

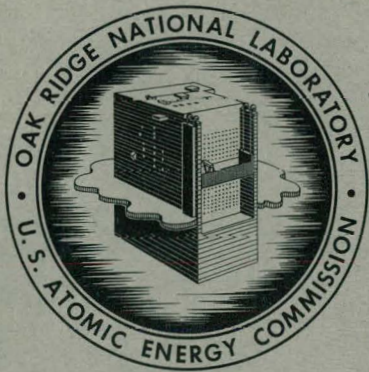
325
1-14-64

ORNL-3525
UC-34 - Physics
TID-4500 (24th ed.)

MASTER

TABLES OF FERMI INTEGRALS AND THE
MULTIPOLE MOMENTS OF A ROUNDED
CHARGE DISTRIBUTION

L. W. Owen
G. R. Satchler



OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
U.S. ATOMIC ENERGY COMMISSION

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Printed in USA. Price: \$1.25 Available from the
Office of Technical Services
U. S. Department of Commerce
Washington 25, D. C.

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

Contract No. W-7405-eng-26

PHYSICS DIVISION

TABLES OF FERMI INTEGRALS AND THE MULTIPOLE MOMENTS
OF A ROUNDED CHARGE DISTRIBUTION

L. W. Owen and G. R. Satchler

DATE ISSUED

JAN 13 1964

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee
operated by
UNION CARBIDE CORPORATION
for the
U.S. ATOMIC ENERGY COMMISSION

ABSTRACT

Tables of numerical values are given for the integrals $\int t^n f(t)dt$, $\int t^n (df/dt)dt$, and $\int t^n (d^2f/dt^2)dt$ over the Fermi function $f(t) = [1 + \exp(t-k)]^{-1}$. They are presented in a form suitable for use in evaluating the various multipole moments of the rounded charge distributions of nuclei, both explicitly and in terms of the radii of "equivalent" uniform distributions which have the same moments. Analytic expressions for the integrals are discussed.

1. Multipole Moments

It has been customary to express the results of measurements of the electric multipole moments of nuclei in terms of a non-spherical but uniform charge distribution,¹ whose radius is usually chosen to be $R_u = 1.2 A^{\frac{1}{3}} F$, rather than in terms of the distribution with a rounded edge which electron scattering measurements indicate.² This may lead to serious error in the estimate of nuclear deformations or "deformabilities".³ For this reason we present here tables of numerical values of the various radial integrals required for evaluating the moments of a non-spherical, rounded-edge, charge distribution.

The multipole moments of a distribution with density $\rho(\underline{r})$ may be defined as⁴

$$q_{lm} = \int_0^{\infty} r^l Y_l^m(\hat{r}) \rho(\underline{r}) d\underline{r}, \quad (1)$$

where \hat{r} denotes the polar angles of the vector \underline{r} . We take for ρ the Fermi function which has often been used in the analysis of electron scattering,²

$$\rho(r) = \rho_0 / (e^x + 1), \quad x = \frac{r - R_0}{a}, \quad (2)$$

normalized so that

$$\int_0^{\infty} \rho(\underline{r}) d\underline{r} = 1. \quad (3)$$

One way of introducing non-sphericity is to allow the surface $r = R$ to be deformed. For example, for a distribution with axial symmetry about the polar axis we may write

$$R(\theta) = R_0 \left[1 + \sum_{k>0} \beta_k Y_k^0(\theta, 0) - \frac{N}{4\pi} \sum_k |\beta_k|^2 \right]. \quad (4)$$

A Taylor-series expansion of ρ about $R = R_0$ to second order in the deformation β yields³

$$q_{lm} = \delta_{m,0} \left[\beta_l y_l + B_l z_l \right] \quad (5)$$

where

$$B_l = \sum_{kk'} \beta_k \beta_{k'} \left[\frac{(2k+1)(2k+1)}{4\pi(2l+1)} \right]^{\frac{1}{2}} \langle k k' 0 0 | l 0 \rangle^2, \quad (6)$$

and the radial integrals are

$$y_l = R_0 \int_0^\infty \left(\frac{d\rho}{dR_0} \right) r^{l+2} dr,$$

$$z_l = \frac{1}{2} R_0^2 \int_0^\infty \left(\frac{d^2\rho}{dR_0^2} \right) r^{l+2} dr. \quad (7)$$

The central density ρ_0 remains independent of β (to second order) if we choose N in Eq. (4) so that

$$N = z_0 / y_0. \quad (8)$$

In similar fashion, a uniform distribution,

$$\begin{aligned} \rho(r) &= \rho_0, & r &\leq R_u \\ &= 0, & r &> R_u \end{aligned} \quad (9)$$

where $\rho_0 = (3/4\pi R_u^3)$, gives the moments (5) with

$$y_l = \frac{3}{4\pi} R_u^l, \quad z_l = \frac{3}{8\pi} (l+2) R_u^l, \quad N = 1. \quad (10)$$

Other ways of defining the deformed distribution lead to moments which can be expressed in terms of the y_ℓ and z_ℓ . For example, instead of Eq. (4) we may deform the equidensity surfaces, according to $r \rightarrow r'$ where

$$r' = r \left[1 - \frac{N'}{4\pi} \sum_k \beta_k^2 + \sum_{k>0} \beta_k Y_k^0(\theta, 0) \right]^{-1}. \quad (11)$$

The moments (5) then become

$$q_{\ell m} = \frac{\delta_{m,0}}{R_0} \left[\beta_\ell y_{\ell+1} + \left(\frac{z_{\ell+2}}{R_0} - y_{\ell+1} \right) B_\ell \right], \quad (12)$$

while the constant central-density condition (8) becomes

$$N' = \frac{z_2}{R_0 y_1} - 1. \quad (13)$$

The prescriptions (4) and (11) are equivalent (to order β^2) for the uniform distribution (9), and Eqs. (12) and (13) also reduce to Eqs. (10).

An alternative prescription to Eq. (11),

$$r' = r \left[1 + \frac{N''}{2\pi} \sum_k \beta_k^2 - \sum_{k>0} \beta_k Y_k^0(\theta, 0) \right], \quad (14)$$

however, is only equivalent to (4) for a uniform distribution to order β .

The second order terms differ, and Eqs. (12) and (13) are replaced by

$$q_{\ell m} = \frac{\delta_{m,0}}{R_0} \left[\beta_\ell y_{\ell+1} + \frac{B_\ell z_{\ell+2}}{R_0} \right], \quad (15)$$

$$N'' = \frac{z_2}{2R_0 y_1}. \quad (16)$$

2. Fermi Integrals and Analytic Expressions

The integrals involved in the quantities y_ℓ and z_ℓ may be expressed in terms of integrals over ρ itself, because for the function (2),

$$\frac{d\rho(r-R_0)}{dR_0} = -\frac{d\rho}{dr} \quad (17)$$

Then we find

$$\int_0^\infty \frac{d\rho}{dR_0} r^n dr = n \int_0^\infty \rho r^{n-1} dr, \quad n > 0, \quad (18)$$

$$\int_0^\infty \frac{d^2\rho}{dR_0^2} r^n dr = n(n-1) \int_0^\infty \rho r^{n-2} dr, \quad n > 1, \quad (19)$$

which immediately gives

$$z_\ell = \frac{1}{2} R_0 (\ell+2) y_{\ell-1} \quad (20)$$

The quantities of interest can then be expressed in terms of the Fermi integrals

$$F_n(k) = \int_0^\infty \frac{t^n dt}{1 + \exp(t-k)} \quad (21)$$

An explicit expression for these has been given by Elton,⁵

$$F_n(k) = \frac{k^{n+1}}{n+1} + \sum_{s=1}^n [1+(-)^s] \frac{n!}{(n-s)!} k^{n-s} \left(1 - \frac{1}{2^s}\right) \zeta(s+1) \\ - \sum_{m=1}^\infty (-)^{m+n} \frac{n!}{m^{n+1}} e^{-km} \quad (22)$$

which uses the Riemann zeta-function. Since in our case $k = R_0/a$ is usually large, the last term can usually be neglected. Expressions for y_l and z_l can now be constructed. First, the normalization condition (3) leads to a value for the "central density" ρ_0 ,

$$\rho_0 = \left[4\pi a^3 F_2 \left(\frac{R_0}{a} \right) \right]^{-1} \quad (23)$$

Then the definitions (7) with the relations (18) and (19) give

$$y_l = \frac{l+2}{4\pi} a^l \left(\frac{R_0}{a} \right) \frac{F_{l+1} \left(\frac{R_0}{a} \right)}{F_2 \left(\frac{R_0}{a} \right)},$$

and

$$z_l = \frac{(l+1)(l+2)}{8\pi} a^l \left(\frac{R_0}{a} \right)^2 \frac{F_l \left(\frac{R_0}{a} \right)}{F_2 \left(\frac{R_0}{a} \right)}, \quad (24)$$

while for the particular choice of Eq. (4), Eq. (8) becomes

$$N = \frac{z_0}{y_0} = \frac{1}{2} \left(\frac{R_0}{a} \right) \frac{F_0 \left(\frac{R_0}{a} \right)}{F_1 \left(\frac{R_0}{a} \right)}.$$

Also of interest is the mean square radius

$$R_m^2 = 4\pi \int_0^\infty \rho r^4 dr = a^2 \frac{F_4 \left(\frac{R_0}{a} \right)}{F_2 \left(\frac{R_0}{a} \right)} = \frac{4\pi}{5} \frac{y_3}{R_0} \quad (25)$$

We note from Eqs. (24) that y_1 and z_2 are independent of a ,

$$y_1 = \frac{1}{2R_0} z_2 = \frac{3}{4\pi} R_0.$$

Explicit expressions for the first few Fermi integrals for large k are

$$F_0(k) = k + e^{-k} - \frac{1}{2} e^{-2k} + \dots$$

$$F_1(k) = \frac{1}{2} k^2 + \frac{1}{6} \pi^2 - e^{-k} + \frac{1}{4} e^{-2k} - \dots$$

$$F_2(k) = \frac{1}{3} k^3 + \frac{1}{3} k \pi^2 + 2e^{-k} - \frac{1}{4} e^{-2k} + \dots$$

$$F_3(k) = \frac{1}{4} k^4 + \frac{1}{2} k^2 \pi^2 + \frac{7}{60} \pi^4 - 6e^{-k} + \frac{3}{8} e^{-2k} - \dots$$

$$F_4(k) = \frac{1}{5} k^5 + \frac{2}{3} k^3 \pi^2 + \frac{7}{15} k \pi^4 + 24e^{-k} - \frac{3}{4} e^{-2k} + \dots$$

$$F_5(k) = \frac{1}{6} k^6 + \frac{5}{6} k^4 \pi^2 + \frac{7}{6} k^2 \pi^4 + \frac{31}{126} \pi^6 - 120e^{-k} + \frac{15}{8} e^{-2k} - \dots$$

$$F_6(k) = \frac{1}{7} k^7 + k^5 \pi^2 + \frac{7}{3} k^3 \pi^4 + \frac{31}{21} k \pi^6 + 720e^{-k} - \frac{45}{8} e^{-2k} + \dots$$

When $a/R_0 = k^{-1}$ is small, it is useful to have expressions for the moments to lowest order in a/R_0 . From the general expression (22) we see

$$F_n\left(\frac{R_0}{a}\right) = \frac{1}{n+1} \left(\frac{R_0}{a}\right)^{n+1} \left[1 + \frac{n(n+1)}{6} \left(\frac{\pi a}{R_0}\right)^2 \dots \right]$$

which leads to

$$\overline{y^2} = \frac{3}{4\pi} R_0^2 \left[1 + \frac{1}{6} (\ell+4)(\ell-1) \left(\frac{\pi a}{R_0}\right)^2 \dots \right]$$

$$\overline{z^2} = \frac{3(\ell+2)}{8\pi} R_0^2 \left[1 + \frac{1}{6} (\ell+3)(\ell-2) \left(\frac{\pi a}{R_0}\right)^2 \dots \right]$$

and

$$R_{1,1}^2 = \frac{3}{5} R_0^2 \left[1 + \frac{7}{3} \left(\frac{\pi a}{R_0}\right)^2 \dots \right]$$

In each case the leading term is that for a uniform distribution of radius R_0 . It is of interest to compare, for a given a/R_0 , the radii of uniform distributions which would give the same moments and RMS radius as the rounded distributions. The equivalent uniform radius for R_m is

$$R_{u1} = R_0 \left[1 + \frac{7}{6} \left(\frac{\pi a}{R_0} \right)^2 \dots \right],$$

while for the moments y_l ,

$$R_{ul} = R_0 \left[1 + \frac{(l+4)(l-1)}{12l} \left(\frac{\pi a}{R_0} \right)^2 \dots \right].$$

For example, $R_{u2}/R_{u1} = 1 - \frac{2}{3} \left(\frac{\pi a}{R_0} \right)^2 \dots$.

3. Numerical Tables

The moments y_l and z_l for $l = 2, 3$ and 4 were computed on the IBM-7090 at Oak Ridge for values of $r_0 = (R_0/A^{1/3}) = 1.00, 1.05, 1.10$ and $a = 0.4, 0.5, \text{ and } 0.6$ for $A = 10$ to 250 in steps of 10 . The results are also expressed in terms of "equivalent uniform radii" R_{ul} by means of Eq. (10), R_{ul} being the radius of the uniform distribution which has the same value of y_l . This helps to emphasize that no single uniform radius is adequate to reproduce the moments of a rounded distribution. In addition, values of the RMS radius R_m , Eq. (25), and the normalizing constant $N = z_0/y_0$ of Eq. (8) were obtained. Equivalent uniform radii

$$R_{u0} = \left(3 / 4\pi \rho_0 \right)^{1/3},$$

and
$$R_{u1} = \left(5 / 3 \right)^{1/3} R_m,$$

are also defined for the uniform distributions which have the same central density and RMS radius, respectively.

The tables are arranged so that, for each choice of r_0 and a , (which are printed as RZ and Q, respectively), the first page contains R_0 , ρ_0 , y_2 , y_3 and y_4 . The second page contains the $R_{u,l}$, and the third page gives $r_{u,l} = R_{u,l} / A^{\frac{1}{3}}$ (labelled as RUK l). Finally the fourth page gives the N of Eq. (8), and y_0 , z_0 , z_2 and z_4 .

References

1. K. Alder, A. Bohr, T. Huus, B. Mottelson and A. Winther, Revs. Modern Phys. 28, 432 (1956).
P. H. Stelson and F. K. McGowan, Ann. Rev. Nuclear Sci. 13, to be published.
2. R. Hofstadter, Revs. Modern Phys. 28, 214 (1956).
H. Crannel, R. Helm, H. Kendall, J. Oeser and M. Yearian, Phys. Rev. 123, 923 (1961).
3. L. W. Owen and G. R. Satchler, submitted to Nuclear Physics.
4. D. M. Brink and G. R. Satchler, Angular Momentum (Oxford University Press, Oxford, 1962).
5. L. R. B. Elton, Nuclear Sizes (Oxford University Press, Oxford, 1961).

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .400

A	RO	RHO	RM	Y2	Y3	Y4
10	2.1544E+000	1.7810E-002	2.2350E+000	1.4336E+000	4.2818E+000	1.3695E+001
20	2.7144E+000	9.8295E-003	2.5752E+000	2.1003E+000	7.1617E+000	2.5694E+001
30	3.1072E+000	6.8390E-003	2.8291E+000	2.6534E+000	9.8943E+000	3.8468E+001
40	3.4199E+000	5.2583E-003	3.0378E+000	3.1450E+000	1.2556E+001	5.1968E+001
50	3.6840E+000	4.2769E-003	3.2177E+000	3.5958E+000	1.5176E+001	6.6126E+001
60	3.9148E+000	3.6072E-003	3.3773E+000	4.0167E+000	1.7766E+001	8.0880E+001
70	4.1212E+000	3.1203E-003	3.5216E+000	4.4144E+000	2.0335E+001	9.6183E+001
80	4.3088E+000	2.7502E-003	3.6538E+000	4.7932E+000	2.2887E+001	1.1199E+002
90	4.4813E+000	2.4592E-003	3.7763E+000	5.1563E+000	2.5425E+001	1.2828E+002
100	4.6415E+000	2.2243E-003	3.8906E+000	5.5061E+000	2.7953E+001	1.4501E+002
110	4.7913E+000	2.0306E-003	3.9981E+000	5.8443E+000	3.0472E+001	1.6215E+002
120	4.9323E+000	1.8682E-003	4.0997E+000	6.1723E+000	3.2983E+001	1.7970E+002
130	5.0657E+000	1.7299E-003	4.1961E+000	6.4912E+000	3.5488E+001	1.9763E+002
140	5.1924E+000	1.6109E-003	4.2881E+000	6.8019E+000	3.7986E+001	2.1591E+002
150	5.3132E+000	1.5072E-003	4.3759E+000	7.1054E+000	4.0479E+001	2.3455E+002
160	5.4287E+000	1.4162E-003	4.4602E+000	7.4021E+000	4.2968E+001	2.5352E+002
170	5.5396E+000	1.3356E-003	4.5412E+000	7.6926E+000	4.5453E+001	2.7281E+002
180	5.6461E+000	1.2637E-003	4.6193E+000	7.9775E+000	4.7933E+001	2.9241E+002
190	5.7488E+000	1.1992E-003	4.6947E+000	8.2571E+000	5.0411E+001	3.1231E+002
200	5.8479E+000	1.1410E-003	4.7676E+000	8.5318E+000	5.2885E+001	3.3250E+002
210	5.9438E+000	1.0882E-003	4.8382E+000	8.8020E+000	5.5356E+001	3.5297E+002
220	6.0367E+000	1.0401E-003	4.9067E+000	9.0679E+000	5.7825E+001	3.7372E+002
230	6.1268E+000	9.9607E-004	4.9733E+000	9.3298E+000	6.0291E+001	3.9473E+002
240	6.2144E+000	9.5565E-004	5.0380E+000	9.5879E+000	6.2755E+001	4.1600E+002
250	6.2995E+000	9.1839E-004	5.1011E+000	9.8425E+000	6.5217E+001	4.3752E+002

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.000

Q= .400

A	RU0	RU1	RU2	RU3	RU4
10	2.3754E+000	2.8854E+000	2.4506E+000	2.6177E+000	2.7521E+000
20	2.8959E+000	3.3245E+000	2.9662E+000	3.1872E+000	3.2210E+000
30	3.2681E+000	3.6523E+000	3.3340E+000	3.4607E+000	3.5629E+000
40	3.5674E+000	3.9218E+000	3.6297E+000	3.7468E+000	3.8412E+000
50	3.8216E+000	4.1541E+000	3.8811E+000	3.9911E+000	4.0796E+000
60	4.0449E+000	4.3601E+000	4.1020E+000	4.2063E+000	4.2903E+000
70	4.2451E+000	4.5464E+000	4.3002E+000	4.4000E+000	4.4802E+000
80	4.4276E+000	4.7171E+000	4.4809E+000	4.5768E+000	4.6540E+000
90	4.5958E+000	4.8752E+000	4.6476E+000	4.7402E+000	4.8147E+000
100	4.7522E+000	5.0228E+000	4.8026E+000	4.8923E+000	4.9645E+000
110	4.8987E+000	5.1616E+000	4.9479E+000	5.0351E+000	5.1052E+000
120	5.0368E+000	5.2927E+000	5.0848E+000	5.1697E+000	5.2380E+000
130	5.1675E+000	5.4172E+000	5.2145E+000	5.2974E+000	5.3640E+000
140	5.2918E+000	5.5359E+000	5.3379E+000	5.4189E+000	5.4840E+000
150	5.4104E+000	5.6493E+000	5.4557E+000	5.5350E+000	5.5987E+000
160	5.5240E+000	5.7581E+000	5.5684E+000	5.6461E+000	5.7086E+000
170	5.6329E+000	5.8627E+000	5.6767E+000	5.7529E+000	5.8142E+000
180	5.7378E+000	5.9635E+000	5.7808E+000	5.8558E+000	5.9160E+000
190	5.8389E+000	6.0608E+000	5.8812E+000	5.9549E+000	6.0141E+000
200	5.9365E+000	6.1549E+000	5.9783E+000	6.0508E+000	6.1091E+000
210	6.0310E+000	6.2461E+000	6.0722E+000	6.1436E+000	6.2010E+000
220	6.1226E+000	6.3346E+000	6.1632E+000	6.2336E+000	6.2902E+000
230	6.2115E+000	6.4205E+000	6.2516E+000	6.3210E+000	6.3768E+000
240	6.2978E+000	6.5041E+000	6.3375E+000	6.4060E+000	6.4610E+000
250	6.3819E+000	6.5855E+000	6.4211E+000	6.4887E+000	6.5430E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, VL

RZ=1.000

Q= .400

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.1026E+000	1.3393E+000	1.1375E+000	1.2150E+000	1.2774E+000
20	1.0669E+000	1.2248E+000	1.0928E+000	1.1447E+000	1.1866E+000
30	1.0518E+000	1.1754E+000	1.0730E+000	1.1138E+000	1.1467E+000
40	1.0431E+000	1.1468E+000	1.0613E+000	1.0956E+000	1.1232E+000
50	1.0374E+000	1.1276E+000	1.0535E+000	1.0834E+000	1.1074E+000
60	1.0332E+000	1.1137E+000	1.0478E+000	1.0745E+000	1.0959E+000
70	1.0301E+000	1.1032E+000	1.0434E+000	1.0676E+000	1.0871E+000
80	1.0276E+000	1.0947E+000	1.0399E+000	1.0622E+000	1.0801E+000
90	1.0255E+000	1.0879E+000	1.0371E+000	1.0578E+000	1.0744E+000
100	1.0238E+000	1.0821E+000	1.0347E+000	1.0540E+000	1.0696E+000
110	1.0224E+000	1.0773E+000	1.0327E+000	1.0509E+000	1.0655E+000
120	1.0212E+000	1.0731E+000	1.0309E+000	1.0481E+000	1.0620E+000
130	1.0201E+000	1.0694E+000	1.0294E+000	1.0457E+000	1.0589E+000
140	1.0191E+000	1.0661E+000	1.0280E+000	1.0436E+000	1.0562E+000
150	1.0183E+000	1.0633E+000	1.0268E+000	1.0417E+000	1.0537E+000
160	1.0175E+000	1.0607E+000	1.0257E+000	1.0400E+000	1.0516E+000
170	1.0169E+000	1.0583E+000	1.0247E+000	1.0385E+000	1.0496E+000
180	1.0162E+000	1.0562E+000	1.0239E+000	1.0371E+000	1.0478E+000
190	1.0157E+000	1.0543E+000	1.0230E+000	1.0359E+000	1.0462E+000
200	1.0151E+000	1.0525E+000	1.0223E+000	1.0347E+000	1.0447E+000
210	1.0147E+000	1.0509E+000	1.0216E+000	1.0336E+000	1.0433E+000
220	1.0142E+000	1.0493E+000	1.0210E+000	1.0326E+000	1.0420E+000
230	1.0136E+000	1.0479E+000	1.0204E+000	1.0317E+000	1.0408E+000
240	1.0134E+000	1.0466E+000	1.0198E+000	1.0308E+000	1.0397E+000
250	1.0131E+000	1.0454E+000	1.0193E+000	1.0300E+000	1.0387E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .400

A	N	Y0	Z0	Z2	Z4
10	6.9916E-001	1.9824E-001	1.7825E-001	2.2160E+000	2.7674E+001
20	9.3352E-001	2.1062E-001	1.9661E-001	3.5177E+000	5.8319E+001
30	9.4836E-001	2.1634E-001	2.0517E-001	4.6895E+000	9.2231E+001
40	9.5696E-001	2.1979E-001	2.1033E-001	5.5840E+000	1.2883E+002
50	9.6268E-001	2.2213E-001	2.1384E-001	6.4796E+000	1.6772E+002
60	9.6680E-001	2.2385E-001	2.1642E-001	7.3171E+000	2.0865E+002
70	9.6994E-001	2.2518E-001	2.1841E-001	8.1090E+000	2.5141E+002
80	9.7243E-001	2.2624E-001	2.2001E-001	8.8640E+000	2.9584E+002
90	9.7446E-001	2.2712E-001	2.2132E-001	9.5881E+000	3.4182E+002
100	9.7615E-001	2.2785E-001	2.2242E-001	1.0286E+001	3.8924E+002
110	9.7759E-001	2.2848E-001	2.2335E-001	1.0960E+001	4.3801E+002
120	9.7882E-001	2.2902E-001	2.2417E-001	1.1615E+001	4.8805E+002
130	9.7990E-001	2.2949E-001	2.2488E-001	1.2252E+001	5.3931E+002
140	9.8085E-001	2.2991E-001	2.2551E-001	1.2872E+001	5.9172E+002
150	9.8170E-001	2.3029E-001	2.2607E-001	1.3478E+001	6.4523E+002
160	9.8245E-001	2.3062E-001	2.2658E-001	1.4071E+001	6.9979E+002
170	9.8314E-001	2.3093E-001	2.2703E-001	1.4651E+001	7.5536E+002
180	9.8376E-001	2.3121E-001	2.2745E-001	1.5220E+001	8.1191E+002
190	9.8432E-001	2.3146E-001	2.2783E-001	1.5779E+001	8.6940E+002
200	9.8484E-001	2.3169E-001	2.2818E-001	1.6328E+001	9.2780E+002
210	9.8532E-001	2.3191E-001	2.2850E-001	1.6867E+001	9.8708E+002
220	9.8576E-001	2.3211E-001	2.2880E-001	1.7399E+001	1.0472E+003
230	9.8617E-001	2.3229E-001	2.2908E-001	1.7922E+001	1.1082E+003
240	9.8655E-001	2.3247E-001	2.2934E-001	1.8438E+001	1.1700E+003
250	9.8691E-001	2.3263E-001	2.2958E-001	1.8946E+001	1.2325E+003

INVESTIGATION OF VARIATION OF RU WITH RHO,RM,YL

RZ=1.000

Q= .500

A	R0	RHO	RM	Y2	Y3	Y4
10	2.1544E+000	1.5577E-002	2.4974E+000	1.5863E+000	5.3463E+000	1.9652E+001
20	2.7144E+000	8.9408E-003	2.8062E+000	2.2686E+000	8.5041E+000	3.4117E+001
30	3.1072E+000	6.3376E-003	3.0409E+000	2.8296E+000	1.1431E+001	4.8905E+001
40	3.4199E+000	4.9284E-003	3.2360E+000	3.3262E+000	1.4248E+001	6.4183E+001
50	3.5840E+000	4.0401E-003	3.4055E+000	3.7805E+000	1.6998E+001	7.9964E+001
60	3.9148E+000	3.4271E-003	3.5567E+000	4.2040E+000	1.9703E+001	9.6231E+001
70	4.1212E+000	2.9778E-003	3.6939E+000	4.6037E+000	2.2374E+001	1.1296E+002
80	4.3088E+000	2.6341E-003	3.8202E+000	4.9841E+000	2.5018E+001	1.3013E+002
90	4.4813E+000	2.3623E-003	3.9375E+000	5.3487E+000	2.7643E+001	1.4771E+002
100	4.6415E+000	2.1420E-003	4.0473E+000	5.6996E+000	3.0250E+001	1.6569E+002
110	4.7913E+000	1.9597E-003	4.1507E+000	6.0388E+000	3.2843E+001	1.8404E+002
120	4.9323E+000	1.8062E-003	4.2487E+000	6.3676E+000	3.5424E+001	2.0276E+002
130	5.0657E+000	1.6753E-003	4.3418E+000	6.6873E+000	3.7994E+001	2.2182E+002
140	5.1924E+000	1.5623E-003	4.4307E+000	6.9988E+000	4.0555E+001	2.4122E+002
150	5.3132E+000	1.4636E-003	4.5158E+000	7.3028E+000	4.3108E+001	2.6094E+002
160	5.4287E+000	1.3768E-003	4.5975E+000	7.6001E+000	4.5654E+001	2.8096E+002
170	5.5396E+000	1.2998E-003	4.6762E+000	7.8911E+000	4.8193E+001	3.0129E+002
180	5.6461E+000	1.2310E-003	4.7520E+000	8.1765E+000	5.0727E+001	3.2191E+002
190	5.7488E+000	1.1692E-003	4.8253E+000	8.4565E+000	5.3255E+001	3.4280E+002
200	5.8479E+000	1.1133E-003	4.8963E+000	8.7316E+000	5.5778E+001	3.6397E+002
210	5.9438E+000	1.0626E-003	4.9651E+000	9.0022E+000	5.8297E+001	3.8540E+002
220	6.0367E+000	1.0163E-003	5.0318E+000	9.2684E+000	6.0812E+001	4.0710E+002
230	6.1268E+000	9.7395E-004	5.0968E+000	9.5306E+000	6.3323E+001	4.2904E+002
240	6.2144E+000	9.3498E-004	5.1600E+000	9.7890E+000	6.5830E+001	4.5123E+002
250	6.2995E+000	8.9904E-004	5.2215E+000	1.0044E+001	6.8334E+001	4.7366E+002

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .500

A	RU0	RU1	RU2	RU3	RU4
10	2.4839E+000	3.2242E+000	2.5778E+000	2.8187E+000	3.0122E+000
20	2.9888E+000	3.6227E+000	3.0827E+000	3.2904E+000	3.4576E+000
30	3.3521E+000	3.9258E+000	3.4429E+000	3.6314E+000	3.7833E+000
40	3.6452E+000	4.1777E+000	3.7328E+000	3.9080E+000	4.0493E+000
50	3.8949E+000	4.3965E+000	3.9795E+000	4.1448E+000	4.2781E+000
60	4.1145E+000	4.5916E+000	4.1965E+000	4.3539E+000	4.4808E+000
70	4.3118E+000	4.7689E+000	4.3914E+000	4.5424E+000	4.6640E+000
80	4.4918E+000	4.9319E+000	4.5693E+000	4.7147E+000	4.8319E+000
90	4.6578E+000	5.0833E+000	4.7334E+000	4.8741E+000	4.9875E+000
100	4.8123E+000	5.2251E+000	4.8863E+000	5.0228E+000	5.1327E+000
110	4.9571E+000	5.3586E+000	5.0296E+000	5.1624E+000	5.2694E+000
120	5.0937E+000	5.4850E+000	5.1647E+000	5.2942E+000	5.3985E+000
130	5.2231E+000	5.6053E+000	5.2927E+000	5.4193E+000	5.5212E+000
140	5.3461E+000	5.7200E+000	5.4146E+000	5.5384E+000	5.6381E+000
150	5.4636E+000	5.8299E+000	5.5310E+000	5.6523E+000	5.7499E+000
160	5.5761E+000	5.9354E+000	5.6424E+000	5.7614E+000	5.8572E+000
170	5.6842E+000	6.0369E+000	5.7494E+000	5.8663E+000	5.9604E+000
180	5.7881E+000	6.1348E+000	5.8525E+000	5.9674E+000	6.0598E+000
190	5.8884E+000	6.2295E+000	5.9518E+000	6.0649E+000	6.1559E+000
200	5.9852E+000	6.3211E+000	6.0479E+000	6.1592E+000	6.2488E+000
210	6.0790E+000	6.4099E+000	6.1409E+000	6.2506E+000	6.3388E+000
220	6.1699E+000	6.4961E+000	6.2310E+000	6.3392E+000	6.4262E+000
230	6.2581E+000	6.5799E+000	6.3185E+000	6.4252E+000	6.5111E+000
240	6.3439E+000	6.6615E+000	6.4036E+000	6.5090E+000	6.5937E+000
250	6.4273E+000	6.7410E+000	6.4864E+000	6.5905E+000	6.6741E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .500

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.1529E+000	1.4965E+000	1.1965E+000	1.3083E+000	1.3981E+000
20	1.1011E+000	1.3346E+000	1.1357E+000	1.2122E+000	1.2738E+000
30	1.0788E+000	1.2634E+000	1.1080E+000	1.1687E+000	1.2176E+000
40	1.0659E+000	1.2216E+000	1.0915E+000	1.1427E+000	1.1840E+000
50	1.0573E+000	1.1934E+000	1.0802E+000	1.1251E+000	1.1613E+000
60	1.0510E+000	1.1729E+000	1.0719E+000	1.1122E+000	1.1446E+000
70	1.0462E+000	1.1571E+000	1.0656E+000	1.1022E+000	1.1317E+000
80	1.0425E+000	1.1446E+000	1.0605E+000	1.0942E+000	1.1214E+000
90	1.0394E+000	1.1343E+000	1.0563E+000	1.0876E+000	1.1129E+000
100	1.0368E+000	1.1257E+000	1.0527E+000	1.0821E+000	1.1058E+000
110	1.0346E+000	1.1184E+000	1.0497E+000	1.0774E+000	1.0998E+000
120	1.0327E+000	1.1121E+000	1.0471E+000	1.0734E+000	1.0945E+000
130	1.0311E+000	1.1065E+000	1.0448E+000	1.0698E+000	1.0899E+000
140	1.0296E+000	1.1016E+000	1.0428E+000	1.0666E+000	1.0858E+000
150	1.0283E+000	1.0972E+000	1.0410E+000	1.0638E+000	1.0822E+000
160	1.0272E+000	1.0933E+000	1.0394E+000	1.0613E+000	1.0789E+000
170	1.0261E+000	1.0898E+000	1.0379E+000	1.0590E+000	1.0760E+000
180	1.0251E+000	1.0866E+000	1.0365E+000	1.0569E+000	1.0733E+000
190	1.0243E+000	1.0836E+000	1.0353E+000	1.0550E+000	1.0708E+000
200	1.0235E+000	1.0809E+000	1.0342E+000	1.0532E+000	1.0685E+000
210	1.0227E+000	1.0784E+000	1.0331E+000	1.0516E+000	1.0665E+000
220	1.0221E+000	1.0761E+000	1.0322E+000	1.0501E+000	1.0645E+000
230	1.0214E+000	1.0740E+000	1.0313E+000	1.0487E+000	1.0627E+000
240	1.0208E+000	1.0720E+000	1.0305E+000	1.0474E+000	1.0610E+000
250	1.0203E+000	1.0701E+000	1.0297E+000	1.0462E+000	1.0595E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .500

A	N	Y0	Z0	Z2	Z4
10	8.5316E-001	1.8314E-001	1.5624E-001	2.2160E+000	3.4554E+001
20	9.0055E-001	1.9872E-001	1.7895E-001	3.5177E+000	6.9251E+001
30	9.2188E-001	2.0630E-001	1.9018E-001	4.6095E+000	1.0656E+002
40	9.3448E-001	2.1098E-001	1.9716E-001	5.5840E+000	1.4618E+002
50	9.4296E-001	2.1423E-001	2.0201E-001	6.4796E+000	1.8787E+002
60	9.4913E-001	2.1665E-001	2.0562E-001	7.3171E+000	2.3140E+002
70	9.5385E-001	2.1853E-001	2.0844E-001	8.1090E+000	2.7662E+002
80	9.5760E-001	2.2005E-001	2.1072E-001	8.8640E+000	3.2340E+002
90	9.6067E-001	2.2130E-001	2.1260E-001	9.5881E+000	3.7183E+002
100	9.6324E-001	2.2236E-001	2.1419E-001	1.0286E+001	4.2122E+002
110	9.6542E-001	2.2327E-001	2.1555E-001	1.0960E+001	4.7208E+002
120	9.6730E-001	2.2406E-001	2.1674E-001	1.1615E+001	5.2416E+002
130	9.6895E-001	2.2476E-001	2.1778E-001	1.2252E+001	5.7740E+002
140	9.7040E-001	2.2537E-001	2.1870E-001	1.2872E+001	6.3174E+002
150	9.7169E-001	2.2593E-001	2.1953E-001	1.3478E+001	6.8713E+002
160	9.7285E-001	2.2642E-001	2.2028E-001	1.4071E+001	7.4353E+002
170	9.7390E-001	2.2687E-001	2.2095E-001	1.4651E+001	8.0091E+002
180	9.7485E-001	2.2729E-001	2.2157E-001	1.5220E+001	8.5923E+002
190	9.7572E-001	2.2766E-001	2.2213E-001	1.5779E+001	9.1846E+002
200	9.7652E-001	2.2801E-001	2.2265E-001	1.6328E+001	9.7856E+002
210	9.7725E-001	2.2833E-001	2.2313E-001	1.6867E+001	1.0395E+003
220	9.7793E-001	2.2863E-001	2.2358E-001	1.7399E+001	1.1013E+003
230	9.7856E-001	2.2890E-001	2.2399E-001	1.7922E+001	1.1639E+003
240	9.7915E-001	2.2916E-001	2.2438E-001	1.8438E+001	1.2273E+003
250	9.7970E-001	2.2940E-001	2.2474E-001	1.8946E+001	1.2914E+003

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.000

Q= .600

A	R0	RH0	RM	Y2	Y3	Y4
10	2.1544E+000	1.3495E-002	2.7843E+000	1.7540E+000	6.6450E+000	2.7857E+001
20	2.7144E+000	8.0492E-003	3.0647E+000	2.4580E+000	1.0144E+001	4.5474E+001
30	3.1072E+000	5.8159E-003	3.2811E+000	3.0304E+000	1.3309E+001	6.2798E+001
40	3.4199E+000	4.5772E-003	3.4628E+000	3.5343E+000	1.6316E+001	8.0297E+001
50	3.6840E+000	3.7838E-003	3.6217E+000	3.9939E+000	1.9226E+001	9.8098E+001
60	3.9148E+000	3.2299E-003	3.7642E+000	4.4214E+000	2.2070E+001	1.1624E+002
70	4.1212E+000	2.8204E-003	3.8942E+000	4.8243E+000	2.4866E+001	1.3473E+002
80	4.3088E+000	2.5048E-003	4.0142E+000	5.2074E+000	2.7624E+001	1.5357E+002
90	4.4813E+000	2.2538E-003	4.1260E+000	5.5741E+000	3.0352E+001	1.7276E+002
100	4.6415E+000	2.0493E-003	4.2309E+000	5.9270E+000	3.3057E+001	1.9228E+002
110	4.7913E+000	1.8794E-003	4.3299E+000	6.2678E+000	3.5740E+001	2.1212E+002
120	4.9323E+000	1.7359E-003	4.4239E+000	6.5980E+000	3.8406E+001	2.3228E+002
130	5.0657E+000	1.6131E-003	4.5134E+000	6.9190E+000	4.1057E+001	2.5274E+002
140	5.1924E+000	1.5067E-003	4.5990E+000	7.2316E+000	4.3695E+001	2.7350E+002
150	5.3132E+000	1.4136E-003	4.6811E+000	7.5366E+000	4.6321E+001	2.9455E+002
160	5.4287E+000	1.3315E-003	4.7599E+000	7.8348E+000	4.8937E+001	3.1587E+002
170	5.5396E+000	1.2586E-003	4.8359E+000	8.1267E+000	5.1543E+001	3.3747E+002
180	5.6461E+000	1.1933E-003	4.9093E+000	8.4128E+000	5.4141E+001	3.5933E+002
190	5.7488E+000	1.1345E-003	4.9803E+000	8.6936E+000	5.6731E+001	3.8145E+002
200	5.8479E+000	1.0813E-003	5.0491E+000	8.9694E+000	5.9315E+001	4.0382E+002
210	5.9438E+000	1.0329E-003	5.1158E+000	9.2405E+000	6.1891E+001	4.2643E+002
220	6.0367E+000	9.8875E-004	5.1807E+000	9.5073E+000	6.4462E+001	4.4929E+002
230	6.1268E+000	9.4822E-004	5.2438E+000	9.7700E+000	6.7028E+001	4.7237E+002
240	6.2144E+000	9.1091E-004	5.3052E+000	1.0029E+001	6.9588E+001	4.9569E+002
250	6.2995E+000	8.7646E-004	5.3651E+000	1.0284E+001	7.2143E+001	5.1923E+002

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, VL

RZ=1.000

Q= .600

A	RU0	RU1	RU2	RU3	RU4
10	2.6056E+000	3.5945E+000	2.7106E+000	3.0306E+000	3.2867E+000
20	3.0954E+000	3.9566E+000	3.2088E+000	3.4895E+000	3.7151E+000
30	3.4495E+000	4.2360E+000	3.5629E+000	3.8202E+000	4.0273E+000
40	3.7362E+000	4.4705E+000	3.8478E+000	4.0886E+000	4.2826E+000
50	3.9809E+000	4.6757E+000	4.0903E+000	4.3185E+000	4.5024E+000
60	4.1966E+000	4.8596E+000	4.3036E+000	4.5217E+000	4.6975E+000
70	4.3906E+000	5.0274E+000	4.4954E+000	4.7051E+000	4.8741E+000
80	4.5678E+000	5.1823E+000	4.6705E+000	4.8730E+000	5.0362E+000
90	4.7314E+000	5.3266E+000	4.8322E+000	5.0285E+000	5.1867E+000
100	4.8838E+000	5.4621E+000	4.9828E+000	5.1736E+000	5.3273E+000
110	5.0267E+000	5.5900E+000	5.1240E+000	5.3099E+000	5.4598E+000
120	5.1616E+000	5.7113E+000	5.2573E+000	5.4388E+000	5.5851E+000
130	5.2894E+000	5.8268E+000	5.3837E+000	5.5612E+000	5.7042E+000
140	5.4111E+000	5.9373E+000	5.5039E+000	5.6778E+000	5.8179E+000
150	5.5273E+000	6.0433E+000	5.6188E+000	5.7894E+000	5.9268E+000
160	5.6386E+000	6.1451E+000	5.7289E+000	5.8963E+000	6.0312E+000
170	5.7455E+000	6.2432E+000	5.8346E+000	5.9992E+000	6.1318E+000
180	5.8485E+000	6.3379E+000	5.9364E+000	6.0984E+000	6.2288E+000
190	5.9478E+000	6.4296E+000	6.0347E+000	6.1941E+000	6.3225E+000
200	6.0437E+000	6.5184E+000	6.1297E+000	6.2867E+000	6.4132E+000
210	6.1367E+000	6.6045E+000	6.2216E+000	6.3765E+000	6.5012E+000
220	6.2268E+000	6.6882E+000	6.3108E+000	6.4636E+000	6.5866E+000
230	6.3142E+000	6.7697E+000	6.3974E+000	6.5482E+000	6.6696E+000
240	6.3993E+000	6.8490E+000	6.4816E+000	6.6305E+000	6.7504E+000
250	6.4821E+000	6.9264E+000	6.5636E+000	6.7107E+000	6.8292E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .600

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.2094E+000	1.6684E+000	1.2582E+000	1.4067E+000	1.5256E+000
20	1.1403E+000	1.4576E+000	1.1821E+000	1.2856E+000	1.3687E+000
30	1.1102E+000	1.3633E+000	1.1467E+000	1.2295E+000	1.2961E+000
40	1.0925E+000	1.3072E+000	1.1251E+000	1.1955E+000	1.2522E+000
50	1.0806E+000	1.2692E+000	1.1103E+000	1.1722E+000	1.2222E+000
60	1.0720E+000	1.2413E+000	1.0993E+000	1.1550E+000	1.1999E+000
70	1.0654E+000	1.2199E+000	1.0908E+000	1.1417E+000	1.1827E+000
80	1.0601E+000	1.2027E+000	1.0840E+000	1.1309E+000	1.1688E+000
90	1.0558E+000	1.1886E+000	1.0783E+000	1.1221E+000	1.1574E+000
100	1.0522E+000	1.1768E+000	1.0735E+000	1.1146E+000	1.1478E+000
110	1.0491E+000	1.1667E+000	1.0694E+000	1.1082E+000	1.1395E+000
120	1.0465E+000	1.1579E+000	1.0659E+000	1.1027E+000	1.1323E+000
130	1.0442E+000	1.1503E+000	1.0628E+000	1.0978E+000	1.1260E+000
140	1.0421E+000	1.1435E+000	1.0600E+000	1.0935E+000	1.1205E+000
150	1.0403E+000	1.1374E+000	1.0575E+000	1.0896E+000	1.1155E+000
160	1.0387E+000	1.1320E+000	1.0553E+000	1.0861E+000	1.1110E+000
170	1.0372E+000	1.1270E+000	1.0533E+000	1.0830E+000	1.1069E+000
180	1.0358E+000	1.1225E+000	1.0514E+000	1.0801E+000	1.1032E+000
190	1.0346E+000	1.1184E+000	1.0497E+000	1.0775E+000	1.0998E+000
200	1.0335E+000	1.1146E+000	1.0482E+000	1.0750E+000	1.0967E+000
210	1.0324E+000	1.1112E+000	1.0467E+000	1.0728E+000	1.0938E+000
220	1.0315E+000	1.1079E+000	1.0454E+000	1.0707E+000	1.0911E+000
230	1.0306E+000	1.1049E+000	1.0442E+000	1.0688E+000	1.0886E+000
240	1.0298E+000	1.1021E+000	1.0430E+000	1.0670E+000	1.0863E+000
250	1.0290E+000	1.0995E+000	1.0419E+000	1.0653E+000	1.0841E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.000

Q= .600

A	N	Y0	70	Z2	Z4
10	8.0547E-001	1.6880E-001	1.3596E-001	2.2160E+000	4.2948E+001
20	8.6436E-001	1.8668E-001	1.6136E-001	3.5177E+000	8.2601E+001
30	8.9203E-001	1.9580E-001	1.7466E-001	4.6095E+000	1.2406E+002
40	9.0875E-001	2.0158E-001	1.8319E-001	5.5840E+000	1.6740E+002
50	9.2016E-001	2.0567E-001	1.8925E-001	6.4796E+000	2.1248E+002
60	9.2853E-001	2.0875E-001	1.9383E-001	7.3171E+000	2.5920E+002
70	9.3499E-001	2.1117E-001	1.9745E-001	8.1090E+000	3.0743E+002
80	9.4016E-001	2.1315E-001	2.0039E-001	8.8640E+000	3.5708E+002
90	9.4440E-001	2.1479E-001	2.0285E-001	9.5881E+000	4.0806E+002
100	9.4796E-001	2.1618E-001	2.0493E-001	1.0286E+001	4.6030E+002
110	9.5099E-001	2.1739E-001	2.0673E-001	1.0960E+001	5.1373E+002
120	9.5362E-001	2.1843E-001	2.0830E-001	1.1615E+001	5.6830E+002
130	9.5591E-001	2.1936E-001	2.0969E-001	1.2252E+001	6.2395E+002
140	9.5794E-001	2.2019E-001	2.1093E-001	1.2872E+001	6.8065E+002
150	9.5975E-001	2.2093E-001	2.1203E-001	1.3478E+001	7.3834E+002
160	9.6138E-001	2.2159E-001	2.1304E-001	1.4071E+001	7.9700E+002
170	9.6285E-001	2.2220E-001	2.1395E-001	1.4651E+001	8.5658E+002
180	9.6419E-001	2.2276E-001	2.1478E-001	1.5220E+001	9.1706E+002
190	9.6541E-001	2.2327E-001	2.1555E-001	1.5779E+001	9.7841E+002
200	9.6653E-001	2.2374E-001	2.1625E-001	1.6328E+001	1.0406E+003
210	9.6757E-001	2.2418E-001	2.1690E-001	1.6867E+001	1.1036E+003
220	9.6853E-001	2.2458E-001	2.1751E-001	1.7399E+001	1.1674E+003
230	9.6942E-001	2.2496E-001	2.1808E-001	1.7922E+001	1.2320E+003
240	9.7025E-001	2.2531E-001	2.1861E-001	1.8438E+001	1.2973E+003
250	9.7102E-001	2.2564E-001	2.1910E-001	1.8946E+001	1.3634E+003

INVESTIGATION OF VARIATION OF RU WITH RH0, RV, YL

RZ=1.050

Q= .400

A	R2	RH0	RM	Y2	Y3	Y4
10	2.2621E+000	1.5758E+002	2.2980E+000	1.5509E+000	4.7529E+000	1.5538E+001
20	2.8501E+000	8.6328E-003	2.6617E+000	2.2833E+000	8.0336E+000	2.9638E+001
30	3.2626E+000	5.9860E-003	2.9621E+000	2.8920E+000	1.1160E+001	4.4766E+001
40	3.5909E+000	4.5931E-003	3.1540E+000	3.4332E+000	1.4212E+001	6.0822E+001
50	3.5682E+000	3.7307E-003	3.3449E+000	3.9297E+000	1.7219E+001	7.7707E+001
60	4.1106E+000	3.1433E-003	3.5141E+000	4.3933E+000	2.0196E+001	9.5340E+001
70	4.3273E+000	2.7169E-003	3.6669E+000	4.8314E+000	2.3150E+001	1.1366E+002
80	4.5242E+000	2.3932E-003	3.8068E+000	5.2488E+000	2.6086E+001	1.3260E+002
90	4.7054E+000	2.1388E-003	3.9364E+000	5.6490E+000	2.9009E+001	1.5213E+002
100	4.8736E+000	1.9337E-003	4.0573E+000	6.0344E+000	3.1920E+001	1.7222E+002
110	5.0309E+000	1.7647E-003	4.1710E+000	6.4071E+000	3.4822E+001	1.9282E+002
120	5.1790E+000	1.6230E-003	4.2783E+000	6.7686E+000	3.7715E+001	2.1391E+002
130	5.3190E+000	1.5025E-003	4.3802E+000	7.1201E+000	4.0602E+001	2.3547E+002
140	5.4520E+000	1.3987E-003	4.4772E+000	7.4626E+000	4.3482E+001	2.5748E+002
150	5.5789E+000	1.3085E-003	4.5700E+000	7.7971E+000	4.6357E+001	2.7992E+002
160	5.7002E+000	1.2292E-003	4.6590E+000	8.1241E+000	4.9227E+001	3.0276E+002
170	5.8165E+000	1.1590E-003	4.7445E+000	8.4443E+000	5.2093E+001	3.2600E+002
180	5.9284E+000	1.0964E-003	4.8269E+000	8.7584E+000	5.4954E+001	3.4962E+002
190	6.0362E+000	1.0403E-003	4.9064E+000	9.0666E+000	5.7812E+001	3.7361E+002
200	6.1403E+000	9.8968E-004	4.9833E+000	9.3694E+000	6.0667E+001	3.9795E+002
210	6.2410E+000	9.4377E-004	5.0578E+000	9.6672E+000	6.3519E+001	4.2265E+002
220	6.3385E+000	9.0194E-004	5.1300E+000	9.9604E+000	6.6368E+001	4.4767E+002
230	6.4332E+000	8.6368E-004	5.2002E+000	1.0249E+001	6.9215E+001	4.7302E+002
240	6.5251E+000	8.2855E-004	5.2685E+000	1.0534E+001	7.2059E+001	4.9869E+002
250	6.6145E+000	7.9617E-004	5.3349E+000	1.0814E+001	7.4901E+001	5.2467E+002

INVESTIGATION OF VARIATION OF RU WITH $\rho H_0, R_m, YL$

$RZ=1.050$

$Q= .400$

A	RU0	RU1	RU2	RU3	RU4
10	2.4744E+000	2.9667E+000	2.5489E+000	2.7103E+000	2.8404E+000
20	3.0240E+000	3.4362E+000	3.0927E+000	3.2285E+000	3.3380E+000
30	3.4165E+000	3.7854E+000	3.4806E+000	3.6024E+000	3.7005E+000
40	3.7319E+000	4.0718E+000	3.7923E+000	3.9047E+000	3.9952E+000
50	3.9997E+000	4.3183E+000	4.0573E+000	4.1627E+000	4.2476E+000
60	4.2348E+000	4.5367E+000	4.2899E+000	4.3899E+000	4.4704E+000
70	4.4456E+000	4.7339E+000	4.4988E+000	4.5943E+000	4.6712E+000
80	4.6377E+000	4.9146E+000	4.6891E+000	4.7809E+000	4.8547E+000
90	4.8147E+000	5.0819E+000	4.8645E+000	4.9531E+000	5.0244E+000
100	4.9792E+000	5.2380E+000	5.0278E+000	5.1136E+000	5.1826E+000
110	5.1334E+000	5.3847E+000	5.1807E+000	5.2641E+000	5.3311E+000
120	5.2786E+000	5.5233E+000	5.3248E+000	5.4060E+000	5.4713E+000
130	5.4161E+000	5.6548E+000	5.4613E+000	5.5405E+000	5.6042E+000
140	5.5468E+000	5.7801E+000	5.5912E+000	5.6686E+000	5.7308E+000
150	5.6716E+000	5.8999E+000	5.7151E+000	5.7908E+000	5.8517E+000
160	5.7910E+000	6.0147E+000	5.8337E+000	5.9080E+000	5.9676E+000
170	5.9056E+000	6.1251E+000	5.9476E+000	6.0204E+000	6.0790E+000
180	6.0158E+000	6.2315E+000	6.0571E+000	6.1287E+000	6.1862E+000
190	6.1221E+000	6.3341E+000	6.1628E+000	6.2332E+000	6.2897E+000
200	6.2248E+000	6.4334E+000	6.2649E+000	6.3341E+000	6.3898E+000
210	6.3242E+000	6.5296E+000	6.3637E+000	6.4319E+000	6.4867E+000
220	6.4204E+000	6.6228E+000	6.4594E+000	6.5266E+000	6.5806E+000
230	6.5139E+000	6.7135E+000	6.5523E+000	6.6187E+000	6.6719E+000
240	6.6047E+000	6.8016E+000	6.6427E+000	6.7081E+000	6.7606E+000
250	6.6930E+000	6.8874E+000	6.7306E+000	6.7951E+000	6.8470E+000

INVESTIGATION OF VARIATION OF RU WITH RHOTRM,YL

RZ=1.050

Q= .400

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.1485E+000	1.3770F+000	1.1831F+000	1.2580E+000	1.3184E+000
20	1.1141E+000	1.2659F+000	1.1394F+000	1.1894E+000	1.2298E+000
30	1.0995E+000	1.2183F+000	1.1202E+000	1.1594E+000	1.1910E+000
40	1.0912E+000	1.1906F+000	1.1089F+000	1.1418E+000	1.1682E+000
50	1.0857E+000	1.1722F+000	1.1013F+000	1.1299E+000	1.1530E+000
60	1.0817E+000	1.1589F+000	1.0958F+000	1.1214E+000	1.1419E+000
70	1.0787E+000	1.1487F+000	1.0916F+000	1.1148E+000	1.1334E+000
80	1.0763E+000	1.1406F+000	1.0883F+000	1.1096E+000	1.1267E+000
90	1.0744E+000	1.1340F+000	1.0855E+000	1.1053E+000	1.1212E+000
100	1.0728E+000	1.1285F+000	1.0832F+000	1.1017E+000	1.1166E+000
110	1.0714E+000	1.1238F+000	1.0813F+000	1.0987E+000	1.1126E+000
120	1.0702E+000	1.1198F+000	1.0796F+000	1.0960E+000	1.1093E+000
130	1.0692E+000	1.1163F+000	1.0781F+000	1.0937E+000	1.1063E+000
140	1.0683E+000	1.1132F+000	1.0768E+000	1.0917E+000	1.1037E+000
150	1.0675E+000	1.1104F+000	1.0756E+000	1.0899E+000	1.1014E+000
160	1.0667F+000	1.1079F+000	1.0746F+000	1.0883E+000	1.0993E+000
170	1.0661E+000	1.1057F+000	1.0737F+000	1.0868E+000	1.0974E+000
180	1.0655E+000	1.1037F+000	1.0728F+000	1.0855E+000	1.0957E+000
190	1.0649E+000	1.1018F+000	1.0720F+000	1.0843E+000	1.0941E+000
200	1.0644E+000	1.1001F+000	1.0713F+000	1.0831E+000	1.0927E+000
210	1.0640E+000	1.0985F+000	1.0706F+000	1.0821E+000	1.0913E+000
220	1.0636E+000	1.0971F+000	1.0700F+000	1.0812E+000	1.0901E+000
230	1.0632E+000	1.0958F+000	1.0695F+000	1.0803E+000	1.0890E+000
240	1.0628E+000	1.0945F+000	1.0689F+000	1.0795E+000	1.0879E+000
250	1.0625E+000	1.0933F+000	1.0684E+000	1.0787E+000	1.0869E+000

INVESTIGATION OF VARIATION OF RU WITH ρ_0, R_0, Y_L

$RZ=1.050$

$Q=.400$

A	N	Y0	Z0	Z2	Z4
10	9.0747E-001	2.0113F-001	1.8252F-001	2.4432E+000	3.2255E+001
20	9.3928F-001	2.1281F-001	1.6988F-001	3.8783E+000	6.8690E+001
30	9.5292E-001	2.1816E-001	2.0788E-001	5.0820E+000	1.0923E+002
40	9.6080E-001	2.2135F-001	2.1268E-001	6.1563E+000	1.5310E+002
50	9.6602E-001	2.2353F-001	2.1593E-001	7.1438E+000	1.9982E+002
60	9.6979E-001	2.2512F-001	2.1832F-001	8.0671E+000	2.4905E+002
70	9.7266E-001	2.2634F-001	2.2015E-001	8.9402E+000	3.0053E+002
80	9.7493F-001	2.2732F-001	2.2162F-001	9.7725E+000	3.5406E+002
90	9.7678E-001	2.2812E-001	2.2283E-001	1.0571E+001	4.0950E+002
100	9.7832E-001	2.2880F-001	2.2384E-001	1.1340E+001	4.6670E+002
110	9.7963E-001	2.2937F-001	2.2470E-001	1.2084E+001	5.2556E+002
120	9.8075E-001	2.2987F-001	2.2544E-001	1.2806E+001	5.8598E+002
130	9.8173E-001	2.3030F-001	2.2610E-001	1.3508E+001	6.4788E+002
140	9.8260E-001	2.3069F-001	2.2668E-001	1.4192E+001	7.1120E+002
150	9.8337E-001	2.3103F-001	2.2719E-001	1.4860E+001	7.7586E+002
160	9.8406E-001	2.3134F-001	2.2765E-001	1.5513E+001	8.4181E+002
170	9.8468E-001	2.3162F-001	2.2807E-001	1.6153E+001	9.0900E+002
180	9.8524E-001	2.3188F-001	2.2845F-001	1.6780E+001	9.7738E+002
190	9.8576E-001	2.3211E-001	2.2880E-001	1.7396E+001	1.0469E+003
200	9.8623E-001	2.3232F-001	2.2912F-001	1.8001E+001	1.1176E+003
210	9.8667E-001	2.3252E-001	2.2942E-001	1.8596E+001	1.1893E+003
220	9.8707F-001	2.3270F-001	2.2969E-001	1.9182E+001	1.2620E+003
230	9.8744E-001	2.3287F-001	2.2994E-001	1.9759E+001	1.3358E+003
240	9.8779E-001	2.3303F-001	2.3018F-001	2.0328E+001	1.4106E+003
250	9.8811E-001	2.3317F-001	2.3040E-001	2.0888E+001	1.4863E+003

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.050

Q= .500

A	R0	RHO	RM	Y2	Y3	Y4
10	2.2621E+000	1.3907E-002	2.5540E+000	1.7077E+000	5.8709E+000	2.1933E+001
20	2.5501E+000	7.9081E-003	2.8858E+000	2.4546E+000	9.4433E+000	3.8730E+001
30	3.2626E+000	5.5804E-003	3.1370E+000	3.0708E+000	1.2774E+001	5.6067E+001
40	3.5909E+000	4.3275E-003	3.3453E+000	3.6167E+000	1.5989E+001	7.4076E+001
50	3.8682E+000	3.5406E-003	3.5259E+000	4.1164E+000	1.9133E+001	9.2745E+001
60	4.1106E+000	2.9991E-003	3.6868E+000	4.5825E+000	2.2229E+001	1.1204E+002
70	4.3273E+000	2.6031E-003	3.8327E+000	5.0225E+000	2.5291E+001	1.3192E+002
80	4.5242E+000	2.3005E-003	3.9668E+000	5.4415E+000	2.8325E+001	1.5236E+002
90	4.7054E+000	2.0616E-003	4.0913E+000	5.8429E+000	3.1337E+001	1.7333E+002
100	4.8736E+000	1.8682E-003	4.2078E+000	6.2295E+000	3.4331E+001	1.9479E+002
110	5.0309E+000	1.7082E-003	4.3175E+000	6.6031E+000	3.7311E+001	2.1672E+002
120	5.1790E+000	1.5738E-003	4.4212E+000	6.9654E+000	4.0278E+001	2.3910E+002
130	5.3190E+000	1.4591E-003	4.5199E+000	7.3176E+000	4.3233E+001	2.6191E+002
140	5.4520E+000	1.3601E-003	4.6140E+000	7.6607E+000	4.6180E+001	2.8514E+002
150	5.5789E+000	1.2739E-003	4.7041E+000	7.9957E+000	4.9117E+001	3.0877E+002
160	5.7002E+000	1.1979E-003	4.7906E+000	8.3233E+000	5.2047E+001	3.3278E+002
170	5.8165E+000	1.1306E-003	4.8738E+000	8.6440E+000	5.4970E+001	3.5716E+002
180	5.9284E+000	1.0705E-003	4.9540E+000	8.9584E+000	5.7888E+001	3.8190E+002
190	6.0362E+000	1.0166E-003	5.0315E+000	9.2671E+000	6.0799E+001	4.0699E+002
200	6.1403E+000	9.6780E-004	5.1065E+000	9.5703E+000	6.3705E+001	4.3241E+002
210	6.2410E+000	9.2353E-004	5.1792E+000	9.8684E+000	6.6607E+001	4.5816E+002
220	6.3385E+000	8.8316E-004	5.2498E+000	1.0162E+001	6.9504E+001	4.8423E+002
230	6.4332E+000	8.4619E-004	5.3184E+000	1.0451E+001	7.2398E+001	5.1061E+002
240	6.5251E+000	8.1221E-004	5.3852E+000	1.0736E+001	7.5287E+001	5.3729E+002
250	6.6145E+000	7.8087E-004	5.4502E+000	1.1016E+001	7.8173E+001	5.6427E+002

INVESTIGATION OF VARIATION OF RU WITH RHO, R_u, Y_L

$RZ=1.050$

$Q=.500$

A	RU0	RU1	RU2	RU3	RU4
10	2.5796E+000	3.2973F+000	2.6741E+000	2.9081E+000	3.0960E+000
20	3.1136E+000	3.7256F+000	3.2066F+000	3.4073E+000	3.5689E+000
30	3.4974E+000	4.0499E+000	3.5866E+000	3.7683E+000	3.9148E+000
40	3.8067E+000	4.3188F+000	3.8923E+000	4.0611E+000	4.1971E+000
50	4.0701E+000	4.5519F+000	4.1525F+000	4.3115E+000	4.4397E+000
60	4.3016E+000	4.7596E+000	4.3813E+000	4.5326E+000	4.6545E+000
70	4.5095E+000	4.9480E+000	4.5869E+000	4.7318E+000	4.8485E+000
80	4.6991E+000	5.1212F+000	4.7743F+000	4.9139E+000	5.0263E+000
90	4.8740E+000	5.2819E+000	4.9473E+000	5.0822E+000	5.1909E+000
100	5.0368E+000	5.4323F+000	5.1083F+000	5.2392E+000	5.3446E+000
110	5.1893E+000	5.5738F+000	5.2593E+000	5.3866E+000	5.4891E+000
120	5.3331E+000	5.7078E+000	5.4017F+000	5.5258E+000	5.6257E+000
130	5.4693E+000	5.8352E+000	5.5365E+000	5.6577E+000	5.7553E+000
140	5.5988E+000	5.9567F+000	5.6649E+000	5.7834E+000	5.8789E+000
150	5.7225E+000	6.0730E+000	5.7874E+000	5.9036E+000	5.9970E+000
160	5.8409E+000	6.1846F+000	5.9048E+000	6.0187E+000	6.1104E+000
170	5.9546E+000	6.2920F+000	6.0175E+000	6.1293E+000	6.2193E+000
180	6.0640E+000	6.3956F+000	6.1259E+000	6.2359E+000	6.3243E+000
190	6.1694E+000	6.4957F+000	6.2305E+000	6.3387E+000	6.4257E+000
200	6.2714E+000	6.5925F+000	6.3317E+000	6.4382E+000	6.5238E+000
210	6.3700E+000	6.6864F+000	6.4295E+000	6.5345E+000	6.6188E+000
220	6.4656E+000	6.7775F+000	6.5244E+000	6.6279E+000	6.7110E+000
230	6.5585E+000	6.8661F+000	6.6165E+000	6.7186E+000	6.8006E+000
240	6.6487E+000	6.9523F+000	6.7061E+000	6.8068E+000	6.8878E+000
250	6.7364E+000	7.0363F+000	6.7932E+000	6.8927E+000	6.9727E+000

INVESTIGATION OF VARIATION OF RU WITH RHO^*R_M, YL

$RZ=1.050$

$Q= .500$

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.1974E+000	1.5305E+000	1.2412E+000	1.3498E+000	1.4371E+000
20	1.1471E+000	1.3725E+000	1.1813E+000	1.2553E+000	1.3148E+000
30	1.1256E+000	1.3034E+000	1.1543E+000	1.2128E+000	1.2599E+000
40	1.1131E+000	1.2628E+000	1.1381E+000	1.1875E+000	1.2272E+000
50	1.1048E+000	1.2356E+000	1.1272E+000	1.1703E+000	1.2051E+000
60	1.0988E+000	1.2158E+000	1.1192E+000	1.1578E+000	1.1889E+000
70	1.0942E+000	1.2006E+000	1.1130E+000	1.1481E+000	1.1765E+000
80	1.0906E+000	1.1885E+000	1.1080E+000	1.1404E+000	1.1665E+000
90	1.0876E+000	1.1786E+000	1.1040E+000	1.1341E+000	1.1583E+000
100	1.0852E+000	1.1704E+000	1.1006E+000	1.1288E+000	1.1515E+000
110	1.0831E+000	1.1633E+000	1.0977E+000	1.1242E+000	1.1456E+000
120	1.0812E+000	1.1572E+000	1.0951E+000	1.1203E+000	1.1406E+000
130	1.0797E+000	1.1519E+000	1.0929E+000	1.1169E+000	1.1361E+000
140	1.0783E+000	1.1472E+000	1.0910E+000	1.1138E+000	1.1322E+000
150	1.0770E+000	1.1430E+000	1.0893E+000	1.1111E+000	1.1287E+000
160	1.0759E+000	1.1392E+000	1.0877E+000	1.1087E+000	1.1256E+000
170	1.0749E+000	1.1358E+000	1.0863E+000	1.1065E+000	1.1227E+000
180	1.0740E+000	1.1327E+000	1.0850E+000	1.1045E+000	1.1201E+000
190	1.0732E+000	1.1299E+000	1.0838E+000	1.1026E+000	1.1178E+000
200	1.0724E+000	1.1273E+000	1.0827E+000	1.1009E+000	1.1156E+000
210	1.0717E+000	1.1249E+000	1.0817E+000	1.0994E+000	1.1136E+000
220	1.0711E+000	1.1227E+000	1.0808E+000	1.0979E+000	1.1117E+000
230	1.0705E+000	1.1207E+000	1.0799E+000	1.0966E+000	1.1100E+000
240	1.0699E+000	1.1187E+000	1.0791E+000	1.0953E+000	1.1084E+000
250	1.0694E+000	1.1170E+000	1.0784E+000	1.0942E+000	1.1069E+000

INVESTIGATION OF VARIATION OF RU WITH $RH\theta, R_m, YL$

$RZ=1.050$

$Q=,500$

A	N	Y0	Z0	Z2	Z4
10	8.6437E-001	1.8669F-001	1.6137F-001	2.4432E+000	3.9842E+001
20	9.0876E-001	2.0159F-001	1.8319E-001	3.8783E+000	8.0744E+001
30	9.2854E-001	2.0875F-001	1.9383E-001	5.0820E+000	1.2503E+002
40	9.4017E-001	2.1315F-001	2.0039E-001	6.1563E+000	1.7224E+002
50	9.4796E-001	2.1619F-001	2.0494E-001	7.1438E+000	2.2203E+002
60	9.5362F-001	2.1844F-001	2.0831E-001	8.0671E+000	2.7413E+002
70	9.5795E+001	2.2019F-001	2.1093E-001	8.9402E+000	3.2832E+002
80	9.6139E-001	2.2160F-001	2.1304F-001	9.7725E+000	3.8444E+002
90	9.6419E-001	2.2276E-001	2.1478E-001	1.0571E+001	4.4236E+002
100	9.6654E-001	2.2374F-001	2.1625F-001	1.1340E+001	5.0195E+002
110	9.6853E-001	2.2458F-001	2.1751E-001	1.2084E+001	5.6312E+002
120	9.7025E-001	2.2531F-001	2.1861E-001	1.2806E+001	6.2579E+002
130	9.7175E-001	2.2595F-001	2.1957E-001	1.3508E+001	6.8988E+002
140	9.7308E-001	2.2652F-001	2.2042F-001	1.4192E+001	7.5532E+002
150	9.7426E-001	2.2703E-001	2.2118E-001	1.4860E+001	8.2205E+002
160	9.7531E-001	2.2749F-001	2.2187F-001	1.5513E+001	8.9004E+002
170	9.7627E-001	2.2790F-001	2.2249E-001	1.6153E+001	9.5921E+002
180	9.7713E-001	2.2828F-001	2.2306F-001	1.6780E+001	1.0295E+003
190	9.7793E-001	2.2862F-001	2.2358E-001	1.7396E+001	1.1010E+003
200	9.7865F-001	2.2894F-001	2.2406F-001	1.8001E+001	1.1735E+003
210	9.7932E-001	2.2924F-001	2.2450E-001	1.8596E+001	1.2471E+003
220	9.7994E-001	2.2951F-001	2.2491E-001	1.9182E+001	1.3217E+003
230	9.8051E-001	2.2976F-001	2.2529E-001	1.9759E+001	1.3972E+003
240	9.8105E-001	2.3000F-001	2.2564F-001	2.0328E+001	1.4738E+003
250	9.8155E-001	2.3022F-001	2.2597E-001	2.0888E+001	1.5512E+003

INVESTIGATION OF VARIATION OF RU WITH RH0, RV, YL

RZ=1.050

Q= .600

A	R0	RH0	RM	Y2	Y3	Y4
10	2.2621E+000	1.2153E-002	2.8353E+000	1.8796E+000	7.2353E+000	3.0704E+001
20	2.8501E+000	7.1710E-003	3.1379E+000	2.6482E+000	1.1165E+001	5.0932E+001
30	3.2626E+000	5.1531E-003	3.3705E+000	3.2753E+000	1.4746E+001	7.1040E+001
40	3.5909E+000	4.0416E-003	3.5652E+000	3.8283E+000	1.8159E+001	9.1482E+001
50	3.8682E+000	3.3329E-003	3.7352E+000	4.3331E+000	2.1472E+001	1.1237E+002
60	4.1106E+000	2.8398E-003	3.8874E+000	4.8030E+000	2.4715E+001	1.3372E+002
70	4.3273E+000	2.4762E-003	4.0261E+000	5.2461E+000	2.7907E+001	1.5554E+002
80	4.5242E+000	2.1965E-003	4.1540E+000	5.6675E+000	3.1060E+001	1.7782E+002
90	4.7054E+000	1.9745E-003	4.2730E+000	6.0710E+000	3.4182E+001	2.0055E+002
100	4.8736E+000	1.7939E-003	4.3847E+000	6.4593E+000	3.7278E+001	2.2370E+002
110	5.0309E+000	1.6440E-003	4.4900E+000	6.8344E+000	4.0353E+001	2.4727E+002
120	5.1790E+000	1.5175E-003	4.5899E+000	7.1981E+000	4.3409E+001	2.7124E+002
130	5.3190E+000	1.4094E-003	4.6850E+000	7.5515E+000	4.6450E+001	2.9559E+002
140	5.4520E+000	1.3158E-003	4.7759E+000	7.8957E+000	4.9477E+001	3.2032E+002
150	5.5789E+000	1.2340E-003	4.8630E+000	8.2316E+000	5.2491E+001	3.4541E+002
160	5.7002E+000	1.1619E-003	4.9467E+000	8.5600E+000	5.5494E+001	3.7085E+002
170	5.8165E+000	1.0978E-003	5.0273E+000	8.8815E+000	5.8488E+001	3.9663E+002
180	5.9284E+000	1.0405E-003	5.1051E+000	9.1967E+000	6.1473E+001	4.2274E+002
190	6.0362E+000	9.8896E-004	5.1803E+000	9.5060E+000	6.4449E+001	4.4917E+002
200	6.1403E+000	9.4233E-004	5.2532E+000	9.8098E+000	6.7418E+001	4.7592E+002
210	6.2410E+000	8.9994E-004	5.3239E+000	1.0108E+001	7.0381E+001	5.0297E+002
220	6.3385E+000	8.6123E-004	5.3926E+000	1.0402E+001	7.3337E+001	5.3031E+002
230	6.4332E+000	8.2575E-004	5.4594E+000	1.0692E+001	7.6288E+001	5.5795E+002
240	6.5251E+000	7.9309E-004	5.5245E+000	1.0977E+001	7.9233E+001	5.8588E+002
250	6.6145E+000	7.6295E-004	5.5879E+000	1.1258E+001	8.2173E+001	6.1408E+002

INVESTIGATION OF VARIATION OF RU WITH $\rho H_0^2 R_0, YL$

$RZ=1.050$

$Q= .600$

A	RU0	RU1	RU2	RU3	RU4
10	2.6982E+000	3.6604E+000	2.8060E+000	3.1179E+000	3.3676E+000
20	3.2169E+000	4.0510E+000	3.2307E+000	3.6030E+000	3.8219E+000
30	3.5914E+000	4.3513E+000	3.7041E+000	3.9530E+000	4.1534E+000
40	3.8944E+000	4.6027E+000	4.0046E+000	4.2371E+000	4.4245E+000
50	4.1529E+000	4.8221E+000	4.2604E+000	4.4805E+000	4.6579E+000
60	4.3805E+000	5.0187E+000	4.4855E+000	4.6956E+000	4.8649E+000
70	4.5853E+000	5.1977E+000	4.6878E+000	4.8896E+000	5.0523E+000
80	4.7722E+000	5.3628E+000	4.8725E+000	5.0673E+000	5.2242E+000
90	4.9447E+000	5.5165E+000	5.0430E+000	5.2316E+000	5.3837E+000
100	5.1054E+000	5.6606E+000	5.2017E+000	5.3850E+000	5.5328E+000
110	5.2560E+000	5.7966E+000	5.3507E+000	5.5292E+000	5.6731E+000
120	5.3982E+000	5.9256E+000	5.4911E+000	5.6654E+000	5.8058E+000
130	5.5329E+000	6.0483E+000	5.6243E+000	5.7947E+000	5.9320E+000
140	5.6611E+000	6.1657E+000	5.7511E+000	5.9179E+000	6.0523E+000
150	5.7835E+000	6.2781E+000	5.8722E+000	6.0358E+000	6.1675E+000
160	5.9007E+000	6.3861E+000	5.9882E+000	6.1487E+000	6.2781E+000
170	6.0133E+000	6.4902E+000	6.0996E+000	6.2574E+000	6.3844E+000
180	6.1217E+000	6.5907E+000	6.2068E+000	6.3621E+000	6.4870E+000
190	6.2263E+000	6.6878E+000	6.3103E+000	6.4631E+000	6.5861E+000
200	6.3274E+000	6.7819E+000	6.4104E+000	6.5609E+000	6.6821E+000
210	6.4252E+000	6.8732E+000	6.5073E+000	6.6556E+000	6.7750E+000
220	6.5200E+000	6.9619E+000	6.6012E+000	6.7475E+000	6.8653E+000
230	6.6121E+000	7.0481E+000	6.6924E+000	6.8368E+000	6.9531E+000
240	6.7017E+000	7.1321E+000	6.7811E+000	6.9237E+000	7.0385E+000
250	6.7888E+000	7.2140E+000	6.8674E+000	7.0083E+000	7.1217E+000

INVESTIGATION OF VARIATION OF RU WITH RW0, RM, YL

RZ=1.050

Q= .600

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.2524E+000	1.6990F+000	1.3024F+000	1.4472E+000	1.5631E+000
20	1.1851E+000	1.4924F+000	1.2270F+000	1.3274E+000	1.4080E+000
30	1.1558E+000	1.4004E+000	1.1921E+000	1.2722E+000	1.3367E+000
40	1.1387E+000	1.3458F+000	1.1710F+000	1.2390E+000	1.2937E+000
50	1.1273E+000	1.3089F+000	1.1565F+000	1.2162E+000	1.2644E+000
60	1.1190E+000	1.2820F+000	1.1458F+000	1.1994E+000	1.2427E+000
70	1.1126F+000	1.2612F+000	1.1375F+000	1.1864E+000	1.2259E+000
80	1.1075E+000	1.2446F+000	1.1308F+000	1.1760E+000	1.2125E+000
90	1.1034E+000	1.2310E+000	1.1253F+000	1.1674E+000	1.2014E+000
100	1.0999F+000	1.2196F+000	1.1207F+000	1.1602E+000	1.1920E+000
110	1.0970E+000	1.2098F+000	1.1167F+000	1.1540E+000	1.1840E+000
120	1.0944E+000	1.2014F+000	1.1133F+000	1.1486E+000	1.1771E+000
130	1.0922E+000	1.1940F+000	1.1103F+000	1.1439E+000	1.1710E+000
140	1.0903E+000	1.1874F+000	1.1076F+000	1.1397E+000	1.1656E+000
150	1.0885E+000	1.1816F+000	1.1052E+000	1.1360E+000	1.1608E+000
160	1.0869F+000	1.1764F+000	1.1030E+000	1.1326E+000	1.1565E+000
170	1.0855E+000	1.1716F+000	1.1011F+000	1.1296E+000	1.1525E+000
180	1.0842F+000	1.1673F+000	1.0993F+000	1.1268E+000	1.1489E+000
190	1.0831E+000	1.1633F+000	1.0977F+000	1.1243E+000	1.1457E+000
200	1.0820E+000	1.1597F+000	1.0962E+000	1.1219E+000	1.1426E+000
210	1.0810E+000	1.1564F+000	1.0948F+000	1.1198E+000	1.1398E+000
220	1.0801E+000	1.1533F+000	1.0935F+000	1.1178E+000	1.1373E+000
230	1.0792E+000	1.1504F+000	1.0923F+000	1.1159E+000	1.1349E+000
240	1.0784E+000	1.1477F+000	1.0912F+000	1.1141E+000	1.1326E+000
250	1.0777E+000	1.1452F+000	1.0902E+000	1.1125E+000	1.1305E+000

INVESTIGATION OF VARIATION OF RU WITH RHO_{CRM},YL

RZ=1.050

Q= .600

A	N	Y0	70	Z2	Z4
10	8.1911E-001	1.7278F-001	1.4153E-001	2.4432E+000	4.9102E+001
20	8.7492E-001	1.9010F-001	1.4632E-001	3.8783E+000	9.5467E+001
30	9.0083E-001	1.9881E-001	1.7910E-001	5.0820E+000	1.4433E+002
40	9.1638E-001	2.0430F-001	1.8722F-001	6.1563E+000	1.9563E+002
50	9.2695E-001	2.0816F-001	1.9295E-001	7.1438E+000	2.4917E+002
60	9.3468E-001	2.1105F-001	1.9727F-001	8.0671E+000	3.0478E+002
70	9.4064E-001	2.1333F-001	2.0066E-001	8.9402E+000	3.6229E+002
80	9.4539E-001	2.1517F-001	2.0342F-001	9.7725E+000	4.2158E+002
90	9.4928E-001	2.1671E-001	2.0572E-001	1.0571E+001	4.8252E+002
100	9.5255E-001	2.1801F-001	2.0766E-001	1.1340E+001	5.4504E+002
110	9.5533E-001	2.1913F-001	2.0934E-001	1.2084E+001	6.0904E+002
120	9.5773E-001	2.2010F-001	2.1080F-001	1.2806E+001	6.7445E+002
130	9.5984E-001	2.2096F-001	2.1209F-001	1.3508E+001	7.4120E+002
140	9.6170E-001	2.2173F-001	2.1323F-001	1.4192E+001	8.0924E+002
150	9.6335E-001	2.2241F-001	2.1426E-001	1.4860E+001	8.7852E+002
160	9.6484E-001	2.2303F-001	2.1519E-001	1.5513E+001	9.4898E+002
170	9.6618E-001	2.2359E-001	2.1603F-001	1.6153E+001	1.0206E+003
180	9.6741E-001	2.2411F-001	2.1680F-001	1.6780E+001	1.0933E+003
190	9.6852E-001	2.2458F-001	2.1751E-001	1.7396E+001	1.1671E+003
200	9.6955F-001	2.2501F-001	2.1816E-001	1.8001E+001	1.2419E+003
210	9.7049E-001	2.2541E-001	2.1876E-001	1.8596E+001	1.3177E+003
220	9.7137E-001	2.2579F-001	2.1932E-001	1.9182E+001	1.3946E+003
230	9.7218E-001	2.2614F-001	2.1984E-001	1.9759E+001	1.4723E+003
240	9.7294E-001	2.2646F-001	2.2033E-001	2.0328E+001	1.5510E+003
250	9.7364E-001	2.2676F-001	2.2079E-001	2.0888E+001	1.6306E+003

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.100

Q= .400

A	R0	RHO	RM	Y2	Y3	Y4
10	2.3699E+000	1.3999E-002	2.3623E+000	1.6734E+000	5.2616E+000	1.7584E+001
20	2.9858E+000	7.6185E-003	2.7495E+000	2.4749E+000	8.9208E+000	3.4065E+001
30	3.4179E+000	5.2667E-003	3.0365E+000	3.1418E+000	1.2538E+001	5.1871E+001
40	3.7619E+000	4.0339E-003	3.2714E+000	3.7351E+000	1.6018E+001	7.0844E+001
50	4.0524E+000	3.2725E-003	3.4733E+000	4.2795E+000	1.9451E+001	9.0845E+001
60	4.3063E+000	2.7548E-003	3.6520E+000	4.7880E+000	2.2285E+001	1.1177E+002
70	4.5333E+000	2.3795E-003	3.8133E+000	5.2686E+000	2.6228E+001	1.3353E+002
80	4.7397E+000	2.0948E-003	3.9610E+000	5.7265E+000	2.9587E+001	1.5607E+002
90	4.9295E+000	1.8713E-003	4.0976E+000	6.1655E+000	3.2931E+001	1.7933E+002
100	5.1057E+000	1.6912E-003	4.2251E+000	6.5884E+000	3.6263E+001	2.0326E+002
110	5.2705E+000	1.5429E-003	4.3448E+000	6.9973E+000	3.9585E+001	2.2782E+002
120	5.4256E+000	1.4186E-003	4.4579E+000	7.3939E+000	4.2899E+001	2.5298E+002
130	5.5723E+000	1.3129E-003	4.5652E+000	7.7795E+000	4.6205E+001	2.7872E+002
140	5.7116E+000	1.2220E-003	4.6674E+000	8.1554E+000	4.9504E+001	3.0499E+002
150	5.8445E+000	1.1429E-003	4.7651E+000	8.5223E+000	5.2798E+001	3.3179E+002
160	5.9716E+000	1.0735E-003	4.8587E+000	8.8812E+000	5.6087E+001	3.5908E+002
170	6.0935E+000	1.0120E-003	4.9487E+000	9.2326E+000	5.9372E+001	3.8686E+002
180	6.2107E+000	9.5727E-004	5.0353E+000	9.5772E+000	6.2652E+001	4.1510E+002
190	6.3237E+000	9.0816E-004	5.1190E+000	9.9154E+000	6.5929E+001	4.4379E+002
200	6.4327E+000	8.6385E-004	5.1999E+000	1.0248E+001	6.9202E+001	4.7291E+002
210	6.5382E+000	8.2369E-004	5.2782E+000	1.0575E+001	7.2471E+001	5.0244E+002
220	6.6404E+000	7.8710E-004	5.3542E+000	1.0896E+001	7.5738E+001	5.3239E+002
230	6.7395E+000	7.5364E-004	5.4280E+000	1.1213E+001	7.9003E+001	5.6273E+002
240	6.8358E+000	7.2292E-004	5.4998E+000	1.1525E+001	8.2265E+001	5.9346E+002
250	6.9294E+000	6.9461E-004	5.5697E+000	1.1833E+001	8.5524E+001	6.2456E+002

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.100

Q= .400

A	RU0	RU1	RU2	RU3	RU4
10	2.5739E+000	3.0497E+000	2.6476E+000	2.8038E+000	2.9296E+000
20	3.1526E+000	3.5496E+000	3.2198E+000	3.3507E+000	3.4563E+000
30	3.5654E+000	3.9201E+000	3.6278E+000	3.7450E+000	3.8394E+000
40	3.8969E+000	4.2234E+000	3.9555E+000	4.0635E+000	4.1505E+000
50	4.1783E+000	4.4840E+000	4.2340E+000	4.3352E+000	4.4167E+000
60	4.4252E+000	4.7148E+000	4.4785E+000	4.5744E+000	4.6517E+000
70	4.6466E+000	4.9230E+000	4.6979E+000	4.7895E+000	4.8632E+000
80	4.8482E+000	5.1137E+000	4.8978E+000	4.9858E+000	5.0566E+000
90	5.0340E+000	5.2900E+000	5.0820E+000	5.1670E+000	5.2353E+000
100	5.2067E+000	5.4546E+000	5.2534E+000	5.3357E+000	5.4018E+000
110	5.3685E+000	5.6092E+000	5.4140E+000	5.4939E+000	5.5581E+000
120	5.5208E+000	5.7552E+000	5.5653E+000	5.6431E+000	5.7056E+000
130	5.6651E+000	5.8937E+000	5.7086E+000	5.7845E+000	5.8455E+000
140	5.8023E+000	6.0256E+000	5.8449E+000	5.9190E+000	5.9786E+000
150	5.9332E+000	6.1517E+000	5.9750E+000	6.0475E+000	6.1058E+000
160	6.0584E+000	6.2726E+000	6.0994E+000	6.1706E+000	6.2277E+000
170	6.1786E+000	6.3887E+000	6.2190E+000	6.2887E+000	6.3448E+000
180	6.2943E+000	6.5006E+000	6.3339E+000	6.4025E+000	6.4575E+000
190	6.4058E+000	6.6086E+000	6.4448E+000	6.5122E+000	6.5663E+000
200	6.5134E+000	6.7130E+000	6.5519E+000	6.6182E+000	6.6715E+000
210	6.6176E+000	6.8142E+000	6.6556E+000	6.7209E+000	6.7733E+000
220	6.7186E+000	6.9123E+000	6.7560E+000	6.8204E+000	6.8720E+000
230	6.8166E+000	7.0076E+000	6.8536E+000	6.9170E+000	6.9679E+000
240	6.9118E+000	7.1002E+000	6.9483E+000	7.0109E+000	7.0611E+000
250	7.0045E+000	7.194E+000	7.0405E+000	7.1023E+000	7.1519E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.100

Q= .400

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.1947E+000	1.4156E+000	1.2289E+000	1.3014E+000	1.3598E+000
20	1.1614E+000	1.3077E+000	1.1862E+000	1.2344E+000	1.2733E+000
30	1.1475E+000	1.2616E+000	1.1675E+000	1.2053E+000	1.2356E+000
40	1.1395E+000	1.2349E+000	1.1566E+000	1.1882E+000	1.2136E+000
50	1.1342E+000	1.2172E+000	1.1493E+000	1.1768E+000	1.1989E+000
60	1.1304E+000	1.2043E+000	1.1440E+000	1.1685E+000	1.1882E+000
70	1.1275E+000	1.1946E+000	1.1399E+000	1.1622E+000	1.1800E+000
80	1.1252E+000	1.1868E+000	1.1367E+000	1.1571E+000	1.1735E+000
90	1.1233E+000	1.1805E+000	1.1340E+000	1.1530E+000	1.1682E+000
100	1.1218E+000	1.1752E+000	1.1318E+000	1.1496E+000	1.1638E+000
110	1.1204E+000	1.1707E+000	1.1300E+000	1.1466E+000	1.1600E+000
120	1.1193E+000	1.1668E+000	1.1283E+000	1.1441E+000	1.1568E+000
130	1.1183E+000	1.1634E+000	1.1269E+000	1.1419E+000	1.1539E+000
140	1.1175E+000	1.1605E+000	1.1257E+000	1.1399E+000	1.1514E+000
150	1.1167E+000	1.1578E+000	1.1245E+000	1.1382E+000	1.1492E+000
160	1.1170E+000	1.1554E+000	1.1235E+000	1.1366E+000	1.1472E+000
170	1.1154E+000	1.1533E+000	1.1226E+000	1.1352E+000	1.1454E+000
180	1.1148E+000	1.1513E+000	1.1218E+000	1.1340E+000	1.1437E+000
190	1.1143E+000	1.1496E+000	1.1211E+000	1.1328E+000	1.1422E+000
200	1.1138E+000	1.1479E+000	1.1204E+000	1.1317E+000	1.1408E+000
210	1.1134E+000	1.1464E+000	1.1197E+000	1.1307E+000	1.1396E+000
220	1.1130E+000	1.1450E+000	1.1192E+000	1.1298E+000	1.1384E+000
230	1.1126E+000	1.1438E+000	1.1186E+000	1.1290E+000	1.1373E+000
240	1.1122E+000	1.1426E+000	1.1181E+000	1.1282E+000	1.1363E+000
250	1.1119E+000	1.1414E+000	1.1176E+000	1.1274E+000	1.1353E+000

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.100

Q= .400

A	N	Y0	Z0	Z2	Z4
10	9.1485E-001	2.0375E-001	1.8640E-001	2.6814E+000	3.7408E+001
20	9.4434E-001	2.1476E-001	2.0281E-001	4.2564E+000	8.0445E+001
30	9.5697E-001	2.1977E-001	2.1030E-001	5.5775E+000	1.2856E+002
40	9.6415E-001	2.2274E-001	2.1476E-001	6.7566E+000	1.8077E+002
50	9.6895E-001	2.2476E-001	2.1778E-001	7.8404E+000	2.3646E+002
60	9.7240E-001	2.2623E-001	2.1999E-001	8.8537E+000	2.9521E+002
70	9.7503E-001	2.2736E-001	2.2168E-001	9.8119E+000	3.5670E+002
80	9.7711E-001	2.2827E-001	2.2304E-001	1.0725E+001	4.2069E+002
90	9.7880E-001	2.2907E-001	2.2415E-001	1.1602E+001	4.8699E+002
100	9.8021E-001	2.2963E-001	2.2508E-001	1.2446E+001	5.5544E+002
110	9.8140E-001	2.3016E-001	2.2588E-001	1.3262E+001	6.2589E+002
120	9.8243E-001	2.3062E-001	2.2656E-001	1.4054E+001	6.9825E+002
130	9.8333E-001	2.3102E-001	2.2717E-001	1.4825E+001	7.7240E+002
140	9.8412E-001	2.3137E-001	2.2770E-001	1.5575E+001	8.4826E+002
150	9.8482E-001	2.3169E-001	2.2817E-001	1.6308E+001	9.2575E+002
160	9.8545E-001	2.3197E-001	2.2860E-001	1.7025E+001	1.0048E+003
170	9.8602E-001	2.3223E-001	2.2898E-001	1.7728E+001	1.0853E+003
180	9.8654E-001	2.3246E-001	2.2933E-001	1.8416E+001	1.1673E+003
190	9.8701E-001	2.3267E-001	2.2965E-001	1.9092E+001	1.2507E+003
200	9.8744E-001	2.3287E-001	2.2994E-001	1.9756E+001	1.3355E+003
210	9.8784E-001	2.3305E-001	2.3021E-001	2.0409E+001	1.4215E+003
220	9.8820E-001	2.3322E-001	2.3046E-001	2.1052E+001	1.5088E+003
230	9.8854E-001	2.3337E-001	2.3070E-001	2.1686E+001	1.5973E+003
240	9.8886E-001	2.3352E-001	2.3091E-001	2.2310E+001	1.6870E+003
250	9.8916E-001	2.3365E-001	2.3112E-001	2.2925E+001	1.7779E+003

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.100

Q= .500

A	R0	RH0	RM	Y2	Y3	Y4
10	2.3699E+000	1.2457E-002	2.6120E+000	1.8328E+000	6.4331E+000	2.4435E+001
20	2.9858E+000	7.0236E-003	2.9670E+000	2.6489E+000	1.0458E+001	4.3855E+001
30	3.4179E+000	4.9360E-003	3.2347E+000	3.3229E+000	1.4229E+001	6.4075E+001
40	3.7619E+000	3.8183E-003	3.4562E+000	3.9207E+000	1.7879E+001	8.5183E+001
50	4.0524E+000	3.1186E-003	3.6479E+000	4.4681E+000	2.1455E+001	1.0714E+002
60	4.3063E+000	2.6383E-003	3.8185E+000	4.9789E+000	2.4982E+001	1.2988E+002
70	4.5333E+000	2.2877E-003	3.9730E+000	5.4613E+000	2.8471E+001	1.5337E+002
80	4.7397E+000	2.0201E-003	4.1150E+000	5.9206E+000	3.1932E+001	1.7754E+002
90	4.9295E+000	1.8092E-003	4.2467E+000	6.3608E+000	3.5370E+001	2.0236E+002
100	5.1057E+000	1.6385E-003	4.3698E+000	6.7847E+000	3.8789E+001	2.2780E+002
110	5.2705E+000	1.4975E-003	4.4857E+000	7.1945E+000	4.2193E+001	2.5382E+002
120	5.4256E+000	1.3791E-003	4.5953E+000	7.5918E+000	4.5583E+001	2.8040E+002
130	5.5723E+000	1.2781E-003	4.6994E+000	7.9782E+000	4.8962E+001	3.0751E+002
140	5.7116E+000	1.1911E-003	4.7988E+000	8.3546E+000	5.2330E+001	3.3512E+002
150	5.8445E+000	1.1152E-003	4.8938E+000	8.7221E+000	5.5690E+001	3.6323E+002
160	5.9716E+000	1.0485E-003	4.9850E+000	9.0814E+000	5.9042E+001	3.9180E+002
170	6.0935E+000	9.8934E-004	5.0728E+000	9.4333E+000	6.2387E+001	4.2083E+002
180	6.2107E+000	9.3656E-004	5.1574E+000	9.7782E+000	6.5725E+001	4.5029E+002
190	6.3237E+000	8.8916E-004	5.2391E+000	1.0117E+001	6.9057E+001	4.8018E+002
200	6.4327E+000	8.4635E-004	5.3181E+000	1.0449E+001	7.2384E+001	5.1049E+002
210	6.5382E+000	8.0750E-004	5.3947E+000	1.0777E+001	7.5706E+001	5.4119E+002
220	6.6404E+000	7.7209E-004	5.4691E+000	1.1099E+001	7.9024E+001	5.7228E+002
230	6.7395E+000	7.3966E-004	5.5414E+000	1.1416E+001	8.2337E+001	6.0375E+002
240	6.8358E+000	7.0987E-004	5.6117E+000	1.1728E+001	8.5647E+001	6.3558E+002
250	6.9294E+000	6.8239E-004	5.6802E+000	1.2036E+001	8.8953E+001	6.6778E+002

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.100

Q= .500

A	RU0	RU1	RU2	RU3	RU4
10	2.6760E+000	3.3722E+000	2.7709E+000	2.9981E+000	3.1807E+000
20	3.2392E+000	3.8304E+000	3.3311E+000	3.5252E+000	3.6816E+000
30	3.6433E+000	4.1760E+000	3.7309E+000	3.9063E+000	4.0476E+000
40	3.9689E+000	4.4620E+000	4.0526E+000	4.2152E+000	4.3463E+000
50	4.2459E+000	4.7095E+000	4.3263E+000	4.4794E+000	4.6027E+000
60	4.4894E+000	4.9297E+000	4.5669E+000	4.7124E+000	4.8296E+000
70	4.7079E+000	5.1292E+000	4.7830E+000	4.9223E+000	5.0345E+000
80	4.9072E+000	5.3125E+000	4.9801E+000	5.1142E+000	5.2222E+000
90	5.0909E+000	5.4824E+000	5.1619E+000	5.2915E+000	5.3959E+000
100	5.2619E+000	5.6414E+000	5.3312E+000	5.4568E+000	5.5580E+000
110	5.4221E+000	5.7910E+000	5.4898E+000	5.6120E+000	5.7103E+000
120	5.5731E+000	5.9325E+000	5.6393E+000	5.7584E+000	5.8543E+000
130	5.7161E+000	6.0670E+000	5.7811E+000	5.8973E+000	5.9909E+000
140	5.8521E+000	6.1952E+000	5.9159E+000	6.0296E+000	6.1211E+000
150	5.9819E+000	6.3179E+000	6.0446E+000	6.1560E+000	6.2456E+000
160	6.1062E+000	6.4357E+000	6.1678E+000	6.2771E+000	6.3649E+000
170	6.2255E+000	6.5489E+000	6.2862E+000	6.3934E+000	6.4797E+000
180	6.3403E+000	6.6581E+000	6.4001E+000	6.5055E+000	6.5902E+000
190	6.4511E+000	6.7636E+000	6.5099E+000	6.6136E+000	6.6970E+000
200	6.5580E+000	6.8657E+000	6.6161E+000	6.7182E+000	6.8002E+000
210	6.6616E+000	6.9646E+000	6.7189E+000	6.8194E+000	6.9002E+000
220	6.7619E+000	7.0606E+000	6.8185E+000	6.9176E+000	6.9973E+000
230	6.8593E+000	7.1539E+000	6.9152E+000	7.0130E+000	7.0916E+000
240	6.9539E+000	7.2447E+000	7.0092E+000	7.1057E+000	7.1832E+000
250	7.0461E+000	7.3331E+000	7.1007E+000	7.1960E+000	7.2725E+000

INVESTIGATION OF VARIATION OF RU WITH RH0.RM,YL

RZ=1.100

Q= .500

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.2421E+000	1.5652E+000	1.2861E+000	1.3916E+000	1.4764E+000
20	1.1934E+000	1.4111E+000	1.2272E+000	1.2987E+000	1.3563E+000
30	1.1726E+000	1.3440E+000	1.2007E+000	1.2572E+000	1.3027E+000
40	1.1605E+000	1.3047E+000	1.1850E+000	1.2325E+000	1.2709E+000
50	1.1525E+000	1.2784E+000	1.1744E+000	1.2159E+000	1.2494E+000
60	1.1468E+000	1.2592E+000	1.1666E+000	1.2037E+000	1.2337E+000
70	1.1424E+000	1.2446E+000	1.1606E+000	1.1944E+000	1.2216E+000
80	1.1389E+000	1.2329E+000	1.1558E+000	1.1869E+000	1.2120E+000
90	1.1370E+000	1.2234E+000	1.1519E+000	1.1808E+000	1.2041E+000
100	1.1337E+000	1.2154E+000	1.1486E+000	1.1757E+000	1.1974E+000
110	1.1316E+000	1.2086E+000	1.1458E+000	1.1713E+000	1.1918E+000
120	1.1299E+000	1.2028E+000	1.1433E+000	1.1675E+000	1.1869E+000
130	1.1284E+000	1.1977E+000	1.1412E+000	1.1642E+000	1.1826E+000
140	1.1270E+000	1.1931E+000	1.1393E+000	1.1612E+000	1.1789E+000
150	1.1259E+000	1.1891E+000	1.1377E+000	1.1586E+000	1.1755E+000
160	1.1248E+000	1.1855E+000	1.1361E+000	1.1563E+000	1.1725E+000
170	1.1238E+000	1.1822E+000	1.1348E+000	1.1541E+000	1.1697E+000
180	1.1230E+000	1.1792E+000	1.1335E+000	1.1522E+000	1.1672E+000
190	1.1222E+000	1.1765E+000	1.1324E+000	1.1504E+000	1.1649E+000
200	1.1214E+000	1.1740E+000	1.1314E+000	1.1488E+000	1.1628E+000
210	1.1208E+000	1.1717E+000	1.1304E+000	1.1473E+000	1.1609E+000
220	1.1201E+000	1.1696E+000	1.1295E+000	1.1459E+000	1.1591E+000
230	1.1196E+000	1.1676E+000	1.1287E+000	1.1446E+000	1.1575E+000
240	1.1190E+000	1.1658E+000	1.1279E+000	1.1434E+000	1.1559E+000
250	1.1185E+000	1.1641E+000	1.1272E+000	1.1423E+000	1.1545E+000

INVESTIGATION OF VARIATION OF RU WITH RHO.RM.YL

RZ=1.100

Q= .500

A	N	YN	Z0	Z2	Z4
10	8.7446E-001	1.8995E-001	1.6610E-001	2.6814E+000	4.5737E+001
20	9.1605E-001	2.0418E-001	1.8704E-001	4.2564E+000	9.3675E+001
30	9.3441E-001	2.1095E-001	1.9712E-001	5.5775E+000	1.4590E+002
40	9.4516E-001	2.1509E-001	2.0329E-001	6.7566E+000	2.0178E+002
50	9.5235E-001	2.1793E-001	2.0754E-001	7.8404E+000	2.6084E+002
60	9.5756E-001	2.2003E-001	2.1069E-001	8.8537E+000	3.2273E+002
70	9.6153E-001	2.2166E-001	2.1313E-001	9.8119E+000	3.8721E+002
80	9.6469E-001	2.2297E-001	2.1509E-001	1.0725E+001	4.5404E+002
90	9.6727E-001	2.2405E-001	2.1671E-001	1.1602E+001	5.2306E+002
100	9.6942E-001	2.2496E-001	2.1808E-001	1.2446E+001	5.9413E+002
110	9.7125E-001	2.2573E-001	2.1924E-001	1.3262E+001	6.6713E+002
120	9.7282E-001	2.2641E-001	2.2026E-001	1.4054E+001	7.4194E+002
130	9.7420E-001	2.2700E-001	2.2115E-001	1.4825E+001	8.1849E+002
140	9.7541E-001	2.2753E-001	2.2193E-001	1.5575E+001	8.9668E+002
150	9.7649E-001	2.2800E-001	2.2264E-001	1.6308E+001	9.7645E+002
160	9.7746E-001	2.2842E-001	2.2327E-001	1.7025E+001	1.0577E+003
170	9.7833E-001	2.2880E-001	2.2384E-001	1.7728E+001	1.1405E+003
180	9.7912E-001	2.2915E-001	2.2437E-001	1.8416E+001	1.2246E+003
190	9.7985E-001	2.2947E-001	2.2484E-001	1.9092E+001	1.3101E+003
200	9.8051E-001	2.2976E-001	2.2528E-001	1.9756E+001	1.3969E+003
210	9.8112E-001	2.3003E-001	2.2569E-001	2.0409E+001	1.4849E+003
220	9.8169E-001	2.3028E-001	2.2607E-001	2.1052E+001	1.5742E+003
230	9.8221E-001	2.3052E-001	2.2642E-001	2.1686E+001	1.6647E+003
240	9.8270E-001	2.3074E-001	2.2675E-001	2.2310E+001	1.7564E+003
250	9.8316E-001	2.3094E-001	2.2705E-001	2.2925E+001	1.8492E+003

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.100

Q= .600

A	R0	RH0	RM	Y2	Y3	Y4
10	2.3699E+000	1.0973E-002	2.8878E+000	2.0097E+000	7.8631E+000	3.3790E+001
20	2.9858E+000	6.4108E-003	3.2128E+000	2.8464E+000	1.2262E+001	5.6934E+001
30	3.4179E+000	4.5840E-003	3.4616E+000	3.5310E+000	1.6295E+001	8.0174E+001
40	3.7619E+000	3.5840E-003	3.6695E+000	4.1355E+000	2.0153E+001	1.0394E+002
50	4.0524E+000	2.9491E-003	3.8506E+000	4.6878E+000	2.3906E+001	1.2831E+002
60	4.3063E+000	2.5087E-003	4.0126E+000	5.2022E+000	2.7586E+001	1.5331E+002
70	4.5333E+000	2.1846E-003	4.1599E+000	5.6874E+000	3.1212E+001	1.7891E+002
80	4.7397E+000	1.9358E-003	4.2957E+000	6.1491E+000	3.4798E+001	2.0510E+002
90	4.9295E+000	1.7387E-003	4.4220E+000	6.5912E+000	3.8351E+001	2.3185E+002
100	5.1057E+000	1.5785E-003	4.5404E+000	7.0168E+000	4.1876E+001	2.5915E+002
110	5.2705E+000	1.4457E-003	4.6520E+000	7.4280E+000	4.5380E+001	2.8696E+002
120	5.4256E+000	1.3337E-003	4.7578E+000	7.8266E+000	4.8864E+001	3.1527E+002
130	5.5723E+000	1.2380E-003	4.8584E+000	8.2140E+000	5.2331E+001	3.4407E+002
140	5.7116E+000	1.1553E-003	4.9546E+000	8.5914E+000	5.5784E+001	3.7333E+002
150	5.8445E+000	1.0831E-003	5.0467E+000	8.9598E+000	5.9224E+001	4.0303E+002
160	5.9716E+000	1.0194E-003	5.1352E+000	9.3199E+000	6.2653E+001	4.3318E+002
170	6.0935E+000	9.6294E-004	5.2204E+000	9.6725E+000	6.6072E+001	4.6374E+002
180	6.2107E+000	9.1242E-004	5.3027E+000	1.0018E+001	6.9481E+001	4.9471E+002
190	6.3237E+000	8.6699E-004	5.3822E+000	1.0357E+001	7.2881E+001	5.2607E+002
200	6.4327E+000	8.2590E-004	5.4591E+000	1.0691E+001	7.6274E+001	5.5783E+002
210	6.5382E+000	7.8857E-004	5.5338E+000	1.1018E+001	7.9660E+001	5.8995E+002
220	6.6404E+000	7.5449E-004	5.6063E+000	1.1341E+001	8.3040E+001	6.2245E+002
230	6.7395E+000	7.2327E-004	5.6769E+000	1.1658E+001	8.6413E+001	6.5529E+002
240	6.8358E+000	6.9454E-004	5.7455E+000	1.1971E+001	8.9781E+001	6.8849E+002
250	6.9294E+000	6.6803E-004	5.8124E+000	1.2280E+001	9.3143E+001	7.2203E+002

INVESTIGATION OF VARIATION OF RU WITH RH0, RM, YL

RZ=1.100

Q= .600

A	RU0	RU1	RU2	RU3	RU4
10	2.7916E+000	3.7282E+000	2.9015E+000	3.2055E+000	3.4492E+000
20	3.3393E+000	4.1477E+000	3.4530E+000	3.7173E+000	3.9298E+000
30	3.7343E+000	4.4690E+000	3.8459E+000	4.0869E+000	4.2809E+000
40	4.0536E+000	4.7373E+000	4.1622E+000	4.3869E+000	4.5679E+000
50	4.3258E+000	4.9711E+000	4.4314E+000	4.6438E+000	4.8150E+000
60	4.5654E+000	5.1802E+000	4.6682E+000	4.8708E+000	5.0341E+000
70	4.7808E+000	5.3705E+000	4.8810E+000	5.0755E+000	5.2322E+000
80	4.9774E+000	5.5457E+000	5.0753E+000	5.2628E+000	5.4140E+000
90	5.1588E+000	5.7088E+000	5.2546E+000	5.4362E+000	5.5825E+000
100	5.3278E+000	5.8616E+000	5.4216E+000	5.5979E+000	5.7400E+000
110	5.4862E+000	6.0057E+000	5.5781E+000	5.7499E+000	5.8882E+000
120	5.6356E+000	6.1423E+000	5.7259E+000	5.8934E+000	6.0284E+000
130	5.7771E+000	6.2723E+000	5.8659E+000	6.0296E+000	6.1615E+000
140	5.9118E+000	6.3964E+000	5.9991E+000	6.1594E+000	6.2885E+000
150	6.0404E+000	6.5153E+000	6.1264E+000	6.2835E+000	6.4101E+000
160	6.1636E+000	6.6296E+000	6.2483E+000	6.4025E+000	6.5267E+000
170	6.2819E+000	6.7396E+000	6.3654E+000	6.5169E+000	6.6389E+000
180	6.3958E+000	6.8457E+000	6.4781E+000	6.6271E+000	6.7471E+000
190	6.5056E+000	6.9484E+000	6.5869E+000	6.7335E+000	6.8516E+000
200	6.6117E+000	7.0478E+000	6.6920E+000	6.8364E+000	6.9527E+000
210	6.7145E+000	7.1442E+000	6.7938E+000	6.9361E+000	7.0507E+000
220	6.8140E+000	7.2378E+000	6.8924E+000	7.0329E+000	7.1458E+000
230	6.9107E+000	7.3288E+000	6.9883E+000	7.1268E+000	7.2383E+000
240	7.0047E+000	7.4175E+000	7.0814E+000	7.2182E+000	7.3283E+000
250	7.0962E+000	7.5039E+000	7.1721E+000	7.3072E+000	7.4159E+000

-77-

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.100

O= .600

A	RUK0	RUK1	RUK2	RUK3	RUK4
10	1.2957E+000	1.7305E+000	1.3468E+000	1.4879E+000	1.6010E+000
20	1.2302E+000	1.5280E+000	1.2721E+000	1.3695E+000	1.4478E+000
30	1.2016E+000	1.4383E+000	1.2378E+000	1.3153E+000	1.3777E+000
40	1.1853E+000	1.3852E+000	1.2170E+000	1.2827E+000	1.3357E+000
50	1.1742E+000	1.3494E+000	1.2029E+000	1.2605E+000	1.3070E+000
60	1.1662E+000	1.3232E+000	1.1924E+000	1.2442E+000	1.2859E+000
70	1.1600E+000	1.3031E+000	1.1844E+000	1.2315E+000	1.2696E+000
80	1.1552E+000	1.2871E+000	1.1779E+000	1.2214E+000	1.2565E+000
90	1.1512E+000	1.2739E+000	1.1725E+000	1.2131E+000	1.2457E+000
100	1.1479E+000	1.2629E+000	1.1681E+000	1.2061E+000	1.2367E+000
110	1.1450E+000	1.2535E+000	1.1642E+000	1.2001E+000	1.2289E+000
120	1.1426E+000	1.2453E+000	1.1609E+000	1.1948E+000	1.2222E+000
130	1.1404E+000	1.2382E+000	1.1580E+000	1.1903E+000	1.2163E+000
140	1.1386E+000	1.2319E+000	1.1554E+000	1.1862E+000	1.2111E+000
150	1.1369E+000	1.2262E+000	1.1530E+000	1.1826E+000	1.2064E+000
160	1.1354E+000	1.2212E+000	1.1510E+000	1.1794E+000	1.2022E+000
170	1.1340E+000	1.2166E+000	1.1491E+000	1.1764E+000	1.1985E+000
180	1.1328E+000	1.2125E+000	1.1474E+000	1.1737E+000	1.1950E+000
190	1.1316E+000	1.2087E+000	1.1458E+000	1.1713E+000	1.1918E+000
200	1.1306E+000	1.2052E+000	1.1443E+000	1.1690E+000	1.1889E+000
210	1.1297E+000	1.2019E+000	1.1430E+000	1.1669E+000	1.1862E+000
220	1.1288E+000	1.1990E+000	1.1418E+000	1.1650E+000	1.1837E+000
230	1.1279E+000	1.1962E+000	1.1406E+000	1.1632E+000	1.1814E+000
240	1.1272E+000	1.1936E+000	1.1395E+000	1.1615E+000	1.1793E+000
250	1.1265E+000	1.1912E+000	1.1385E+000	1.1600E+000	1.1772E+000

INVESTIGATION OF VARIATION OF RU WITH RHO, RM, YL

RZ=1.100

Q= .600

A	N	Y0	Z0	Z2	Z4
10	8.3152E-001	1.7649E-001	1.4675E-001	2.6814E+000	5.5903E+001
20	8.8439E-001	1.9323E-001	1.7089E-001	4.2564E+000	1.0984E+002
30	9.0866E-001	2.0155E-001	1.8314E-001	5.5775E+000	1.6709E+002
40	9.2313E-001	2.0675E-001	1.9086E-001	6.7566E+000	2.2745E+002
50	9.3294E-001	2.1040E-001	1.9629E-001	7.8404E+000	2.9063E+002
60	9.4009E-001	2.1312E-001	2.0035E-001	8.8537E+000	3.5637E+002
70	9.4559E-001	2.1525E-001	2.0354E-001	9.8119E+000	4.2449E+002
80	9.4997E-001	2.1698E-001	2.0613E-001	1.0725E+001	4.9479E+002
90	9.5356E-001	2.1841E-001	2.0827E-001	1.1602E+001	5.6714E+002
100	9.5657E-001	2.1963E-001	2.1009E-001	1.2446E+001	6.4142E+002
110	9.5913E-001	2.2067E-001	2.1165E-001	1.3262E+001	7.1752E+002
120	9.6134E-001	2.2158E-001	2.1301E-001	1.4054E+001	7.9534E+002
130	9.6327E-001	2.2238E-001	2.1421E-001	1.4825E+001	8.7482E+002
140	9.6498E-001	2.2309E-001	2.1527E-001	1.5575E+001	9.5586E+002
150	9.6650E-001	2.2372E-001	2.1623E-001	1.6308E+001	1.0384E+003
160	9.6786E-001	2.2430E-001	2.1709E-001	1.7025E+001	1.1224E+003
170	9.6909E-001	2.2482E-001	2.1787E-001	1.7728E+001	1.2078E+003
180	9.7021E-001	2.2530E-001	2.1858E-001	1.8416E+001	1.2946E+003
190	9.7124E-001	2.2573E-001	2.1924E-001	1.9092E+001	1.3826E+003
200	9.7218E-001	2.2613E-001	2.1984E-001	1.9756E+001	1.4720E+003
210	9.7304E-001	2.2651E-001	2.2040E-001	2.0409E+001	1.5625E+003
220	9.7384E-001	2.2685E-001	2.2092E-001	2.1052E+001	1.6542E+003
230	9.7459E-001	2.2717E-001	2.2140E-001	2.1686E+001	1.7471E+003
240	9.7528E-001	2.2747E-001	2.2185E-001	2.2310E+001	1.8412E+003
250	9.7593E-001	2.2775E-001	2.2227E-001	2.2925E+001	1.9363E+003

ORNL-3525
 UC-34 - Physics
 TID-4500 (24th ed.)

INTERNAL DISTRIBUTION

- | | |
|-------------------------------------|------------------------------------|
| 1. Biology Library | 75. L. W. Owen |
| 2-4. Central Research Library | 76. S. K. Penny |
| 5. Reactor Division Library | 77. S. A. Rabin |
| 6-7. ORNL - Y-12 Technical Library | 78-127. G. R. Satchler |
| Document Reference Section | 128. H. C. Schweinler |
| 8-57. Laboratory Records Department | 129. M. J. Skinner |
| 58. Laboratory Records, ORNL R.C. | 130. G. M. Slaughter |
| 59. J. A. Auxier | 131. G. P. Smith |
| 60. R. H. Bassel | 132. A. H. Snell |
| 61. R. J. Beaver | 133. P. H. Stelson |
| 62. R. L. Becker | 134. R. L. Stephenson |
| 63. K. Bhatt | 135. J. O. Steigler |
| 64. L. N. Blumberg | 136. J. A. Swartout |
| 65. G. E. Boyd | 137. A. M. Weinberg |
| 66. R. E. Clausing | 138. L. C. Biedenharn (consultant) |
| 67. G. Czjzek | 139. A. M. Clogston (consultant) |
| 68. J. L. Fowler | 140. B. L. Cohen (consultant) |
| 69. G. W. Keilholtz | 141. M. Deutsch (consultant) |
| 70. C. E. Larson | 142. J. B. French (consultant) |
| 71. R. E. MacPherson, Jr. | 143. D. L. Judd (consultant) |
| 72. F. K. McGowan | 144. W. T. Pinkston (consultant) |
| 73. A. Meyer | 145. L. J. Rainwater (consultant) |
| 74. W. F. Mruk | 146. J. A. Wheeler (consultant) |

EXTERNAL DISTRIBUTION

147. N. Austern, Department of Physics, University of Pittsburgh, Pittsburgh, Pennsylvania
148. J. S. Blair, Department of Physics, University of Washington, Seattle, Washington
149. K. T. Hecht, Department of Physics, University of Michigan, Ann Arbor, Michigan
150. R. Hofstadter, Department of Physics, Stanford University, Stanford, California
151. D. L. Onley, Department of Physics, Duke University, Durham, North Carolina
152. E. Rost, Department of Physics, Princeton University, Princeton, New Jersey
153. G. Temmer, Department of Physics, Rutgers University, New Brunswick, New Jersey
154. V. B. Bhanot, Physics Department, Panjab University, Chandigarh-3, India
155. Jacobo Rapaport, University of Chile, Box 2777, Institute of Science, Santiago, Chile
156. Research and Development Division, AEC, ORO
- 157-800. Given distribution as shown in TID-4500 (24th ed.) under Physics category (75 copies - OTS)