $b\,\delta r = 1.4086$

Therefore $r = 0.5 - 0.0221 = 0.4779$ .

The data may now be graduated with the formula, since there is no need to go to the second cycle of iteration,

$$y_e = 113.62 + 6.2830x - 63.53\,(0.478)^x \quad \ldots (1.11)$$

We have also calculated the expected values for the curve $y = \alpha + \beta \rho^x$ and for the curve (1.11) giving error sum of squares in each case. We have also fitted $y = \alpha + \delta x + \beta \rho^x$ by Hartley's method of Internal least squares and the expected values by this method is also given in the table for comparison.

| x | Observed y | Expected for $y=\alpha+\beta\gamma^x$ | Expected for $y=\alpha+\delta x+\beta\gamma^x$ By Hartley's | Expected for $y=\alpha+\delta x+\beta\gamma^x$ By Least Square |
|---|---|---|---|---|
| 0 | 50.0 | 50.59 | 50.27 | 50.08 |
| 1 | 90.0 | 88.87 | 89.03 | 89.54 |
| 2 | 111.0 | 112.78 | 112.00 | 111.67 |
| 3 | 125.7 | 127.71 | 125.85 | 125.53 |
| 4 | 136.0 | 137.03 | 135.26 | 135.43 |
| 5 | 143.2 | 142.84 | 143.51 | 143.45 |
| Error sum of squares : | | 10.0240 | 2.6800 | 1.0925 |

The residual sum of squares for the exponential curve is found to be 10.0240, while residual sum of squares for the curve (1.11) is found to be 1.0925, which shows that the addition of a linear term improves the graduation. If the linear part is not necessary then the estimate of $\delta$ will be negligible. This can be seen in one example as discussed in Chapter IV.

Table for calculating the covariance matrix

n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .20 | 17.2658417 | 4.7919881 | 17.1374648 | 10.3056393 | 1.3691395 |
| .21 | 18.6685536 | 5.1421550 | 18.5223558 | 11.0012536 | 1.4560224 |
| .22 | 20.2143657 | 5.5247174 | 20.0485470 | 11.7549649 | 1.5501006 |
| .23 | 21.9200096 | 5.9431135 | 21.7326210 | 12.5724480 | 1.6520569 |
| .24 | 23.8044446 | 6.4012009 | 23.5933738 | 13.4600290 | 1.7626496 |
| .25 | 25.8890777 | 6.9032840 | 25.6520338 | 14.4247081 | 1.8827138 |
| .26 | 28.1982272 | 7.4542139 | 27.9327705 | 15.4743307 | 2.0131819 |
| .27 | 30.7596750 | 8.0594329 | 30.4630167 | 16.6176302 | 2.1550864 |
| .28 | 33.6047759 | 8.7250717 | 33.2740302 | 17.8643801 | 2.3095778 |
| .29 | 36.7695398 | 9.4580568 | 36.4015203 | 19.2255530 | 2.4779410 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 4.7607383 | 2.7832007 | 18.0089335 | 10.0360686 | 7.1875764 |
| .21 | 5.1068242 | 2.9501837 | 19.3759756 | 10.7132274 | 7.5181475 |
| .22 | 5.4849410 | 3.1295334 | 20.8825147 | 11.4478197 | 7.8697790 |
| .23 | 5.8988523 | 3.3223241 | 22.5449836 | 12.2454834 | 8.2441373 |
| .24 | 6.3513396 | 3.5297418 | 24.3820164 | 13.1125062 | 8.6430550 |
| .25 | 6.8477284 | 3.7530819 | 26.4146512 | 14.0558456 | 9.0685123 |
| .26 | 7.3924903 | 3.9937834 | 28.6668947 | 15.0833029 | 9.5227023 |
| .27 | 7.9910337 | 4.2534287 | 31.1659350 | 16.2035627 | 10.0080180 |
| .28 | 8.6494545 | 4.5337695 | 33.9428077 | 17.4263475 | 10.5270921 |
| .29 | 9.3746411 | 4.8367528 | 37.0329661 | 18.7625747 | 11.0828371 |

Table for calculating the covariance matrix

n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{at}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 40.2948318 | 10.2661533 | 39.8860698 | 20.7133410 | 2.6615953 |
| .31 | 44.2277250 | 11.1582239 | 43.7744474 | 22.3416007 | 2.8621467 |
| .32 | 48.6220727 | 12.1442769 | 48.1201653 | 24.1258600 | 3.0813837 |
| .33 | 53.5394683 | 13.2356056 | 52.9844465 | 26.0834899 | 3.3212944 |
| .34 | 59.0511484 | 14.4451338 | 58.4381137 | 28.2342780 | 3.5841311 |
| .35 | 65.2391958 | 15.7875624 | 64.5628023 | 30.6005666 | 3.8724211 |
| .36 | 72.1978235 | 17.2795074 | 71.4522209 | 33.2023870 | 4.1889719 |
| .37 | 80.0376806 | 18.9403350 | 79.2164669 | 36.0838590 | 4.5370387 |
| .38 | 88.8848362 | 20.7916656 | 87.9809980 | 39.2620578 | 4.9201656 |
| .39 | 98.8880711 | 22.8588154 | 97.8939133 | 42.7794943 | 5.3424823 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .30 | 10.1743170 | 5.1645068 | 40.4767137 | 20.2243767 | 11.6784017 |
| .31 | 11.0573001 | 5.5194363 | 44.3205094 | 21.8255465 | 12.3173450 |
| .32 | 12.0335507 | 5.9041978 | 48.6175275 | 23.5815425 | 13.0035660 |
| .33 | 13.1143098 | 6.3217175 | 53.4286194 | 25.5096631 | 13.7413151 |
| .34 | 14.3124437 | 6.7753019 | 58.8241963 | 27.6296153 | 14.5353918 |
| .35 | 15.6425924 | 7.2686338 | 64.8854418 | 29.9636562 | 15.3911035 |
| .36 | 17.1213052 | 7.8057650 | 71.7055664 | 32.5367250 | 16.3142235 |
| .37 | 18.7678745 | 8.3914038 | 79.3941097 | 35.3778391 | 17.3115027 |
| .38 | 20.6038420 | 9.0305860 | 88.0759201 | 38.5189667 | 18.3900023 |
| .39 | 22.6544368 | 9.7291998 | 97.8984175 | 41.9975014 | 19.5580409 |

Table for calculating the covariance matrix

n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 110.2199125 | 25.1706760 | 109.1269865 | 46.6786141 | 5.8086179 |
| .41 | 123.0814810 | 27.7604253 | 121.8804922 | 51.0077777 | 6.3238037 |
| .42 | 137.7078648 | 30.6662679 | 136.3885918 | 55.8222742 | 6.8939674 |
| .43 | 154.3764648 | 33.9327140 | 152.9276466 | 61.1862087 | 7.5259336 |
| .44 | 173.4134350 | 37.6112876 | 171.8226376 | 67.1732521 | 8.2274705 |
| .45 | 195.2066879 | 41.7625036 | 193.4601421 | 73.8695841 | 9.0075994 |
| .46 | 220.2041607 | 46.4544935 | 218.2866993 | 81.3706989 | 9.8761539 |
| .47 | 248.9565277 | 51.7708468 | 246.8512516 | 89.7944994 | 10.8452771 |
| .48 | 282.0993004 | 57.8052640 | 279.7875252 | 99.2707624 | 11.9280716 |
| .49 | 320.4018059 | 64.6699533 | 317.8627396 | 109.9546938 | 13.1401128 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 24.9484551 | 10.4937829 | 109.0326118 | 45.8557572 | 20.8247616 |
| .41 | 27.5189729 | 11.3316655 | 121.6779480 | 50.1419597 | 22.2003257 |
| .42 | 30.4040809 | 12.2510958 | 136.0676517 | 54.9112463 | 23.6960948 |
| .43 | 33.6481676 | 13.2615424 | 152.4770432 | 60.2275605 | 25.3250868 |
| .44 | 37.3026185 | 14.3737081 | 171.2299328 | 66.1643915 | 27.1019187 |
| .45 | 41.4277949 | 15.6000004 | 192.7115650 | 72.8077116 | 29.0435314 |
| .46 | 46.0916748 | 16.9536498 | 217.3670712 | 80.2528238 | 31.1675079 |
| .47 | 51.3776493 | 18.4512625 | 245.7436695 | 88.6173668 | 33.4964538 |
| .48 | 57.3792324 | 20.1102955 | 278.4733009 | 98.0308838 | 36.0533681 |
| .49 | 64.2084112 | 21.9515703 | 316.3210907 | 108.6482944 | 38.8658838 |

Table for calculating the covariance matrix

n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 364.7959137 | 72.4990845 | 362.0063400 | 122.0312586 | 14.4998188 |
| .51 | 416.3781242 | 81.4464035 | 413.3122368 | 135.7094269 | 16.0276086 |
| .52 | 476.4869041 | 91.6972198 | 473.1157722 | 151.2406006 | 17.7478530 |
| .53 | 546.7553588 | 103.4741993 | 543.0465775 | 168.9253025 | 19.6894259 |
| .54 | 629.1369324 | 117.0369329 | 625.0542145 | 189.1099300 | 21.8849602 |
| .55 | 726.0545578 | 132.7034874 | 721.5569382 | 212.2183495 | 24.3741124 |
| .56 | 840.4002533 | 150.8420353 | 835.4418793 | 238.7339745 | 27.2010295 |
| .57 | 975.8994598 | 171.9264622 | 970.4279785 | 269.2833176 | 30.4232051 |
| .58 | 1136.9402771 | 196.4919567 | 1130.8969116 | 304.5593109 | 34.1019173 |
| .59 | 1329.0776520 | 225.2081146 | 1322.3957672 | 345.4286537 | 38.3134317 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 71.9990911 | 23.9996977 | 360.2410274 | 120.6542225 | 41.9667082 |
| .51 | 80.9047699 | 26.2814422 | 411.2434425 | 134.2537261 | 45.3905969 |
| .52 | 91.1104364 | 28.8288231 | 470.7416000 | 149.7086124 | 49.1793451 |
| .53 | 102.8384056 | 31.6796443 | 540.3345871 | 167.3081551 | 53.3821988 |
| .54 | 116.3479195 | 34.8760166 | 621.9681168 | 187.4019184 | 58.0530601 |
| .55 | 131.9565830 | 38.4692788 | 718.0557632 | 210.4131966 | 63.2580929 |
| .56 | 150.0321579 | 42.5154185 | 831.4797897 | 236.8249130 | 69.0676641 |
| .57 | 171.0478973 | 47.0886531 | 965.9526138 | 267.2627716 | 75.5773897 |
| .58 | 195.5384827 | 52.2656193 | 1125.8495026 | 302.4191093 | 82.8822441 |
| .59 | 224.7128249 | 58.1422467 | 1316.7096405 | 343.1598129 | 91.1023159 |

Table for calculating the covariance matrix
n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 1559.3319397 | 258.9070663 | 1551.9350739 | 392.9653130 | 43.1511974 |
| .61 | 1836.5655518 | 298.6179771 | 1828.3662567 | 448.4888611 | 48.7284794 |
| .62 | 2171.4936829 | 345.5338745 | 2162.3927002 | 513.5036545 | 55.1692972 |
| .63 | 2578.2178345 | 401.2156410 | 2568.1009216 | 589.9840622 | 62.6370916 |
| .64 | 3074.8260498 | 467.6190643 | 3063.5602722 | 680.3902588 | 71.3317604 |
| .65 | 3683.8934937 | 547.0938416 | 3671.3268127 | 787.6369247 | 81.4821205 |
| .66 | 4436.1935425 | 642.8339005 | 4422.1458130 | 915.7088242 | 93.4032335 |
| .67 | 5368.8264771 | 758.4561996 | 5353.0931396 | 1069.0081177 | 107.4208689 |
| .68 | 6533.8107300 | 899.0570450 | 6516.1486816 | 1253.7968292 | 124.0079556 |
| .69 | 7992.9800415 | 1070.2372742 | 7973.1166382 | 1476.7578125 | 143.6252460 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .60 | 257.7821999 | 64.8361130 | 1545.5337830 | 390.5577927 | 100.3850336 |
| .61 | 297.3948593 | 72.4888830 | 1821.1623077 | 445.9315224 | 110.9069405 |
| .62 | 344.2029800 | 81.2518663 | 2154.2868652 | 510.7843819 | 122.8512173 |
| .63 | 399.7663460 | 91.3269253 | 2558.9789734 | 587.0893326 | 136.4663010 |
| .64 | 466.0390739 | 102.9597998 | 3053.2892151 | 677.3047180 | 152.0536747 |
| .65 | 545.3697281 | 116.4263716 | 3659.7546387 | 784.3438187 | 169.9438725 |
| .66 | 640.9498291 | 132.1125984 | 4409.0922241 | 912.1885986 | 190.6094913 |
| .67 | 756.3953934 | 150.4020023 | 5338.3538818 | 1065.2399902 | 214.4979210 |
| .68 | 896.7996063 | 171.8650494 | 6499.4805908 | 1249.7565765 | 242.2966843 |
| .69 | 1067.7626648 | 197.0302486 | 7954.2470703 | 1472.4204407 | 274.6050034 |

Table for calculating the covariance matrix

n = 5

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 9849.3308105 | 1281.9833984 | 9826.9090576 | 1750.2529907 | 167.2153893 |
| .71 | 12217.6434326 | 1544.1547546 | 12192.2619629 | 2085.9259338 | 195.5480862 |
| .72 | 15249.8336182 | 1869.3282623 | 15221.0368652 | 2498.5330505 | 229.5669556 |
| .73 | 19219.6437988 | 2282.0983276 | 19186.7924805 | 3018.0694580 | 271.4385986 |
| .74 | 24343.8681641 | 2796.1351929 | 24306.3759766 | 3658.8933411 | 321.6799736 |
| .75 | 31182.9643555 | 3459.6228333 | 31139.8989258 | 4479.4221191 | 384.4028168 |
| .76 | 40269.0888672 | 4308.6123047 | 40219.4755859 | 5519.9652710 | 461.6381226 |
| .77 | 52710.7729492 | 5429.6381326 | 52658.1582081 | 6883.0690308 | 560.0068970 |
| .78 | 69240.3535156 | 6853.6543579 | 69173.6123047 | 8597.0725098 | 679.1945419 |
| .79 | 93134.5615234 | 8840.4318848 | 93055.9082031 | 10973.0339355 | 840.0388184 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .70 | 1279.2625122 | 227.0586624 | 9805.4807129 | 1745.5836639 | 312.8579788 |
| .71 | 1541.1581573 | 262.8261223 | 12167.8734131 | 2080.8891602 | 358.0408897 |
| .72 | 1866.0238800 | 305.4011383 | 15193.2324219 | 2493.0920410 | 411.3535881 |
| .73 | 2278.4406433 | 357.4213905 | 19154.9343262 | 3012.1671442 | 476.0154343 |
| .74 | 2792.0896301 | 419.2465515 | 24269.8767090 | 3652.4923401 | 552.1232605 |
| .75 | 3455.1240540 | 495.8742447 | 31097.8251953 | 4472.4459839 | 645.7733078 |
| .76 | 4303.6041870 | 589.4156799 | 40170.8540039 | 5512.3489990 | 759.0953674 |
| .77 | 5424.0281372 | 707.7068939 | 52596.5346680 | 6874.7025146 | 901.3839645 |
| .78 | 6847.3959961 | 849.5382843 | 69107.8623047 | 8587.9127197 | 1070.1814575 |
| .79 | 8833.3383789 | 1039.9982452 | 92978.2441406 | 10962.8610840 | 1295.7664795 |

Table of covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .20 | 7.3464978 | 1.7534548 | 7.2616331 | 4.9363495 | 0.4383637 |
| .21 | 7.8331130 | 1.8586665 | 7.7367375 | 5.2068968 | 0.4610193 |
| .22 | 8.3647522 | 1.9728175 | 8.2557425 | 5.4974934 | 0.4854251 |
| .23 | 8.9463571 | 2.0968084 | 8.8234982 | 5.8099584 | 0.5117409 |
| .24 | 9.5835252 | 2.2316522 | 9.4455041 | 6.1463119 | 0.5401451 |
| .25 | 10.2825369 | 2.3784732 | 10.1279318 | 6.5087928 | 0.5708336 |
| .26 | 11.0505013 | 2.5385334 | 10.8777742 | 6.8998787 | 0.6040240 |
| .27 | 11.8954540 | 2.7132453 | 11.7029371 | 7.3223217 | 0.6399577 |
| .28 | 12.8265121 | 2.9041964 | 12.6123979 | 7.7791882 | 0.6789031 |
| .29 | 13.8540196 | 3.1131704 | 13.6163465 | 8.2738919 | 0.7211586 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 1.7355338 | 1.1384583 | 8.1764232 | 4.6903316 | 4.2812073 |
| .21 | 1.8384337 | 1.1943066 | 8.6399508 | 4.9455136 | 4.4195591 |
| .22 | 1.9500696 | 1.2538679 | 9.1462469 | 5.2203475 | 4.5653714 |
| .23 | 2.0713284 | 1.3174444 | 9.7000700 | 5.5166263 | 4.7191997 |
| .24 | 2.2032088 | 1.3853728 | 10.3068209 | 5.8363579 | 4.8816625 |
| .25 | 2.3468192 | 1.4580173 | 10.9725628 | 6.1817448 | 5.0534191 |
| .26 | 2.5034050 | 1.5357808 | 11.7041713 | 6.5552413 | 5.2351931 |
| .27 | 2.6743601 | 1.6191051 | 12.5094221 | 6.9595698 | 5.4277726 |
| .28 | 2.8612528 | 1.7084787 | 13.3971528 | 7.3977656 | 5.6320201 |
| .29 | 3.0658454 | 1.8044393 | 14.3773985 | 7.8732085 | 5.8488784 |

Table for calculating the covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 14.9897084 | 3.3421678 | 14.7263460 | 8.8102232 | 0.7670550 |
| .31 | 16.2470098 | 3.5934593 | 15.9556419 | 9.3924576 | 0.8169644 |
| .32 | 17.6411963 | 3.8695969 | 17.3193045 | 10.0253451 | 0.8713000 |
| .33 | 19.1897309 | 4.1734673 | 18.8345728 | 10.7142123 | 0.9305235 |
| .34 | 20.9126315 | 4.5083443 | 20.5212183 | 11.4650481 | 0.9951530 |
| .35 | 22.3832911 | 4.8779517 | 22.4019833 | 12.2846062 | 1.0657710 |
| .36 | 24.9769628 | 5.2865068 | 24.5029614 | 13.1804579 | 1.1430826 |
| .37 | 27.3753860 | 5.7388522 | 26.8544219 | 14.1612411 | 1.2276662 |
| .38 | 30.0631881 | 6.2404441 | 29.4910054 | 15.2365509 | 1.3205036 |
| .39 | 33.0813222 | 6.7976109 | 32.4532614 | 16.4174764 | 1.4224848 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .30 | 3.2901155 | 1.9075770 | 15.4615532 | 8.3896523 | 6.0793687 |
| .31 | 3.5363091 | 2.0185532 | 16.6626770 | 8.9513332 | 6.3246351 |
| .32 | 3.8069512 | 2.1380925 | 17.9956369 | 9.5629594 | 6.5859123 |
| .33 | 4.1048997 | 2.2669992 | 10.2298124 | 10.2298124 | 6.8645607 |
| .34 | 4.4333967 | 2.4061676 | 21.1276350 | 10.9578309 | 7.1620823 |
| .35 | 4.7961317 | 2.5565968 | 22.9686699 | 11.7537173 | 7.4801434 |
| .36 | 5.1972851 | 2.7193909 | 25.0263462 | 12.6249852 | 7.8205645 |
| .37 | 5.6416590 | 2.8958009 | 27.3306029 | 13.5802112 | 8.1854059 |
| .38 | 6.1346650 | 3.0871882 | 29.9157143 | 14.6289240 | 8.5768631 |
| .39 | 6.6825842 | 3.2951219 | 32.8218260 | 15.7821410 | 8.9974816 |

Table for calculating the covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 36.4771080 | 7.4175625 | 35.7880583 | 17.7165082 | 1.5346682 |
| .41 | 40.3055701 | 8.1085753 | 39.5499201 | 19.1478479 | 1.6582529 |
| .42 | 44.6307721 | 8.8801565 | 43.8023577 | 20.7276488 | 1.7945963 |
| .43 | 49.5281024 | 9.7433711 | 48.6201363 | 22.4746015 | 1.9452616 |
| .44 | 55.0853453 | 10.7108978 | 54.0903535 | 24.4098513 | 2.1120082 |
| .45 | 61.4062405 | 11.7975411 | 60.3159685 | 26.5579355 | 2.2968666 |
| .46 | 68.6125965 | 13.0204142 | 67.4179268 | 28.9468925 | 2.5021440 |
| .47 | 76.8492098 | 14.3996038 | 75.5400457 | 31.6094298 | 2.7305155 |
| .48 | 86.2868710 | 15.9584053 | 84.8520212 | 34.5830193 | 2.9850257 |
| .49 | 97.1291656 | 17.7241890 | 95.5562162 | 37.9113307 | 3.2691998 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 7.2925730 | 17.7165082 | 36.0953526 | 17.0522733 | 9.4500427 |
| .41 | 7.9728511 | 3.7677919 | 39.7903214 | 18.4534388 | 9.9376378 |
| .42 | 8.7328631 | 4.0366650 | 43.9696884 | 20.0016990 | 10.4636991 |
| .43 | 9.5836039 | 4.3304701 | 48.7075963 | 21.7156448 | 11.0321739 |
| .44 | 10.5376779 | 4.6519917 | 54.0904541 | 23.6163125 | 11.6473591 |
| .45 | 11.6098057 | 5.0044324 | 60.2204428 | 25.7281191 | 12.3141991 |
| .46 | 12.8170093 | 5.3913860 | 67.2176466 | 28.0789759 | 13.0381633 |
| .47 | 14.1792735 | 5.8170047 | 75.2248964 | 30.7014427 | 13.8255709 |
| .48 | 15.7197825 | 6.2859504 | 84.4104087 | 33.6328406 | 14.6834058 |
| .49 | 17.4657843 | 6.8035847 | 94.9765005 | 36.9166675 | 15.6196579 |

Table for calculating the covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 109.6187897 | 19.7290621 | 107.8939314 | 41.6451082 | 3.5871029 |
| .51 | 124.0485592 | 22.0112500 | 122.1563854 | 45.8444095 | 3.9435153 |
| .52 | 140.7673588 | 24.6154034 | 138.6906796 | 50.5784602 | 4.3438954 |
| .53 | 160.1990948 | 27.5950212 | 157.9186821 | 55.9296918 | 4.7946994 |
| .54 | 182.8523121 | 31.0129542 | 180.3466587 | 61.9936728 | 5.3033317 |
| .55 | 209.3539143 | 34.9457302 | 206.5987740 | 68.8864565 | 5.8787223 |
| .56 | 240.4605370 | 39.4836349 | 237.4286995 | 76.4529314 | 6.5311289 |
| .57 | 277.1071587 | 44.7365022 | 273.7678452 | 85.7263031 | 7.2728540 |
| .58 | 320.4344597 | 50.8352966 | 316.7529907 | 96.0285263 | 8.1181865 |
| .59 | 371.8676071 | 57.9410710 | 367.8045883 | 107.8845863 | 9.0844550 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 19.4492500 | 7.3760352 | 107.1618938 | 40.6034813 | 16.6433802 |
| .51 | 21.7082498 | 8.0104856 | 121.2566090 | 44.7531247 | 17.7651920 |
| .52 | 24.2872665 | 8.7150130 | 137.6059657 | 49.4345984 | 18.9968133 |
| .53 | 27.2396097 | 9.4991384 | 156.6297855 | 54.7300773 | 20.3520567 |
| .54 | 30.6279266 | 10.3736154 | 178.8320560 | 60.7348623 | 21.8462431 |
| .55 | 34.5284982 | 11.3514458 | 204.8342228 | 67.5646715 | 23.4980567 |
| .56 | 39.0313520 | 12.4472947 | 235.3869514 | 75.3540564 | 25.3281038 |
| .57 | 44.2460208 | 13.6787156 | 271.4181366 | 84.2658281 | 27.3610833 |
| .58 | 50.3031459 | 15.0657687 | 214.0606079 | 94.4915304 | 29.6247034 |
| .59 | 57.3633990 | 16.6327717 | 364.7301369 | 106.2656498 | 32.1526656 |

Table for Calculating the covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 433.1878395 | 66.2513914 | 428.6982918 | 121.5805788 | 10.1925255 |
| .61 | 506.6062431 | 76.0056915 | 501.6390381 | 137.4586449 | 11.4670141 |
| .62 | 594.8665619 | 87.4932375 | 589.3664262 | 155.9269199 | 12.9367499 |
| .63 | 701.5563431 | 101.0892162 | 695.4499054 | 177.5161800 | 14.6391503 |
| .64 | 831.0933838 | 117.2388191 | 824.3065796 | 202.8428593 | 16.6165352 |
| .65 | 989.2285614 | 136.5124302 | 981.6722183 | 232.6948185 | 18.9225290 |
| .66 | 1183.5264282 | 159.6478786 | 1175.0959473 | 268.0878677 | 21.6256146 |
| .67 | 1423.3261871 | 187.5142288 | 1413.9019623 | 310.1868629 | 24.8014913 |
| .68 | 1721.3681793 | 221.2893238 | 1710.8089752 | 360.5806732 | 28.5534782 |
| .69 | 2093.7874756 | 262.3998184 | 2081.9300842 | 421.1515579 | 32.9996157 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .60 | 65.6238899 | 18.4088387 | 425.1967964 | 119.8736830 | 34.9851494 |
| .61 | 75.3235788 | 20.4277906 | 497.6593361 | 135.6571827 | 38.1680079 |
| .62 | 86.7512083 | 22.7286496 | 584.8472443 | 154.0236397 | 41.7532721 |
| .63 | 100.2812662 | 25.3627083 | 690.3298569 | 175.5029030 | 45.8107648 |
| .64 | 116.3582640 | 28.3682450 | 818.5055847 | 200.7106152 | 50.4142618 |
| .65 | 135.5517426 | 31.8708458 | 975.1010818 | 230.4335651 | 55.6584492 |
| .66 | 158.5983753 | 35.9080839 | 1167.6500702 | 265.6861000 | 61.6650887 |
| .67 | 186.3664036 | 40.5951996 | 1405.4617004 | 307.6321564 | 68.5570107 |
| .68 | 220.0321960 | 46.0676174 | 1701.2331696 | 357.8587456 | 76.5107288 |
| .69 | 261.0211678 | 52.4751735 | 2071.0554810 | 418.2467728 | 85.7140093 |

Table for Calculating the covariance matrix

n = 6

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 2563.7717285 | 312.9064046 | 2550.4168701 | 494.6569557 | 38.3151035 |
| .71 | 3160.3452759 | 375.2352982 | 3145.2615356 | 584.2401886 | 44.6892552 |
| .72 | 3923.3305969 | 452.6413994 | 3906.2430725 | 694.1058731 | 52.3717918 |
| .73 | 4911.0516968 | 549.8737259 | 4891.6174927 | 830.4352798 | 61.7321572 |
| .74 | 6191.8340454 | 671.9151535 | 6169.6730347 | 999.3494720 | 73.0954819 |
| .75 | 7881.7846680 | 827.7466202 | 7856.3960571 | 1212.4146729 | 87.1313305 |
| .76 | 10126.9755859 | 1027.6596222 | 10097.7705078 | 1482.3331604 | 104.5079203 |
| .77 | 13154.2570801 | 1287.6333771 | 13120.4843750 | 1829.0519562 | 126.2925129 |
| .78 | 17251.0197754 | 1625.8890991 | 17211.8310547 | 2274.3389588 | 153.5181103 |
| .79 | 22979.0388184 | 2081.0124207 | 22933.1535645 | 2866.6016846 | 188.7745037 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .70 | 311.3914490 | 60.0476413 | 2538.0442200 | 491.5502663 | 96.4679441 |
| .71 | 373.5676231 | 69.0212374 | 3131.1592407 | 580.9108353 | 109.0635748 |
| .72 | 450.8021240 | 79.7086983 | 3890.1363525 | 690.5303497 | 123.8895826 |
| .73 | 547.8395233 | 92.5822887 | 4873.1632080 | 826.5842285 | 141.5492058 |
| .74 | 669.6629257 | 108.0166893 | 6148.4915161 | 995.1947250 | 162.4603405 |
| .75 | 825.2444229 | 126.8649397 | 7831.9862671 | 1207.9170837 | 187.7128410 |
| .76 | 1024.8723907 | 149.9219208 | 10069.5430908 | 1477.4506836 | 218.2412052 |
| .77 | 1284.5181372 | 178.4960136 | 13087.6889648 | 1823.7318573 | 255.6464844 |
| .78 | 1622.4011688 | 213.7597351 | 17173.6179199 | 2268.5301208 | 301.2340569 |
| .79 | 2077.0785522 | 258.9525871 | 22888.2426758 | 2860.2155752 | 359.0701370 |

Table for Calculating the covariance matrix

$n = 7$

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| .20 | 4.0693409 | 0.8487614 | 4.0082251 | 2.9778604 | 0.1886136 |
| .21 | 4.2922132 | 0.8911364 | 4.2230241 | 3.1133727 | 0.1966474 |
| .22 | 4.5338610 | 0.9368218 | 4.4558421 | 3.2578255 | 0.2052587 |
| .23 | 4.7962366 | 0.9861371 | 4.7085727 | 3.4119878 | 0.2144987 |
| .24 | 5.0815334 | 1.0394388 | 4.9833460 | 3.5767097 | 0.2244243 |
| .25 | 5.3922073 | 1.0971227 | 5.2825476 | 3.7529241 | 0.2350977 |
| .26 | 5.7310251 | 1.1596312 | 5.6088691 | 3.9416642 | 0.2465883 |
| .27 | 6.1011009 | 1.2274580 | 5.9653410 | 4.1440709 | 0.2589724 |
| .28 | 6.5059503 | 1.3011559 | 6.3553882 | 4.3614083 | 0.2723350 |
| .29 | 6.9495499 | 1.3813447 | 6.7828881 | 4.5950804 | 0.2867704 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 0.8373965 | 0.5977970 | 4.9465922 | 2.7460355 | 3.1107784 |
| .21 | 0.8783321 | 0.6222634 | 5.1532149 | 2.8680632 | 3.1817825 |
| .22 | 0.9224548 | 0.6481900 | 5.3770866 | 2.9987979 | 3.2559863 |
| .23 | 0.9700762 | 0.6756912 | 5.6200412 | 3.1389953 | 3.3336385 |
| .24 | 1.0215443 | 0.7048931 | 5.8841444 | 3.2894918 | 3.4150105 |
| .25 | 1.0772453 | 0.7359324 | 6.1717111 | 3.4512044 | 3.5003922 |
| .26 | 1.1376118 | 0.7689593 | 6.4853567 | 3.6251500 | 3.5901001 |
| .27 | 1.2031266 | 0.8041385 | 6.8280271 | 3.8124506 | 3.6844756 |
| .28 | 1.2743306 | 0.8416507 | 7.2030562 | 4.0143508 | 3.7838902 |
| .29 | 1.3518313 | 0.8816950 | 7.6142211 | 4.2322329 | 3.8887491 |

Table for Calculating the Covariance matrix

n = 7

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 7.4363879 | 1.4687174 | 7.2522200 | 4.8466371 | 0.3023830 |
| .31 | 7.9715798 | 1.5640576 | 7.7683798 | 5.1178183 | 0.3192899 |
| .32 | 8.5609179 | 1.6682436 | 8.3370289 | 5.4105479 | 0.3376207 |
| .33 | 9.2110108 | 1.7822681 | 8.9646320 | 5.7269815 | 0.3575209 |
| .34 | 9.9293892 | 1.9072516 | 9.6585611 | 6.0695234 | 0.3791524 |
| .35 | 10.7246703 | 2.0444634 | 10.4272596 | 6.4408699 | 0.4026973 |
| .36 | 11.6067302 | 2.1953438 | 11.2804105 | 6.8440496 | 0.4283598 |
| .37 | 12.5869051 | 2.3615288 | 12.2291385 | 7.2824629 | 0.4563691 |
| .38 | 13.6782215 | 2.5448775 | 13.2862346 | 7.7599310 | 0.4869828 |
| .39 | 14.8957466 | 2.7475190 | 14.4665072 | 8.2807883 | 0.5204927 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| ~~x~~ | (+) | (+) | (+) | (+) | (+) |
| .30 | 1.4363079 | 0.9244886 | 8.0657916 | 4.4676234 | 3.9994867 |
| .31 | 1.5285291 | 0.9702741 | 8.5626435 | 4.7222367 | 4.1165877 |
| .32 | 1.6293570 | 1.0193164 | 9.1103064 | 4.9979694 | 4.2405710 |
| .33 | 1.7399574 | 1.0719098 | 9.7151010 | 5.2969478 | 4.3720095 |
| .34 | 1.8608615 | 1.1283792 | 10.3842394 | 5.6215439 | 4.5115275 |
| .35 | 1.9938884 | 1.1890854 | 11.1259915 | 5.9744198 | 4.6598116 |
| .36 | 2.1402659 | 1.2544298 | 11.9498463 | 6.3585662 | 4.8176194 |
| .37 | 2.3016059 | 1.3248581 | 12.8667164 | 6.7773436 | 4.9857811 |
| .38 | 2.4797410 | 1.4008652 | 13.8891575 | 7.2345291 | 5.1652085 |
| .39 | 2.6767716 | 1.4830080 | 15.0317186 | 7.7344103 | 5.3569210 |

Table for Calculating the covariance matrix

n = 7

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 16.2568634 | 2.9718803 | 15.7870498 | 8.8499186 | 0.5572276 |
| .41 | 17.7817333 | 3.2207454 | 17.2677052 | 9.4728633 | 0.5975597 |
| .42 | 19.4937599 | 3.4973071 | 18.9315207 | 10.1559060 | 0.6419108 |
| .43 | 21.4202609 | 3.8052506 | 20.8054185 | 10.9062289 | 0.6907621 |
| .44 | 23.5930588 | 4.1488122 | 22.9207811 | 11.7319833 | 0.7446587 |
| .45 | 26.0495269 | 4.5329094 | 25.3144858 | 12.6425457 | 0.8042259 |
| .46 | 28.8334882 | 4.9632310 | 28.0298040 | 13.6486298 | 0.8701769 |
| .47 | 31.9966278 | 5.4464005 | 31.1178014 | 14.7625798 | 0.9433309 |
| .48 | 35.5999565 | 5.9901283 | 34.6387935 | 15.9985999 | 1.0246273 |
| .49 | 39.7158861 | 6.6034421 | 38.6644063 | 17.3731439 | 1.1151509 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 2.8950931 | 1.5719056 | 16.3112037 | 8.2818191 | 5.5620379 |
| .41 | 3.1374550 | 1.6682528 | 17.7471364 | 8.8822414 | 5.7818037 |
| .42 | 3.4070125 | 1.7728280 | 19.3622081 | 9.5419005 | 6.0175966 |
| .43 | 3.7074095 | 1.8865120 | 21.1829455 | 10.2679133 | 6.2709669 |
| .44 | 4.0428370 | 2.0102893 | 23.2402897 | 11.0683601 | 6.5436222 |
| .45 | 4.4181625 | 2.1452817 | 25.5706232 | 11.9525386 | 6.8374999 |
| .46 | 4.8390198 | 2.2927520 | 28.2166657 | 12.9310783 | 7.1547526 |
| .47 | 5.3119721 | 2.4541378 | 31.2288632 | 14.0162305 | 7.4978119 |
| .48 | 5.8446625 | 2.6310695 | 34.6668363 | 15.2220984 | 7.8694047 |
| .49 | 6.4460449 | 2.8254116 | 38.6014256 | 16.5650239 | 8.2726263 |

Table for calculating the covariance matrix

n = 7

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 44.4304395 | 7.2969101 | 43.2797818 | 18.9053455 | 1.2161518 |
| .51 | 49.8464599 | 8.0829899 | 48.5867586 | 20.6171174 | 1.3290824 |
| .52 | 56.0869365 | 8.9763486 | 54.7071962 | 22.5345933 | 1.4556243 |
| .53 | 63.3004241 | 9.9944574 | 61.7883496 | 24.6881766 | 1.5977535 |
| .54 | 71.6639967 | 11.1577228 | 70.0058613 | 27.1128380 | 1.7577238 |
| .55 | 81.3959942 | 12.4910567 | 79.5763550 | 29.8512440 | 1.9382678 |
| .56 | 92.7584057 | 14.0236971 | 90.7599277 | 32.9524832 | 2.1425098 |
| .57 | 106.0755396 | 15.7913868 | 103.8786488 | 36.4763064 | 2.3742297 |
| .58 | 121.7393875 | 17.8363118 | 119.3220320 | 40.4918385 | 2.6377649 |
| .59 | 140.2379646 | 20.2102356 | 137.5751743 | 45.0833812 | 2.9383687 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 7.1266055 | 3.0392876 | 43.1168904 | 18.0639195 | 8.7109601 |
| .51 | 7.8987104 | 3.2751445 | 48.3140688 | 19.7408631 | 9.1883954 |
| .52 | 8.7769256 | 3.5357811 | 54.3136864 | 21.6215394 | 9.7094408 |
| .53 | 9.7786075 | 3.8244653 | 61.2617021 | 23.7362857 | 10.2793458 |
| .54 | 10.9240142 | 4.1448407 | 69.3323250 | 26.1199043 | 10.9037915 |
| .55 | 12.2379915 | 4.5013584 | 78.7404642 | 28.8148444 | 11.5898596 |
| .56 | 13.7495410 | 4.8989819 | 89.7443228 | 31.8699803 | 12.3451904 |
| .57 | 15.4942486 | 5.3437256 | 102.6637335 | 35.3448014 | 13.1791327 |
| .58 | 17.5141087 | 5.8423183 | 117.8857346 | 39.3081741 | 14.1018035 |
| .59 | 19.8606555 | 6.4029003 | 135.8924999 | 43.8440900 | 15.1255164 |

Table for Calculating the variance matrix

n = 7

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 162.1810665 | 22.9767916 | 159.2443619 | 50.3538308 | 3.2823996 |
| .61 | 188.3180637 | 26.2122507 | 185.0751343 | 56.4240713 | 3.6772595 |
| .62 | 219.5977859 | 30.0116427 | 216.0116062 | 63.4439654 | 4.1320285 |
| .63 | 257.2088051 | 34.4912829 | 253.2370644 | 71.5940924 | 4.6575833 |
| .64 | 302.6657372 | 39.7965155 | 298.2596779 | 81.0982161 | 5.2671871 |
| .65 | 357.8834000 | 46.1064081 | 352.9870110 | 92.2275133 | 5.9767599 |
| .66 | 425.3884964 | 53.6542921 | 419.9362370 | 105.3355970 | 6.8068897 |
| .67 | 508.3388672 | 52.7208319 | 502.2552986 | 120.8358793 | 7.7811589 |
| .68 | 610.9581375 | 73.6763725 | 604.1547394 | 139.2743320 | 8.9304743 |
| .69 | 738.6939011 | 86.9828062 | 731.0673828 | 161.3185329 | 10.2918674 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| .60 | 22.5972497 | 7.0352891 | 157.2868061 | 49.0550551 | 16.2651401 |
| .61 | 25.7998872 | 7.7506316 | 182.8103695 | 55.0616002 | 17.5370078 |
| .62 | 29.5632460 | 8.5626210 | 213.4025879 | 62.0131054 | 18.9613547 |
| .63 | 34.0032768 | 9.4873134 | 250.2414665 | 70.0896778 | 20.5614128 |
| .64 | 39.2648697 | 10.5442818 | 294.8287125 | 79.5144739 | 22.3654768 |
| .65 | 45.5266204 | 11.7565109 | 349.0646477 | 90.5580769 | 24.4060233 |
| .66 | 53.0211940 | 13.1540550 | 415.4569283 | 103.5731831 | 26.7264400 |
| .67 | 62.0286684 | 14.7699850 | 497.1435928 | 118.9725180 | 29.3719718 |
| .68 | 72.9185514 | 16.6481471 | 598.3220596 | 137.3009434 | 32.4040313 |
| .69 | 86.1518736 | 18.8397684 | 724.4104462 | 159.2250004 | 35.8921900 |

Table for Calculating the covariance matrix

n = 7

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 899.0403061 | 103.2683182 | 890.4670944 | 187.8789291 | 11.9155792 |
| .71 | 1101.5900116 | 123.3002930 | 1091.9259338 | 220.0342484 | 13.8593432 |
| .72 | 1359.6994019 | 148.1313515 | 1348.7713165 | 259.2668991 | 16.2018754 |
| .73 | 1691.6623688 | 179.1615257 | 1679.2614594 | 307.5248756 | 19.0447268 |
| .74 | 2121.4527893 | 218.1310406 | 2107.3348083 | 367.1574249 | 22.5056129 |
| .75 | 2685.2838440 | 267.6744423 | 2669.1415405 | 441.7828674 | 26.7674749 |
| .76 | 3431.5426941 | 331.1058083 | 3413.0083008 | 535.8034058 | 32.0425491 |
| .77 | 4433.1982422 | 413.3561478 | 4411.8069458 | 655.8024521 | 38.6471405 |
| .78 | 5787.0702515 | 520.4741592 | 5762.2780151 | 809.5276718 | 46.9281445 |
| .79 | 7663.3482666 | 663.4663773 | 7634.3939819 | 1011.6112213 | 57.5735421 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| .70 | 102.3555288 | 21.4153626 | 882.8623276 | 185.6533928 | 39.9346652 |
| .71 | 122.2958479 | 24.4525441 | 1083.2290955 | 217.6636772 | 44.6333947 |
| .72 | 147.0237942 | 28 .0582020 | 1338.8093262 | 256.7361374 | 50.1328826 |
| .73 | 177.9373932 | 32.3992551 | 1667.8253937 | 304.8162422 | 56.6152520 |
| .74 | 216.7754784 | 37.5371399 | 2094.1804504 | 364.2518997 | 64.2712746 |
| .75 | 266.1689034 | 43.8072653 | 2653.9617004 | 438.6564941 | 73.4294424 |
| .76 | 329.4291763 | 51.4505968 | 3395.4350281 | 532.4295349 | 84.4305630 |
| .77 | 411.4823532 | 60.8789601 | 4391.3755493 | 652.1480484 | 97.8084993 |
| .78 | 518.3751602 | 72.5150547 | 5738.4442139 | 805.5585327 | 114.0667334 |
| .79 | 661.1013489 | 87.2637568 | 7606.3969727 | 1007.2758408 | 134.3990364 |

Table for Calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .20 | 2.6250174 | 0.4850060 | 2.5781878 | 2.0464101 | 0.0970012 |
| .21 | 2.7461174 | 0.5055149 | 2.6932585 | 2.1255279 | 0.1004671 |
| .22 | 2.8765625 | 0.5275023 | 2.8171340 | 2.2093012 | 0.1041650 |
| .23 | 3.0172742 | 0.5511050 | 2.9506960 | 2.2981129 | 0.1081149 |
| .24 | 3.1692323 | 0.5764745 | 3.0949310 | 2.3923838 | 0.1123386 |
| .25 | 3.3337376 | 0.6037793 | 3.2509429 | 2.4925756 | 0.1168605 |
| .26 | 3.5119287 | 0.6332065 | 3.4199684 | 2.5991960 | 0.1217072 |
| .27 | 3.7053020 | 0.6649644 | 3.6033972 | 2.7128046 | 0.1269082 |
| .28 | 3.9154856 | 0.6992863 | 3.8027963 | 2.8340206 | 0.1324964 |
| .29 | 4.1443105 | 0.7364322 | 4.0199289 | 2.9635268 | 0.1385078 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 0.4772391 | 0.3632095 | 3.5306999 | 1.8237984 | 2.5100822 |
| .21 | 0.4967835 | 0.3758787 | 3.6396070 | 1.8906522 | 2.5506202 |
| .22 | 0.5177268 | 0.3892255 | 3.7567602 | 1.9620351 | 2.5926156 |
| .23 | 0.5402004 | 0.4033014 | 3.8830001 | 2.0383229 | 2.6361998 |
| .24 | 0.5643508 | 0.4181627 | 4.0192685 | 2.1199285 | 2.6815149 |
| .25 | 0.5903405 | 0.4338708 | 4.1666207 | 2.2073046 | 2.7287130 |
| .26 | 0.6183502 | 0.4504925 | 4.3262407 | 2.3009489 | 2.7779583 |
| .27 | 0.6485816 | 0.4681011 | 4.4994600 | 2.4014096 | 2.8294275 |
| .28 | 0.6812605 | 0.4867769 | 4.6877834 | 2.5092936 | 2.8833132 |
| .29 | 0.7166389 | 0.5066078 | 4.8929049 | 2.6252699 | 2.9398221 |

Table for calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 4.3938380 | 0.7766924 | 4.2567824 | 3.1020758 | 0.1449826 |
| .31 | 4.6664073 | 0.8203941 | 4.5156151 | 3.2505085 | 0.1519656 |
| .32 | 4.9646611 | 0.8679035 | 4.7989802 | 3.4097543 | 0.1595066 |
| .33 | 5.2915948 | 0.9196326 | 5.1097761 | 3.5808451 | 0.1676609 |
| .34 | 5.6506180 | 0.9760459 | 5.4513044 | 3.7649327 | 0.1764905 |
| .35 | 6.0456119 | 1.0376677 | 5.8273283 | 3.9639010 | 0.1860646 |
| .36 | 6.4810081 | 1.1050914 | 6.2421489 | 4.1773866 | 0.1964607 |
| .37 | 6.9618757 | 1.1789891 | 6.7006913 | 4.4087963 | 0.2077659 |
| .38 | 7.4940245 | 1.2601240 | 7.2086065 | 4.6593329 | 0.2200780 |
| .39 | 8.0841345 | 1.3493649 | 7.7723988 | 4.9310247 | 0.2335071 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .30 | 0.7549985 | 0.5276898 | 5.1167369 | 2.7500756 | 2.9991763 |
| .31 | 0.7966572 | 0.5501295 | 5.3614555 | 2.8845354 | 3.0616222 |
| .32 | 0.8419711 | 0.5740437 | 5.6295239 | 3.0295603 | 3.1274205 |
| .33 | 0.8913411 | 0.5995605 | 5.9237417 | 3.1861623 | 3.1968595 |
| .34 | 0.9452197 | 0.6268221 | 6.2473019 | 3.3554716 | 3.2702510 |
| .35 | 1.0041185 | 0.6559855 | 6.6038491 | 3.5387488 | 3.3479350 |
| .36 | 1.0686165 | 0.6872247 | 6.9975526 | 3.7374045 | 3.4302847 |
| .37 | 1.1393705 | 0.7207324 | 7.4331931 | 3.9530180 | 3.5177070 |
| .38 | 1.2171270 | 0.7567227 | 7.9162619 | 4.1873619 | 3.6106480 |
| .39 | 1.3027364 | 0.7954343 | 8.4530872 | 4.4424319 | 3.7095993 |

Table for calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 8.7399038 | 1.4477033 | 8.3995709 | 5.2261592 | 0.2481777 |
| .41 | 9.4702075 | 1.5562700 | 9.0987827 | 5.5473098 | 0.2642300 |
| .42 | 10.2853363 | 1.6763627 | 9.8800836 | 5.8973973 | 0.2818233 |
| .43 | 11.1972313 | 1.8094711 | 10.7551486 | 6.2797320 | 0.3011983 |
| .44 | 12.2197706 | 1.9573062 | 11.7375575 | 6.6980653 | 0.3223799 |
| .45 | 13.3691926 | 2.1218491 | 12.8432164 | 7.1566944 | 0.3457828 |
| .46 | 14.6644746 | 2.3053866 | 14.0907303 | 7.6605125 | 0.3716146 |
| .47 | 16.1278906 | 2.5105699 | 15.5019560 | 8.2151188 | 0.4001811 |
| .48 | 17.7856920 | 2.7404864 | 17.1026785 | 8.8269551 | 0.4318343 |
| .49 | 19.6688991 | 2.9987377 | 18.9233894 | 9.5034425 | 0.4669790 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 1.3971703 | 0.8371837 | 9.0509756 | 4.7204795 | 3.8151041 |
| .41 | 1.5015375 | 0.8821171 | 9.7183708 | 5.0240399 | 3.9277553 |
| .42 | 1.6171118 | 0.9307178 | 10.4650816 | 5.3559917 | 4.0482155 |
| .43 | 1.7453567 | 0.9833093 | 11.3025157 | 5.7196000 | 4.1772165 |
| .44 | 1.8879544 | 1.0403094 | 12.2439550 | 6.1185666 | 4.3155656 |
| .45 | 2.0468543 | 1.1021927 | 13.3049721 | 6.5571347 | 4.4641744 |
| .46 | 2.2243079 | 1.1694921 | 14.5038005 | 7.0401384 | 4.6240510 |
| .47 | 2.4229283 | 1.2428104 | 15.8618799 | 7.5731130 | 4.7963210 |
| .48 | 2.6457602 | 1.3228327 | 17.4045279 | 8.1624306 | 4.9822530 |
| .49 | 2.8963578 | 1.4103386 | 19.1617091 | 8.8154349 | 5.1832742 |

Table for Calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 21.8142266 | 3.2895291 | 21.0002136 | 10.2531240 | 0.5060814 |
| .51 | 24.2654490 | 3.6178106 | 23.3762515 | 11.0859466 | 0.5496829 |
| .52 | 27.0747235 | 3.9893970 | 26.1029122 | 12.0134281 | 0.5984096 |
| .53 | 30.3046806 | 4.4111697 | 29.2419338 | 13.0490352 | 0.6529921 |
| .54 | 34.0302944 | 4.8912427 | 32.8673477 | 14.2083983 | 0.7142768 |
| .55 | 38.3427949 | 5.4393587 | 37.0692444 | 15.5101347 | 0.7832678 |
| .56 | 43.3521752 | 6.0670587 | 41.9563403 | 16.9759178 | 0.8611310 |
| .57 | 49.1929779 | 6.7882553 | 47.6617093 | 18.6315951 | 0.9492520 |
| .58 | 56.0289674 | 7.6195709 | 54.3474402 | 20.5075381 | 1.0492525 |
| .59 | 64.0626831 | 8.5812575 | 62.2141147 | 22.6404040 | 1.1630798 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 3.1788747 | 1.5062127 | 21.1689560 | 9.5405856 | 5.4009801 |
| .51 | 3.4982026 | 1.6114734 | 23.4686985 | 10.3477368 | 5.6271980 |
| .52 | 4.2713513 | 1.8549786 | 29.1584952 | 12.2556432 | 6.1736766 |
| .53 | 3.8600916 | 1.7272819 | 26.1115856 | 11.2483042 | 5.8939804 |
| .54 | 4.7400161 | 1.9960908 | 32.6824837 | 13.3852625 | 6.4789128 |
| .55 | 5.2757373 | 2.1524233 | 36.7725143 | 14.6556381 | 6.8128064 |
| .56 | 5.8899553 | 2.3260320 | 41.5360274 | 16.0882924 | 7.1788252 |
| .57 | 6.5964687 | 2.5193400 | 47.1046276 | 17.7089033 | 7.5810422 |
| .58 | 7.4117739 | 2.7351332 | 43.6387296 | 19.5476582 | 8.0240424 |
| .59 | 8.3559767 | 2.9767374 | 61.3369584 | 21.6410003 | 8.5133041 |

Table for calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 73.5442829 | 9.6978812 | 71.5096169 | 25.0740416 | 1.2930510 |
| .61 | 84.7832985 | 10.9992460 | 82.5408945 | 27.8607790 | 1.4419184 |
| .62 | 98.1687775 | 12.5221910 | 95.6938896 | 31.0647166 | 1.6130283 |
| .63 | 114.1876202 | 14.3118633 | 111.4519539 | 34.7630973 | 1.8103899 |
| .64 | 133.4564915 | 16.4243333 | 130.4275322 | 39.0507011 | 2.0388821 |
| .65 | 156.7572212 | 18.9291306 | 153.3975563 | 44.0432034 | 2.3044166 |
| .66 | 185.1023693 | 21.9147346 | 181.3685493 | 49.8867126 | 2.6143900 |
| .67 | 219.7797375 | 25.4905488 | 215.6214905 | 56.7579274 | 2.9776580 |
| .68 | 262.4854355 | 29.7980907 | 257.8439522 | 64.8839493 | 3.4054974 |
| .69 | 315.4190063 | 35.0157194 | 310.2255821 | 74.5454578 | 3.9116681 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .60 | 9.4534765 | 3.2480572 | 70.4449234 | 24.0325339 | 9.0551795 |
| .61 | 10.7338959 | 3.5536501 | 81.2669907 | 26.7743349 | 9.6569322 |
| .62 | 12.2338545 | 3.8990298 | 94.1859970 | 29.9301851 | 10.3273727 |
| .63 | 13.9982598 | 4.2906838 | 109.6817465 | 33.5769973 | 11.0766495 |
| .64 | 16.0829008 | 4.7364300 | 128.3624611 | 37.8091593 | 11.9169142 |
| .65 | 18.5569935 | 5.2455807 | 151.0001793 | 42.7419238 | 12.8623881 |
| .66 | 21.5086257 | 5.8297739 | 178.5953884 | 48.5208492 | 13.9309509 |
| .67 | 25.0467918 | 6.5025625 | 212.4222469 | 55.3221045 | 15.1427070 |
| .68 | 29.3124886 | 7.2812092 | 254.1597881 | 63.3720794 | 16.5235074 |
| .69 | 34.4835057 | 8.1863036 | 305.9877548 | 72.9507198 | 18.1033573 |

Table for calculating the covariance matrix

n = 8

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 381.5409927 | 41.3792000 | 375.7141647 | 86.1116428 | 4.5140954 |
| .71 | 464.7106400 | 49.1851053 | 458.1548157 | 100.0349464 | 5.2343804 |
| .72 | 570.2220535 | 58.8324275 | 562.8229218 | 116.9217708 | 6.1011437 |
| .73 | 705.3251190 | 70.8531418 | 696.9449387 | 137.5696449 | 7.1515308 |
| .74 | 879.5510254 | 85.9137411 | 870.0280838 | 162.9450741 | 8.4292817 |
| .75 | 1107.1694794 | 105.0113935 | 1096.3012238 | 194.5202217 | 10.0010921 |
| .76 | 1407.1304169 | 129.3942719 | 1393.6749725 | 234.0623112 | 11.9440997 |
| .77 | 1808.1331940 | 160.9344730 | 1793.7848358 | 284.2469864 | 14.3747271 |
| .78 | 2348.5166626 | 201.9593716 | 2331.9133301 | 348.2465515 | 17.4239757 |
| .79 | 3091.4346619 | 256.3423080 | 3072.0952454 | 431.4883652 | 21.3195720 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .70 | 40.7948565 | 9.2447411 | 370.8412018 | 84.4261875 | 19.9219251 |
| .71 | 48.5423775 | 10.4878470 | 452.5510864 | 98.2500296 | 22.0234079 |
| .72 | 58.1240320 | 11.9573172 | 556.3741074 | 115.0270891 | 24.4675481 |
| .73 | 70.0705347 | 13.7066925 | 689.5132751 | 135.5538216 | 27.3303692 |
| .74 | 85.0473719 | 15.7959718 | 861.4517899 | 160.7951450 | 30.6915612 |
| .75 | 104.0494518 | 18.3208327 | 1086.3777771 | 192.2201900 | 34.6877723 |
| .76 | 128.3233490 | 21.3852553 | 1383.1624908 | 231.5945263 | 39.4556623 |
| .77 | 159.7379227 | 25.1508026 | 1780.3774872 | 281.5894127 | 45.2180700 |
| .78 | 200.6189117 | 29.7863696 | 2316.2490845 | 345.3759613 | 52.1859889 |
| .79 | 254.8335323 | 35.6044555 | 3053.6930237 | 428.3730240 | 60.7880993 |

Table for Calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .20 | 1.8650043 | 0.3087890 | 1.8274539 | 1.5259924 | 0.0561435 |
| .21 | 1.9388379 | 0.3200490 | 1.8965631 | 1.5771867 | 0.0578578 |
| .22 | 2.0179299 | 0.3320623 | 1.9705257 | 1.6310723 | 0.0596794 |
| .23 | 2.1027721 | 0.3448956 | 2.0498053 | 1.6878610 | 0.0616171 |
| .24 | 2.1939129 | 0.3586235 | 2.1349200 | 1.7477860 | 0.0636806 |
| .25 | 2.2919632 | 0.3733247 | 2.2264470 | 1.8111027 | 0.0658808 |
| .26 | 2.3976038 | 0.3890927 | 2.3250309 | 1.8780903 | 0.0682295 |
| .27 | 2.5115973 | 0.4060271 | 2.4313942 | 1.9490572 | 0.0707398 |
| .28 | 2.6347977 | 0.4242400 | 2.5463476 | 2.0243421 | 0.0734262 |
| .29 | 2.7681639 | 0.4438562 | 2.6708021 | 2.1043190 | 0.0763046 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 0.3031736 | 0.2425453 | 2.7891318 | 1.3097346 | 2.1537270 |
| .21 | 0.3137492 | 0.2499018 | 2.8533569 | 1.3495002 | 2.1781618 |
| .22 | 0.3250237 | 0.2576103 | 2.9220079 | 1.3919037 | 2.2032189 |
| .23 | 0.3370602 | 0.2656968 | 2.9955183 | 1.4371540 | 2.2289756 |
| .24 | 0.3499291 | 0.2741896 | 3.0743740 | 1.4854806 | 2.2555158 |
| .25 | 0.3637081 | 0.2831197 | 3.1591168 | 1.5371344 | 2.2829300 |
| .26 | 0.3784836 | 0.2925208 | 3.2503534 | 1.5923894 | 2.3113140 |
| .27 | 0.3943518 | 0.3024297 | 3.3487643 | 1.6515473 | 2.3407723 |
| .28 | 0.4114198 | 0.3128866 | 3.4551152 | 1.7149396 | 2.3714169 |
| .29 | 0.4298074 | 0.3239357 | 3.5702675 | 1.7829320 | 2.4033690 |

Table for calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 2.9127699 | 0.4650147 | 2.8057796 | 2.1893976 | 0.0793928 |
| .31 | 3.0698314 | 0.4878716 | 2.9524383 | 2.3800356 | 0.0827104 |
| .32 | 3.2407162 | 0.5126015 | 3.1120833 | 2.3767363 | 0.0862795 |
| .33 | 3.4269701 | 0.5393999 | 3.2861912 | 2.4800574 | 0.0901242 |
| .34 | 3.6303462 | 0.5684869 | 3.4764390 | 2.5906198 | 0.0942717 |
| .35 | 3.8528326 | 0.6001104 | 3.6847320 | 2.7091123 | 0.0987523 |
| .36 | 4.0966926 | 0.6345500 | 3.9132405 | 2.8363044 | 0.1036000 |
| .37 | 4.3645053 | 0.6721219 | 4.1644426 | 2.9730531 | 0.1088527 |
| .38 | 4.6592171 | 0.7131840 | 4.4411721 | 3.1203172 | 0.1145529 |
| .39 | 4.9842040 | 0.7581428 | 4.7466812 | 3.2791721 | 0.1207486 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .30 | 0.4496477 | 0.3356247 | 3.6951890 | 1.8559245 | 2.4367568 |
| .31 | 0.4710909 | 0.3480070 | 3.8309792 | 1.9343640 | 2.4717227 |
| .32 | 0.4943046 | 0.3611404 | 3.9788786 | 2.0187419 | 2.5084179 |
| .33 | 0.5194771 | 0.3750888 | 4.1402933 | 2.1096026 | 2.5470057 |
| .34 | 0.5468208 | 0.3899225 | 4.3168226 | 2.2075519 | 2.5876642 |
| .35 | 0.5765749 | 0.4057189 | 4.5102872 | 2.3132629 | 2.6305854 |
| .36 | 0.6090097 | 0.4225640 | 4.7227638 | 2.4274866 | 2.6759796 |
| .37 | 0.6444310 | 0.4405524 | 4.9566277 | 2.5510609 | 2.7240741 |
| .38 | 0.6831857 | 0.4597892 | 5.2145993 | 2.6849230 | 2.7751170 |
| .39 | 0.7256683 | 0.4803911 | 5.4998056 | 2.8301249 | 2.8293805 |

Table for calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 5.3433416 | 0.8074610 | 5.0847076 | 3.4508252 | 0.1274938 |
| .41 | 5.7410854 | 0.8616652 | 5.4595549 | 3.6366316 | 0.1348495 |
| .42 | 6.1825845 | 0.9213583 | 5.8762028 | 3.8381244 | 0.1428844 |
| .43 | 6.6737885 | 0.9872303 | 6.3404124 | 4.0570325 | 0.1517669 |
| .44 | 7.2215906 | 1.0600717 | 6.8588677 | 4.2953086 | 0.1613153 |
| .45 | 7.8340362 | 1.1407968 | 7.4393799 | 4.5551868 | 0.1719009 |
| .46 | 8.5304921 | 1.2304579 | 8.0910541 | 4.8391982 | 0.1836490 |
| .47 | 9.2919064 | 1.3302708 | 8.8245456 | 5.1502249 | 0.1963910 |
| .48 | 10.1611565 | 1.4416505 | 9.6524034 | 5.5915797 | 0.2105782 |
| .49 | 11.1483916 | 1.5662414 | 10.5814076 | 5.8670554 | 0.2262842 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 0.7722279 | 0.5024882 | 5.8158458 | 2.9878483 | 2.8871625 |
| .41 | 0.8236768 | 0.5262247 | 6.1668703 | 3.1594205 | 2.9487873 |
| .42 | 0.8803020 | 0.5517624 | 6.5576888 | 3.3463444 | 3.0146153 |
| .43 | 0.9428758 | 0.5792820 | 6.9938724 | 3.5503159 | 3.0850411 |
| .44 | 1.0121698 | 0.6089851 | 7.4818984 | 3.7732519 | 3.1604972 |
| .45 | 1.0890770 | 0.6411008 | 8.0293400 | 4.0173470 | 3.2414729 |
| .46 | 1.1746865 | 0.6758853 | 8.6650411 | 4.2850895 | 3.3285046 |
| .47 | 1.2700084 | 0.7136266 | 9.3393646 | 4.5793151 | 3.4221846 |
| .48 | 1.3766094 | 0.7546531 | 10.1245206 | 4.9032859 | 3.5231831 |
| .49 | 1.4960435 | 0.7993356 | 11.0149496 | 5.2607391 | 3.6322450 |

Table for calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{bh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 12.2565010 | 1.7059619 | 11.6530311 | 6.2810131 | 0.2437089 |
| .51 | 13.5217186 | 1.8630612 | 12.8640376 | 6.7384992 | 0.2623086 |
| .52 | 14.9643027 | 2.0401808 | 14.2471548 | 7.2453517 | 0.2846764 |
| .53 | 16.6144340 | 2.2404353 | 15.8319598 | 7.8083593 | 0.3087990 |
| .54 | 18.5081837 | 2.4674924 | 17.6538422 | 8.4353800 | 0.3358128 |
| .55 | 20.6892698 | 2.7257483 | 19.7557330 | 9.1357415 | 0.3661454 |
| .56 | 23.2101898 | 3.0203875 | 22.1892407 | 9.9203347 | 0.4002934 |
| .57 | 26.1349792 | 3.3576539 | 25.0173757 | 10.8016990 | 0.4388423 |
| .58 | 29.5415387 | 3.7450179 | 28.3168678 | 11.7952366 | 0.4824870 |
| .59 | 33.5254660 | 4.1915042 | 32.1819582 | 12.9188420 | 0.5320487 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 1.6301913 | 0.8480954 | 12.0276791 | 5.6559750 | 3.7502039 |
| .51 | 1.7812663 | 0.9014146 | 13.1830126 | 6.0939727 | 3.8780044 |
| .52 | 1.9518660 | 0.9598434 | 14.5051465 | 6.5804972 | 4.0167099 |
| .53 | 2.1450571 | 1.0240137 | 16.0220553 | 7.1222565 | 4.1675267 |
| .54 | 2.3644549 | 1.0946446 | 17.7714479 | 7.7270215 | 4.3317986 |
| .55 | 2.6143921 | 1.1725839 | 19.7924678 | 8.4040182 | 4.5111194 |
| .56 | 2.8999892 | 1.2587913 | 22.1368358 | 9.1639307 | 4.7072384 |
| .57 | 3.2274131 | 1.3543972 | 24.8665383 | 10.0194772 | 4.9222128 |
| .58 | 3.6040495 | 1.4607071 | 28.0571844 | 10.9856273 | 5.1583729 |
| .59 | 4.0388265 | 1.5792540 | 31.8015096 | 12.0802252 | 5.4184321 |

Table for calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 38.2049265 | 4.7080970 | 36.7292309 | 14.1941375 | 0.5885122 |
| .61 | 43.7254534 | 5.3080674 | 42.1024189 | 15.6467332 | 0.6530432 |
| .62 | 50.2694144 | 6.0077878 | 48.4817371 | 17.3079109 | 0.7270572 |
| .63 | 58.0639515 | 6.8272387 | 56.0918837 | 19.2150686 | 0.8122440 |
| .64 | 67.3968506 | 7.7913027 | 65.2177010 | 21.4142759 | 0.9106719 |
| .65 | 78.6317120 | 8.9307576 | 76.2193813 | 23.9614525 | 1.0248413 |
| .66 | 92.2358446 | 10.2844442 | 89.5601149 | 26.9262790 | 1.1578516 |
| .67 | 108.8055410 | 11.9007216 | 105.8814266 | 30.3941140 | 1.3134590 |
| .68 | 129.1188240 | 13.8415108 | 125.8055220 | 34.4722853 | 1.4963802 |
| .69 | 154.1913681 | 16.1856959 | 150.4910870 | 39.2958622 | 1.7124806 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .60 | 4.5426168 | 1.7118558 | 36.2146668 | 13.3247198 | 5.7055904 |
| .61 | 5.1285703 | 1.8606166 | 41.4385419 | 14.7445420 | 6.0234508 |
| .62 | 5.8129132 | 2.0280784 | 47.6511970 | 16.3707483 | 6.3763868 |
| .63 | 6.6154680 | 2.2172067 | 55.0748835 | 18.2405097 | 6.7693542 |
| .64 | 7.5609280 | 2.4316071 | 63.9915085 | 20.3996148 | 7.2083875 |
| .65 | 8.6798587 | 2.6755519 | 74.7578535 | 22.9036810 | 7.7004786 |
| .66 | 10.0108471 | 2.9542994 | 87.8329916 | 25.8221188 | 8.2542331 |
| .67 | 11.6019828 | 3.2740701 | 103.8036814 | 29.2396023 | 8.8795326 |
| .68 | 13.5148171 | 3.6426221 | 123.4363089 | 33.2622813 | 9.5887156 |
| .69 | 15.8278687 | 4.0694498 | 147.7325821 | 38.0275755 | 10.3966495 |

Table for calculating the covariance matrix

n = 9

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 185.3661919 | 19.0352829 | 181.2226391 | 45.0367889 | 1.9691677 |
| .71 | 224.4158382 | 22.5211787 | 219.7626972 | 51.9112182 | 2.2756602 |
| .72 | 273.7394295 | 26.8165493 | 268.4977074 | 60.2019296 | 2.6438865 |
| .73 | 336.6063118 | 32.1513276 | 330.6812515 | 70.2789030 | 3.0892749 |
| .74 | 417.4111710 | 38.8235698 | 410.6900024 | 82.6088009 | 3.6309842 |
| .75 | 522.4390488 | 47.3519603 | 514.7835693 | 97.8471127 | 4.2956365 |
| .76 | 660.3903122 | 57.9942802 | 651.6325455 | 116.8445702 | 5.1171462 |
| .77 | 843.8288422 | 71.8338366 | 823.7610245 | 140.7832565 | 6.1419278 |
| .78 | 1090.5094910 | 89.8295383 | 1078.8779907 | 171.2172042 | 7.4295184 |
| .79 | 1427.6051636 | 113.5697374 | 1414.0857391 | 210.4803047 | 9.0683113 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .70 | 18.6426613 | 4.5663985 | 178.0185089 | 43.7037764 | 11.3217168 |
| .71 | 22.0895782 | 5.1478757 | 216.0465889 | 50.5073524 | 12.3856881 |
| .72 | 26.3411205 | 5.8324094 | 264.1905975 | 58.7201781 | 13.6165975 |
| .73 | 31.6864219 | 6.6436613 | 325.6882420 | 68.7111378 | 15.0498874 |
| .74 | 38.2426872 | 7.6100333 | 404.8984832 | 80.9459181 | 16.7262712 |
| .75 | 46.6073713 | 8.7715080 | 508.0552368 | 96.0782513 | 18.7048535 |
| .76 | 57.2769017 | 10.1774117 | 643.7993456 | 114.9572058 | 21.0556955 |
| .77 | 71.0328140 | 11.8949219 | 824.6158496 | 138.7625313 | 23.8743353 |
| .78 | 88.9322233 | 14.0072243 | 1068.1659088 | 169.0463505 | 27.2740965 |
| .79 | 112.5603704 | 16.6398401 | 1401.4831085 | 208.1380367 | 31.4813877 |

Table for calculating the covariance matrix

n = 10

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (-) |
| .20 | 1.4143923 | 0.2119226 | 1.3832464 | 1.2021484 | 0.0353204 |
| .21 | 1.4632543 | 0.2186956 | 1.4282672 | 1.2377912 | 0.0362580 |
| .22 | 1.5153537 | 0.2258920 | 1.4762094 | 1.2751107 | 0.0372507 |
| .23 | 1.5709784 | 0.2335475 | 1.5273406 | 1.3142341 | 0.0383028 |
| .24 | 1.6304493 | 0.2417018 | 1.5819592 | 1.3553017 | 0.0394192 |
| .25 | 1.6941214 | 0.2503985 | 1.6403955 | 1.3984659 | 0.0406052 |
| .26 | 1.7623899 | 0.2596859 | 1.7030191 | 1.4438926 | 0.0418666 |
| .27 | 1.8356961 | 0.2696178 | 1.7702411 | 1.4917690 | 0.0432099 |
| .28 | 1.9145323 | 0.2802534 | 1.8425225 | 1.5422933 | 0.0446421 |
| .29 | 1.9994494 | 0.2916592 | 1.9203793 | 1.5956888 | 0.0461712 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .20 | 0.2076840 | 0.1729297 | 2.3513378 | 0.9904934 | 1.9209881 |
| .21 | 0.2139490 | 0.1775720 | 2.3922371 | 1.0153055 | 1.9359555 |
| .22 | 0.2205983 | 0.1824127 | 2.4358159 | 1.0417924 | 1.9511006 |
| .23 | 0.2276655 | 0.1874660 | 2.4822189 | 1.0700814 | 1.9664733 |
| .24 | 0.2351878 | 0.1927477 | 2.5317202 | 1.1003122 | 1.9821285 |
| .25 | 1.6403953 | 0.1982748 | 2.5846238 | 1.1326357 | 1.9981237 |
| .26 | 0.2517664 | 0.2040656 | 2.6412693 | 1.1672169 | 2.0145214 |
| .27 | 0.2609188 | 0.2101405 | 2.7020375 | 1.2042370 | 2.0313890 |
| .28 | 0.2707198 | 0.2165214 | 2.7673551 | 1.2438937 | 2.0487983 |
| .29 | 0.2812319 | 0.2232325 | 2.8377010 | 1.2864048 | 2.0668271 |

Table for calculating the covariance matrix

$n = 10$

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .30 | 2.0910626 | 0.3039085 | 2.0043885 | 1.6521985 | 0.0478058 |
| .31 | 2.1900662 | 0.3170838 | 2.0952024 | 1.7120929 | 0.0495556 |
| .32 | 2.2972385 | 0.3312768 | 2.1935539 | 1.7756691 | 0.0514311 |
| .33 | 2.4134563 | 0.3465902 | 2.3002689 | 1.8432552 | 0.0534443 |
| .34 | 2.5397110 | 0.3631394 | 2.4162836 | 1.9152159 | 0.0556083 |
| .35 | 2.6771232 | 0.3810538 | 2.5426577 | 1.9919545 | 0.0579380 |
| .36 | 2.8269645 | 0.4004792 | 2.6805955 | 2.0739207 | 0.0604497 |
| .37 | 2.9906791 | 0.4215799 | 2.8314669 | 2.1616136 | 0.0631618 |
| .38 | 3.1699113 | 0.4445416 | 2.9968345 | 2.2555899 | 0.0660949 |
| .39 | 3.3665411 | 0.4695750 | 3.1784877 | 2.3564738 | 0.0692722 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .30 | 0.2925248 | 0.2303000 | 2.9136117 | 1.3320073 | 2.0855577 |
| .31 | 0.3046766 | 0.2377529 | 2.9956958 | 1.3809655 | 2.1050807 |
| .32 | 0.3177746 | 0.2456228 | 3.0846378 | 1.4335688 | 2.1254924 |
| .33 | 0.3319164 | 0.2539443 | 3.1812114 | 1.4901264 | 2.1468957 |
| .34 | 0.3472121 | 0.2627557 | 3.2862950 | 1.5510233 | 2.1694030 |
| .35 | 0.3637851 | 0.2720990 | 3.4008859 | 1.6166218 | 2.1931343 |
| .36 | 0.3817749 | 0.2820207 | 3.5261188 | 1.6873688 | 2.2182211 |
| .37 | 0.4013388 | 0.2925718 | 3.6632879 | 1.7637495 | 2.2448038 |
| .38 | 0.4226547 | 0.3038089 | 3.8138721 | 1.8463054 | 2.2730253 |
| .39 | 0.4459251 | 0.3157950 | 3.9795689 | 1.9356435 | 2.3030829 |

Table for calculating the covariance matrix

n = 10

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{bh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .40 | 3.5827168 | 0.4969187 | 3.3784746 | 2.4649618 | 0.0727198 |
| .41 | 3.8209028 | 0.5268441 | 3.5991482 | 2.5818352 | 0.0764669 |
| .42 | 4.0839348 | 0.5596609 | 3.8432212 | 2.7079732 | 0.0805467 |
| .43 | 4.3750820 | 0.5957228 | 4.1138255 | 2.8443660 | 0.0849968 |
| .44 | 4.6981214 | 0.6354348 | 4.4145852 | 2.9921297 | 0.0898595 |
| .45 | 5.0574422 | 0.6792630 | 4.7497193 | 3.1525342 | 0.0951834 |
| .46 | 5.4581409 | 0.7277432 | 5.1241335 | 3.3270150 | 0.1010235 |
| .47 | 5.9061564 | 0.7814933 | 5.5425544 | 3.5172016 | 0.1074427 |
| .48 | 6.4084507 | 0.8412305 | 6.0147045 | 3.7249609 | 0.1145131 |
| .49 | 6.9731905 | 0.9077868 | 6.5454823 | 3.9524250 | 0.1223174 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .40 | 0.4713793 | 0.3285998 | 4.1623241 | 2.0224416 | 2.3351274 |
| .41 | 0.4992738 | 0.3423004 | 4.3643788 | 2.1374603 | 2.3693657 |
| .42 | 0.5299223 | 0.3569834 | 4.5883206 | 2.2515565 | 2.4060136 |
| .43 | 0.5636515 | 0.3727450 | 4.8371426 | 2.3756956 | 2.4453073 |
| .44 | 0.6008580 | 0.3896926 | 5.1143177 | 2.5109668 | 2.4875050 |
| .45 | 0.6419935 | 0.4079477 | 5.4238910 | 2.6586105 | 2.5328947 |
| .46 | 0.6875777 | 0.4276457 | 5.7705775 | 2.8200297 | 2.5817913 |
| .47 | 0.7382107 | 0.4489389 | 6.1598908 | 2.9968193 | 2.6345408 |
| .48 | 0.7945902 | 0.4720002 | 6.5933141 | 3.1908077 | 2.6915322 |
| .49 | 0.8575263 | 0.4970247 | 7.0934768 | 3.4040848 | 2.7531964 |

Table for calculating the covariance matrix

n = 10

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .50 | 7.6099867 | 0.9821301 | 7.1451969 | 4.2020344 | 0.1309507 |
| .51 | 8.3302134 | 1.0653930 | 7.8248796 | 4.4766056 | 0.1405229 |
| .52 | 9.1473595 | 1.1589035 | 8.5973671 | 4.7793893 | 0.1511613 |
| .53 | 10.0774800 | 1.2642215 | 9.4790842 | 5.1141416 | 0.1630135 |
| .54 | 11.1307372 | 1.3831854 | 10.4878908 | 5.4852149 | 0.1768508 |
| .55 | 12.3572296 | 1.5179846 | 11.6465859 | 5.8977327 | 0.1910750 |
| .56 | 13.7576704 | 1.6712071 | 12.9822289 | 6.3576289 | 0.2077207 |
| .57 | 15.3746994 | 1.8459520 | 14.5277504 | 6.8719125 | 0.2264650 |
| .58 | 17.2491970 | 2.0459243 | 16.3231535 | 7.4488354 | 0.2476347 |
| .59 | 19.4310987 | 2.2756161 | 18.4173989 | 8.0981582 | 0.2716165 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .50 | 0.9279680 | 0.5242831 | 7.6543861 | 3.6390456 | 2.8200114 |
| .51 | 1.0070062 | 0.5538776 | 8.3917318 | 3.8384559 | 2.8935173 |
| .52 | 1.0959540 | 0.5868457 | 9.0182352 | 4.1855111 | 2.9713206 |
| .53 | 1.1963831 | 0.6216653 | 9.8490751 | 4.5039073 | 3.0571000 |
| .54 | 1.3099452 | 0.6605113 | 10.8084266 | 4.8579308 | 3.1506169 |
| .55 | 1.4389377 | 0.7038212 | 11.9002513 | 5.2526305 | 3.2527602 |
| .56 | 1.5858522 | 0.7502922 | 13.1689751 | 5.6933594 | 3.3645107 |
| .57 | 1.7537362 | 0.8028055 | 14.6407604 | 6.1885373 | 3.4870065 |
| .58 | 1.9462431 | 0.8599348 | 16.3547924 | 6.7448165 | 3.6215461 |
| .59 | 2.1677707 | 0.9239647 | 18.8359046 | 7.7223472 | 3.7696188 |

Table for calculating the covariance matrix

n = 10

| r | $F_{aa}$ | $F_{ab}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .60 | 21.9819117 | 3.5404307 | 20.3708756 | 8.8315713 | 0.2988731 |
| .61 | 24.9773479 | 2.8469047 | 23.7579739 | 9.6629264 | 0.3209524 |
| .62 | 28.5116844 | 3.2031070 | 27.1714394 | 10.6089773 | 0.3655198 |
| .63 | 32.7024670 | 3.6188722 | 31.2270420 | 11.6898535 | 0.4063681 |
| .64 | 37.6975846 | 4.1062691 | 36.0705748 | 12.9300486 | 0.4534642 |
| .65 | 43.6838975 | 4.6806837 | 41.8864374 | 14.3593819 | 0.5079812 |
| .66 | 50.9003186 | 5.3607584 | 48.0106031 | 16.0147657 | 0.5713662 |
| .67 | 59.6514220 | 6.1702067 | 57.4442124 | 17.9411979 | 0.6452784 |
| .68 | 70.3333673 | 7.1391735 | 67.8792486 | 20.1954129 | 0.7322232 |
| .69 | 83.4606300 | 8.3059103 | 80.7252388 | 22.8479400 | 0.8346299 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .60 | 2.4236654 | 0.9953239 | 20.7127745 | 8.0826932 | 3.9329780 |
| .61 | 2.7203982 | 1.0750907 | 23.4890656 | 8.8895707 | 4.1136075 |
| .62 | 3.0659086 | 1.1645523 | 26.7791293 | 9.8095732 | 4.3138686 |
| .63 | 3.4699098 | 1.2652259 | 30.6969604 | 10.8626580 | 4.5364853 |
| .64 | 3.9445011 | 1.3789275 | 35.3862562 | 12.0731179 | 4.7846874 |
| .65 | 4.5045604 | 1.5078249 | 41.0289612 | 13.4705487 | 5.0622659 |
| .66 | 5.1688760 | 1.6545614 | 47.8581066 | 15.0915970 | 5.3738320 |
| .67 | 5.9608658 | 1.8222743 | 56.1714058 | 16.9809771 | 5.7246569 |
| .68 | 6.9104388 | 2.0148655 | 66.3566647 | 19.1950743 | 6.1213771 |
| .69 | 8.0555761 | 2.2370624 | 78.9184504 | 21.8040292 | 6.5718040 |

Table for Calculating the covariance matrix

n = 10

| r | $F_{aa}$ | $F_{ah}$ | $F_{ab}$ | $F_{ar}$ | $F_{hh}$ |
|---|---|---|---|---|---|
| | (+) | (-) | (-) | (-) | (+) |
| .70 | 99.7125854 | 9.7198677 | 96.6554461 | 25.9886537 | 0.9560528 |
| .71 | 119.9835939 | 11.4444430 | 116.5570745 | 29.7301228 | 1.1007927 |
| .72 | 145.4821167 | 13.5624732 | 141.6295033 | 34.2194834 | 1.2744207 |
| .73 | 177.8396626 | 16.1871088 | 173.4932079 | 39.6461306 | 1.4840476 |
| .74 | 219.2663021 | 19.4600253 | 214.3450909 | 46.2529526 | 1.7386979 |
| .75 | 272.8945503 | 23.5832832 | 267.2996674 | 54.3760047 | 2.0507216 |
| .76 | 343.0379829 | 28.8234859 | 336.6495819 | 64.4474621 | 2.4357339 |
| .77 | 435.9048767 | 35.5542178 | 428.5751801 | 77.0660114 | 2.9152198 |
| .78 | 560.3472137 | 44.2881465 | 551.8946075 | 93.0323257 | 3.5174734 |
| .79 | 729.6583099 | 55.7753258 | 719.8526840 | 113.5097141 | 4.2825683 |

| r | $F_{hb}$ | $F_{hr}$ | $F_{bb}$ | $F_{br}$ | $F_{rr}$ |
|---|---|---|---|---|---|
| | (+) | (+) | (+) | (+) | (+) |
| .70 | 9.4454017 | 2.4947834 | 94.5239496 | 24.8972440 | 7.0856844 |
| .71 | 11.1429472 | 2.7953107 | 114.0531864 | 28.5867898 | 7.6741894 |
| .72 | 13.2315843 | 3.1475926 | 138.6964588 | 33.0191379 | 8.3530596 |
| .73 | 15.8209264 | 3.5634903 | 170.0688229 | 38.2889565 | 9.1395370 |
| .74 | 19.0550461 | 4.0571898 | 210.3271982 | 44.9203334 | 10.0556514 |
| .75 | 23.1341276 | 4.6483806 | 262.6149216 | 53.9661050 | 11.1321081 |
| .76 | 28.2339048 | 5.3611081 | 331.1681061 | 62.9513025 | 12.4045589 |
| .77 | 34.9967170 | 6.2280882 | 422.1491547 | 75.4729795 | 13.9217749 |
| .78 | 43.6628999 | 7.2910794 | 544.3423538 | 91.3301782 | 15.7428666 |
| .79 | 55.0734897 | 8.6100687 | 710.9441528 | 111.6824382 | 17.9585869 |