JAERI-M
83-006

NEANDC (J) 88/U
INDC (JAP) 75/L

XN83000 49

EVALUATION OF NEUTRON NUCLEAR DATA FOR DEUTERIUM

February 1983

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編集兼発行　日本原子力研究所
印　　刷　いばらき印刷㈱

(JAERI-M 83-006) NEANDC (J) -- 88 - U.

Evaluation of Neutron Nuclear Data for Deuterium

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(Received January 17, 1983)

Evaluation of neutron nuclear data for ^{2}H has been performed in the neutron energy region from 10^{-5} eV to 20 MeV. The evaluated quantities are the total, elastic scattering, capture and (n,2n) reaction cross sections, the angular distribution for the elastic scattering and the double-differential cross section for the (n,2n) reaction. Theoretical calculations were done of the elastic angular distribution and the neutron spectrum from the (n,2n) reaction on the basis of the Faddeev equation. The present evaluated data are compiled in the ENDF/B format and to be stored in the second version of Japanese Evaluated Nuclear Data Library, JENDL-2.

Keywords: Evaluation, Deuterium, Neutron Nuclear Data, Cross Section, Faddeev Equation, JENDL-2, 10^{-5}eV - 20MeV Range

重水素の中性子核データの評価

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（1983年1月17日受理）

^{2}Hの中性子核データを10^{-5} eVから20 MeVの中性子エネルギーにわたって評価した。評価した量は全断面積，弾性散乱断面積，中性子捕獲断面積，（n，2n）反応断面積，弾性散乱角度分布および（n，2n）反応二重微分断面積である。弾性散乱角度分布および（n，2n）反応からの放出中性子スペクトルはFaddeev方程式にもとづいて計算された。評価ずみデータはENDF/Bフォーマットでファイル化されており，日本の評価ずみ核データライブラリーの第2版，JENDL　2に格納される。

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1. Introduction

Evaluation of neutron nuclear data for deuterium is important not only for thermal reactors but also for fusion neutronics. Horsley and Stewart[1] performed the evaluation on the basis of the available experimental data, and ENDF/B-V[2] adopted their results with a slight modification. Although they also calculated the double-differential cross sections for the (n,2n) reaction from the phase-space model, their results could not reproduce the experimental data of Brüllmann et al.[3].

In the present work, the neutron nuclear data of ^{2}H were evaluated from 10^{-5} eV to 20 MeV on the basis of the available experimental data and theoretical calculations. The evaluated quantities are the total, elastic scattering, capture and (n,2n) reaction cross sections, the elastic angular distribution and the double-differential cross section for the ^{2}H(n,2n)p reaction.

The angular distributions of elastically scattered neutrons and the neutron spectra from the breakup reaction have been calculated in this work from the three-body model based on the Faddeev equation[4]. Proton spectra from the ^{2}H(n,p)2n and ^{2}H(p,2p)n reactions were reproduced fairly well[5,6] by this model. Thus, it is not unappropriate approach to analyze neutron spectra from the ^{2}H(n,2n)p reaction with the three-body model, although the experimental data on the neutron spectra are very scarce.

The present results are compiled in the ENDF/B format, and they are stored in the second version of Japanese Evaluated Nuclear Data Library, JENDL-2.

2. Status of Experimental Data

2.1 Total Cross Section

In the thermal energy region Fermi and Marschall[7] gave a value of 3.44 b for the scattering cross section, while Van Oers and Seagrave[8] reported a value of 3.14 ± 0.06 b. Dilg et al.[9] performed a measurement of the n-^{2}H scattering at 130 eV and obtained a value of 3.390 ± 0.012 b, which was recommended in the fourth edition of BNL-325[10]. Since the capture cross section is very small in these energy regions, the scattering cross section is nearly equal to the total cross section. Stoler et al.[11] measured the total cross sections in the energy range from 1 keV to 1 MeV. It should be noted that their measured cross sections join smoothly to the measurements of Fermi and Marschall and of Dilg et al. rather than that of Van Oers and Seagrave.

Above 200 keV several measurements were performed: Adair et al. in 260 keV ∿ 2.96 MeV (1953)[12]; Seagrave and Henkel in 270 keV ∿ 22 MeV (1955)[13]; Foester, Jr. and Glasgow in 2.5 MeV ∿ 15 MeV (1971)[14]; Davis and Barschall in 1.5 MeV ∿ 27.5 MeV (1971)[15]; Clement et al. in 500 keV ∿ 30 MeV (1972)[16]. In the region from 0.5 to 1 MeV, the results of Clement et al. were in good agreement with those of Stoler et al. The data of Clement et al. were also consistent with those of Davis and Barschall and of Foester, Jr. and Glasgow.

In Table I are given the brief descriptions of the above experiments.

2.2 Elastic Scattering Cross Section

There are only a few measurements of the differential cross sections in the energy region from 100 keV to 1 MeV. On the other hand many experiments were performed above 1 MeV, and the elastic scattering cross

sections were obtained by integrating the measured angular distributions.

2.3 Radiative Capture Cross Section

Thermal cross sections were given in several papers[17-21]. The brief descriptions of the experiments are listed in Table II. The measured values are the following:

0.57 ± 0.01 mb, Kaplan et al. (1952)[17];

0.60 ± 0.05 mb, Jurney and Motz (1963)[18];

0.353 ± 0.035 mb, Trail and Raboy (1963)[19];

0.521 ± 0.009 mb, Merritt et al. (1968)[20];

0.55 ± 0.01 mb, Ishikawa (1973)[21].

Of these measurements Ishikawa[21] determined the thermal cross section by using four different methods. Hence, his measured value seems to be most reliable.

Cerineo et al.[22] obtained the capture cross section at 14.4 MeV from measurement of tritons. There are no experimental data in the other energy regions.

2.4 (n,2n) Reaction Cross Section

Catron et al.[23] obtained the (n,2n) reaction cross sections by counting double-pulse events in the energy region of 6.1 to 14.1 MeV. Holmberg[24] measured the correlation time between two pulses due to neutrons, and deduced the (n,2n) cross sections for 4.1 - 6.55 MeV. Pauletta and Brooks[25] measured the n-d breakup cross sections between 8 and 22 MeV by integrating the energy distributions of breakup protons in a deuterated scintillator.

The experimental data on the energy-angular distributions of neutrons emitted from the (n,2n) reaction are very scarce. However

there are a few measurements around 14 MeV. Jérémie[26] and Messelt[27] performed experiments at a few angles. Brüllmann et al.[3] measured the double-differential cross sections for eight angles between 7.5° to 75° at an incident energy of 14.1 MeV. Recently Gul et al.[28] measured the emitted neutron spectra for 30° - 75°.

The status of the experimental work is given in Tables III and IV.

3. Evaluation of Neutron Nuclear Data

3.1 Total Cross Section

The total cross section was estimated from the available experimental data[9,11-16] by using the spline function.

3.2 Elastic Scattering Cross Section

The elastic scattering cross section below the (n,2n) threshold energy was given as the difference between the total and capture cross sections. Above the (n,2n) threshold the elastic scattering cross section was obtained by subtracting the (n,2n) and capture cross sections from the total cross section. Evaluation of the (n,2n) and capture cross sections are described in the following subsections.

3.3 Radiative Capture Cross Section

Since there are measurements only at the thermal energy and 14.4 MeV, present evaluated values were obtained from the inverse reaction $^{3}H(\gamma,n)^{2}H$ by taking account of the detailed balance. Gunn and Irving[29] derived the photo-disintegration cross-section formula for three-particle nuclei. The electric dipole disintegration cross-section

for tritium is given by

$$\sigma_{T(\gamma,n)D} = 32(e^2/\hbar c)E_\gamma(E_\gamma - Q)^{3/2}\mu_T^4\hbar^6 f^2(\lambda)W_D^{-11/2}M^{-3} \quad (1)$$

with

$$f(\lambda) = (7\lambda - 2)\lambda^{-2}(\lambda - 1)^{-2} - 15(\lambda - 1)^{-3} + 15(\lambda - 1)^{-7/2}\cos^{-1}(\lambda^{-1/2}) \quad (2)$$

and

$$\lambda = (ME_\gamma - MQ + 3\mu_T^2\hbar^2/2)(MW_D)^{-1}, \quad (3)$$

where E_γ is the incident energy of γ-ray, -Q is the Q-value of the photo-disintegration, M is the nucleon mass, and W_D is the deuteron binding energy. The value of μ_T determines the size of the tritium wave-function and is adjusted so as to give the best fit to the experimental data on the photo-disintegration cross section. The capture cross section $\sigma_{n,\gamma}$ is obtained from $\sigma_{T(\gamma,n)D}$ by using the principle of detailed balance. That is,

$$\sigma_{n,\gamma}(E) = E_\gamma^2[2Mc^2(E_\gamma - Q)]^{-1}\sigma_{T(\gamma,n)D}(E_\gamma). \quad (4)$$

The neutron energy E in laboratory system is given by

$$E = 3(E_\gamma - Q)/2. \quad (5)$$

Although the capture cross sections are expected to be 1/v-form in the low energy region, the Gunn-Irving theory[29] is not able to reproduce such behaviour. Thus, the capture cross section at 0.0253 eV was determined from the measurement of Ishikawa[21] and extrapolated as 1/v up to 1 keV. Above 1 keV the capture cross sections were given by the Gunn-Irving theory with $\mu_T^{-1} = 2.6$ fm[30].

3.4 (n,2n) Reaction Cross Section

The (n,2n) reaction cross section was evaluated from the measurements of Catron et al.[23], Holmberg[24] and Pauletta and Brooks[25] by the spline function fitting.

3.5 Elastic Angular Distribution and Double-Differential Cross Section for the (n,2n) Reaction

The elastic angular distributions and the double-differential cross sections (energy-angular distributions) for the (n,2n) reaction were calculated from the three-body model based on the Faddeev equation[4]. According to the Faddeev theory, the three-body T-matrix consists of three parts:

$$T = T^{(1)} + T^{(2)} + T^{(3)} \tag{6}$$

with

$$T^{(i)} = V_i + V_i G_0 T, \quad i=1,2,3, \tag{7}$$

where V_i is the interaction between particles j and k ($j \neq k \neq i$), and G_0 is the free three-particle Green's function. By introducing the two-body T-matrices which are given by

$$T_i = V_i + V_i G_0 T_i, \quad i=1,2,3, \tag{8}$$

eq. (7) is rearranged to give the following coupled integral equations:

$$T^{(i)} = T_i + \sum_{j=1}^{3} (1 - \delta_{ij}) T_i G_0 T^{(j)}, \quad i=1,2,3. \tag{9}$$

Equation (9) has a unique solution, while the Lippmann-Schwinger equation has no unique solution in the three-particle case.[4]

As the nucleon-nucleon interaction, s-wave separable potentials were employed to simplify the coupled integral equations. In the momentum representation these potentials are given by

$$\langle \vec{p}' | V_i | \vec{p} \rangle = \lambda_i g_i(p') g_i(p). \tag{10}$$

The form factor $g_i(p)$ was assumed to be Yamaguchi type[31], i.e.

$$g_i(p) = 1/(p^2 + \beta_i^2). \tag{11}$$

The parameters λ_i and β_i in eqs. (10) and (11) are determined from the scattering lengths a and effective ranges r_0 for the nucleon-nucleon scattering. The values of a and r_0 used in the present calculations are listed in Table V.

The three-body amplitudes were calculated by the computer code developed by Ebenhöh[32]. From these amplitudes the elastic angular distribution was derived as follows:

$$d\sigma_{el}/d\Omega = 2|T_E^Q|^2/3 + |T_E^D|^2/3, \tag{12}$$

where T_E^Q and T_E^D are the quartet and doublet elastic amplitudes, respectively. The double-differential cross section of the (n,2n) reaction is given by

$$d^2\sigma_{n,2n}/dE_n d\Omega_n = E^{-1/2}\ \rho(E_n,\theta_n) \int |T|^2 d\Omega_{23} \tag{13}$$

with

$$|T|^2 = 2|T_B^Q|^2/3 + |T_B^D|^2/3, \tag{14}$$

where E is the laboratory energy of the incident neutron, E_n is the emitted-neutron energy, Ω_{23} is the direction of the relative momentum between remaining two nucleons, ρ is the phase-space factor, and T_B^Q and T_B^D are the quartet and doublet breakup amplitudes, respectively. The phase-space factor is proportional to $(E_n E_{23})^{1/2}$, where E_{23} is the relative energy between proton and neutron. The derivations of the elastic and breakup amplitudes are briefly described in the appendix.

4. Results and Discussions

In Figs. 1, 2 and 3 are shown the present results of the total cross section by comparing with ENDF/B-IV[33]. The latter data, based on the experimental data measured before 1966, disagree with the recent measurements[9,11,14-16]. The elastic scattering cross section, which was given as the difference between the total and reaction cross sections, gives a good fit to the experimental data[34-39] as shown in Fig. 4.

The calculation of the capture cross section is shown in Fig. 5. It gives a value of one-third at 14.4 MeV as compared with that of Cerineo et al.[22]. We do not, however, take account of this measurement for the present because there are no other measurements around this energy region.

Figure 6 shows the evaluated (n,2n) reaction cross sections. Above 14 MeV the present result differs from ENDF/B-IV which was based on the data of Catron et al.[23] alone. The three-body model calculation gives a flat excitation function at these energies and is in good agreement with the experiments. Our evaluation, therefore, seems to be more reasonable than ENDF/B-IV.

Figures 7-11 show the calculated angular distributions of elastically scattered neutrons. The calculated differential cross sections were normalized so that the angle-integrated value might be consistent with that given as the difference between the total and reaction cross sections at each energy. The calculations are in good agreement with the experimental data[12,34,37,38,40-45]. Furthermore it should be noted that the present calculated differential cross section at 0 degree is always reasonably greater than Wick's limit.

In Figs. 12, 13 and 14 are given the double-differential cross sections for the (n,2n) reaction at 14.1 MeV. Normalization was taken so

that the integrated cross section might give a value twice as large as the (n,2n) reaction cross section. At all angles the calculations reproduce the shapes of the measured neutron spectra[3,27,28] fairly well. In Fig. 12 three peaks are seen around zero, intermediate and maximum neutron energies. The small peak at the upper end of the spectrum is due to the final-state interaction[46] between neutron and proton at very small neutron-proton relative energy. The broader peak in the intermediate energy region is caused by the neutron-neutron and neutron-proton final-state interactions. The peak near zero energy is associated with the quasi-free scattering of neutron and proton. The agreement with experiment is also good at 20°, as shown in Fig. 13. The evaluation by Horsley and Stewart[1], who employed the phase-space model, could not explain the structure of the measured spectrum. Even at large angles the calculated double-differential cross sections are in good agreement with the measured neutron spectra, as shown in Fig. 14.

5. Concluding Remarks

The neutron nuclear data for deuterium have been evaluated in the energy range of 10^{-5} eV to 20 MeV, and these data are stored in JENDL-2. The presently evaluated data are listed in Table VI with ENDF/B format.

The elastic angular distributions and (n,2n) double-differential cross sections which were calculated from the three-body model based on the Faddeev equation reproduced the experimental data fairly well. The calculation including higher partial-wave components of the nucleon-nucleon interaction, however, might be required in order to fit the n-^{2}H data satisfactorily, as performed by Doleschall[47].

Acknowledgements

The authors would like to thank Professor S. Oryu of Science University of Tokyo for providing the computer code developed by Ebenhöh. They are also grateful to Miss N. Komatsu for carefully and cheerfully typing.

Appendix

Here we describe the derivations of the elastic and breakup amplitudes from eq. (9).

First of all we define the following momentum coordinate in the three-body center-of-mass system:

$$\vec{p}_i = \vec{p}_{jk} = (\vec{k}_j - \vec{k}_k)/2, \ (i \neq j \neq k),$$

$$\vec{q}_i = \vec{k}_i,$$

$$\varepsilon = 3\vec{q}_i^{\,2}/4 + \vec{p}_i^{\,2}, \ i=1,2,3,$$

where $\vec{k}_i$ is the momentum of particle i and ε is the total kinetic energy of the three-body system.

If we decompose $T^{(i)}$ such as

$$T^{(i)} = \sum_{k=1}^{3} T_{ik}, \tag{A-1}$$

we get the following equation from eq. (9):

$$T_{ik} = T_i \delta_{ik} + \sum_{j=1}^{3} (1 - \delta_{ij}) T_i G_0 T_{jk}. \tag{A-2}$$

By defining a new operator $U_{ik} = T_{ik} - T_i \delta_{ik}$, we obtain

$$U_{ik} = T_i G_0 T_k (1 - \delta_{ik}) + \sum_{j=1}^{3} (1 - \delta_{ij}) T_i G_0 U_{jk}. \tag{A-3}$$

Furthermore eq. (A-3) can be rearranged by introducing $u_{ik} = G_0^{-1} T_i^{-1} U_{ik} T_k^{-1} G_0^{-1}$:

$$u_{ik} = G_0^{-1}(1 - \delta_{ik}) + \sum_{j=1}^{3}(1 - \delta_{ij})T_j G_0 u_{jk}. \tag{A-4}$$

Equation (A-4) is often referred to as the AGS equation[48], and u_{ik} predicts the correct physical scattering amplitude.

Using the separable potential of eq. (10), we can write the two-body T-matrix as follows:

$$T_i(\varepsilon) = |g_i\rangle\tau_i(\varepsilon - 3\vec{q}_i^{\,2}/4)\langle g_i|, \tag{A-5}$$

where $\langle\vec{p}|g_i\rangle = g_i(p)$ and τ_i can be obtained analytically,

$$\tau_i^{-1}(z) = \lambda_i^{-1} - \int d\vec{p}\,' g^2(p')/(z - p'^2). \tag{A-6}$$

The free state for n-d system is represented by

$$|\phi_i\rangle = |\vec{q}_i\rangle|\chi_i\rangle, \tag{A-7}$$

where $|\chi_i\rangle$ is the bound state for composite particle j+k (deuteron). The bound state $|\chi_i\rangle$ is given by

$$|\chi_i\rangle = G_0|g_i\rangle, \tag{A-8}$$

which is derived from the equation $|\chi_i\rangle = G_0 V_i|\chi_i\rangle$ by using the separable potential.

From eqs. (A-4), (A-5), (A-7) and (A-8) the following coupled integral equations are obtained:

$$\langle\vec{q}_i|X_{ij}|\vec{q}_j\rangle = \langle\vec{q}_i|Z_{ij}|\vec{q}_j\rangle + \sum_{k=1}^{3}\int d\vec{q}_k'\langle\vec{q}_i|Z_{ik}|\vec{q}_k'\rangle\tau_k(\varepsilon - 3\vec{q}_k'^{\,2}/4)$$
$$\langle\vec{q}_k'|X_{kj}|\vec{q}_j\rangle, \tag{A-9}$$

where $Z_{ij} = (1 - \delta_{ij})\langle g_i|G_0|g_j\rangle$ and $X_{ij} = \langle g_i|G_0 u_{ij} G_0|g_j\rangle$.

By introducing the three-free-particle state $|\vec{q}\vec{p}\rangle$ and the operator $u_{0i} = G_0^{-1} + \sum_{j=1}^{3} T_j G_0 u_{ji}$, the breakup amplitude is given by

$$\langle\vec{q}\vec{p}|u_{0i}|\phi_i\rangle = \sum_{j=1}^{3} g_j(p)\tau_j(\varepsilon - 3\vec{q}^{\,2}/4)\langle\vec{q}|X_{ji}|\vec{q}_i\rangle. \tag{A-10}$$

After introducing spins and antisymmetrization into eqs. (A-9) and (A-10), the elastic and breakup amplitudes are obtained by solving the coupled integral equations.

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Table I Measurements of the total cross sections.

Institute and Facility	Neutron Source and Energy	Method and Detector	Ref.
ANL Heavy water pile	Thermal	Transmission BF_3 counter	7)
MUN Reactor	130 eV	Transmission	9)
RPI Linac	1.0 ∿ 1000 keV	Transmission NaI	11)
WIS Van de Graaff	^{7}Li(p,n),p-T 0.26 ∿ 2.96 MeV	Transmission Ionization chamber	12)
LAS Van de Graaff	p-T,D-D,D-T 0.27 ∿ 22 MeV	Transmission Stilbene scintillator	13)
BNW Van de Graaff	Li(d,n) 2.5 ∿ 15 MeV	Transmission Liquid scintillator	14)
WIS Tandem	p-T,D-D,D-T 1.5 ∿ 27.5 MeV	Transmission Stilbene scintillator	15)
RPI Linac	0.5 ∿ 30 MeV	Transmission Liquid scintillator	16)

Table II Measurements of the capture cross sections.

Institute and Facility	Neutron Source and Energy	Method and Detector	Ref.
ANL Reactor	Thermal	Activation Ionization chamber	17)
LAS Reactor	Thermal	Detection of γ-rays NaI	18)
ANL	Thermal	Detection of γ-rays	19)
CRC Reactor	Thermal	Activation Proportional counter	20)
JAERI Reactor	Thermal	Activation Liquid scintillator	21)
RBZ Cockcroft-Walton	14.4 MeV	Detection of ^3H Counter telescope	22)

Table III Measurements of the (n,2n) reaction cross sections.

Institute and Facility	Neutron Source and Energy	Method and Detector	Ref.
LRL Cyclotron	p-T,D-D 6.1 ∿ 14.1 MeV	Coincidence Liquid scintillator	23)
FOA Van de Graaff	D-D 4.1 ∿ 6.55 MeV	Correlation time Liquid scintillator	24)
SCT Van de Graaff	D-D,D-T 8.2 ∿ 22 MeV	Detection of protons Liquid scintillator	25)

Table IV Measurements of the (n,2n) double-differential cross sections.

Institute	Neutron Source and Energy	Method and Detector	Angles (deg)	Ref.
PCF	D-T 14 MeV	Liquid scintillator	20	26)
OSL	D-T 14.7 MeV	Plastic scintillator	10,13,16, 20,28	27)
ETH	D-T 14.1 MeV	Liquid scintillator	7.5-75	3)
NIL	D-T 14.8 MeV	Scintillator	30-75	28)

Table V Scattering length and effective range parameters.

System	a (fm)	r_0 (fm)
n-p triplet	5.4	1.8
n-p singlet	-23.7	2.7
n-n singlet	-16.0	2.8

Table VI Evaluated neutron nuclear data of ^{2}H obtained in the present work. File 6 is not included in this listing.

```
........10........20........30........40........50........60......MAT MF MT   SEQ
 1.00200+ 3 1.99700+ 0           0           0           0           9 102 1451    1
 0.0    + 0 0.0    + 0           0           0           1           0 102 1451    2
                                                                       102 1451    3
                                 1         451          12             102 1451    4
                                 3           1          59             102 1451    5
                                 3           2          59             102 1451    6
                                 3          16           8             102 1451    7
                                 3         102          31             102 1451    8
                                 3         251          31             102 1451    9
                                 4           2         274             102 1451   10
                                 4          16         166             102 1451   11
                                 5          16         368             102 1451   12
                                                                       102 1   0   13
                                                                       102 0   0   14
 1.00200+ 3 1.99700+ 0           0           0           0           0 102 3   1   15
 0.0    + 0 0.0    + 0           0           0           1         168 102 3   1   16
        168         5            0           0           0           0 102 3   1   17
 1.00000- 5 3.39000+ 0 3.00000- 5 3.39000+ 0 1.00000- 4 3.39000+ 0 102 3   1   18
 3.00000- 4 3.39000+ 0 1.00000- 3 3.39000+ 0 3.00000- 3 3.39000+ 0 102 3   1   19
 1.00000- 2 3.39000+ 0 2.53000- 2 3.39000+ 0 1.00000- 1 3.39000+ 0 102 3   1   20
 3.00000- 1 3.39000+ 0 1.00000+ 0 3.39000+ 0 3.00000+ 0 3.39000+ 0 102 3   1   21
 1.00000+ 1 3.39000+ 0 3.00000+ 1 3.39000+ 0 1.00000+ 2 3.39000+ 0 102 3   1   22
 1.30000+ 2 3.39000+ 0 2.00000+ 2 3.38870+ 0 3.00000+ 2 3.38746+ 0 102 3   1   23
 4.00000+ 2 3.38659+ 0 5.00000+ 2 3.38591+ 0 6.00000+ 2 3.38536+ 0 102 3   1   24
 7.00000+ 2 3.38489+ 0 8.00000+ 2 3.38448+ 0 9.00000+ 2 3.38413+ 0 102 3   1   25
 1.00000+ 3 3.38381+ 0 1.50000+ 3 3.38258+ 0 2.00000+ 3 3.38171+ 0 102 3   1   26
 2.50000+ 3 3.38104+ 0 3.00000+ 3 3.38049+ 0 3.50000+ 3 3.38002+ 0 102 3   1   27
 4.00000+ 3 3.37962+ 0 4.78160+ 3 3.37908+ 0 5.00000+ 3 3.37896+ 0 102 3   1   28
 6.00000+ 3 3.37849+ 0 7.00000+ 3 3.37809+ 0 7.12452+ 3 3.37805+ 0 102 3   1   29
 8.00000+ 3 3.37710+ 0 9.00000+ 3 3.37614+ 0 9.46746+ 3 3.37573+ 0 102 3   1   30
 1.00000+ 4 3.37470+ 0 1.10000+ 4 3.37290+ 0 1.20000+ 4 3.37126+ 0 102 3   1   31
 1.50000+ 4 3.36707+ 0 1.70000+ 4 3.36471+ 0 1.87256+ 4 3.36290+ 0 102 3   1   32
 2.00000+ 4 3.36057+ 0 2.50000+ 4 3.35271+ 0 2.79838+ 4 3.34875+ 0 102 3   1   33
 3.00000+ 4 3.34582+ 0 3.50000+ 4 3.33934+ 0 3.72420+ 4 3.33674+ 0 102 3   1   34
 4.00000+ 4 3.33468+ 0 4.97088+ 4 3.29317+ 0 5.00000+ 4 3.29234+ 0 102 3   1   35
 5.74441+ 4 3.27285+ 0 6.00000+ 4 3.26497+ 0 6.51794+ 4 3.25004+ 0 102 3   1   36
 7.00000+ 4 3.24021+ 0 7.29147+ 4 3.23461+ 0 8.00000+ 4 3.22379+ 0 102 3   1   37
 9.00000+ 4 3.21011+ 0 9.16821+ 4 3.20797+ 0 1.00000+ 5 3.19224+ 0 102 3   1   38
 1.10449+ 5 3.17435+ 0 1.29217+ 5 3.14158+ 0 1.47984+ 5 3.11753+ 0 102 3   1   39
 1.50000+ 5 3.11551+ 0 1.79382+ 5 3.08902+ 0 2.00000+ 5 3.07083+ 0 102 3   1   40
 2.10781+ 5 3.06209+ 0 2.42179+ 5 3.03896+ 0 2.50000+ 5 3.03449+ 0 102 3   1   41
 2.73577+ 5 3.02185+ 0 3.00000+ 5 3.01333+ 0 3.50000+ 5 2.99915+ 0 102 3   1   42
 3.73788+ 5 2.99312+ 0 4.00000+ 5 2.99008+ 0 4.73999+ 5 2.98248+ 0 102 3   1   43
 5.00000+ 5 2.98048+ 0 5.74209+ 5 2.97532+ 0 6.00000+ 5 2.97031+ 0 102 3   1   44
 6.74421+ 5 2.95702+ 0 7.00000+ 5 2.95055+ 0 7.39563+ 5 2.94102+ 0 102 3   1   45
 8.00000+ 5 2.92894+ 0 8.04706+ 5 2.92802+ 0 8.69849+ 5 2.91439+ 0 102 3   1   46
 9.00000+ 5 2.90596+ 0 9.34992+ 5 2.89655+ 0 9.59498+ 5 2.89149+ 0 102 3   1   47
 9.84005+ 5 2.88986+ 0 1.00000+ 6 2.88866+ 0 1.00851+ 6 2.88802+ 0 102 3   1   48
 1.03302+ 6 2.88238+ 0 1.12462+ 6 2.85196+ 0 1.21623+ 6 2.82487+ 0 102 3   1   49
```

.....10	20	30	40	50	60	MAT	MF	MT	SEQ
1.30783+ 6	2.79917+ 0	1.39944+ 6	2.77289+ 0	1.48668+ 6	2.74405+ 0	102	3	1	50
1.50000+ 6	2.73886+ 0	1.57392+ 6	2.71103+ 0	1.66117+ 6	2.67634+ 0	102	3	1	51
1.74841+ 6	2.64247+ 0	1.86296+ 6	2.59976+ 0	1.97751+ 6	2.55682+ 0	102	3	1	52
2.00000+ 6	2.54795+ 0	2.09206+ 6	2.51297+ 0	2.20661+ 6	2.46752+ 0	102	3	1	53
2.50000+ 6	2.34941+ 0	2.54258+ 6	2.33387+ 0	2.87854+ 6	2.20615+ 0	102	3	1	54
3.00000+ 6	2.16006+ 0	3.21451+ 6	2.08519+ 0	3.33872+ 6	2.04121+ 0	102	3	1	55
3.50000+ 6	1.98777+ 0	3.55048+ 6	1.97184+ 0	3.92774+ 6	1.86017+ 0	102	3	1	56
4.00000+ 6	1.84127+ 0	4.04574+ 6	1.82957+ 0	4.30500+ 6	1.76699+ 0	102	3	1	57
4.68225+ 6	1.68692+ 0	4.96015+ 6	1.63129+ 0	5.00000+ 6	1.62541+ 0	102	3	1	58
5.05951+ 6	1.61457+ 0	5.61545+ 6	1.51858+ 0	5.89056+ 6	1.47597+ 0	102	3	1	59
6.00000+ 6	1.45989+ 0	6.17139+ 6	1.43563+ 0	6.72732+ 6	1.36261+ 0	102	3	1	60
6.81297+ 6	1.35184+ 0	7.00000+ 6	1.32906+ 0	7.28326+ 6	1.29638+ 0	102	3	1	61
7.73539+ 6	1.24756+ 0	8.00000+ 6	1.22108+ 0	8.03102+ 6	1.21807+ 0	102	3	1	62
8.77878+ 6	1.15170+ 0	9.00000+ 6	1.13332+ 0	9.52654+ 6	1.09241+ 0	102	3	1	63
9.58021+ 6	1.08806+ 0	1.00000+ 7	1.05545+ 0	1.02743+ 7	1.03537+ 0	102	3	1	64
1.09804+ 7	9.81954- 1	1.10000+ 7	9.80467- 1	1.14250+ 7	9.49369- 1	102	3	1	65
1.16865+ 7	9.31277- 1	1.20000+ 7	9.10006- 1	1.23926+ 7	8.84791- 1	102	3	1	66
1.30000+ 7	8.49411- 1	1.30988+ 7	8.43943- 1	1.32699+ 7	8.35381- 1	102	3	1	67
1.35877+ 7	8.19988- 1	1.38741+ 7	8.06656- 1	1.40000+ 7	8.01546- 1	102	3	1	68
1.41000+ 7	7.97544- 1	1.43025+ 7	7.89583- 1	1.46495+ 7	7.76380- 1	102	3	1	69
1.50000+ 7	7.65022- 1	1.51147+ 7	7.61397- 1	1.54249+ 7	7.51816- 1	102	3	1	70
1.60000+ 7	7.33706- 1	1.69595+ 7	7.05788- 1	1.70000+ 7	7.04668- 1	102	3	1	71
1.71088+ 7	7.01680- 1	1.80000+ 7	6.64478- 1	1.80174+ 7	6.63789- 1	102	3	1	72
1.89259+ 7	6.31353- 1	1.90000+ 7	6.30380- 1	2.00000+ 7	6.17747- 1	102	3	1	73
						102	3	0	74
1.00200+ 3	1.99700+ 0	0	0	0	0	102	3	2	75
0.0 + 0	0.0 + 0	0	0	0	1	168	102	3	2 76
168	5	0	0	0	0	0	102	3	2 77
1.00000- 5	3.36234+ 0	3.00000- 5	3.37403+ 0	1.00000- 4	3.38125+ 0	102	3	2	78
3.00000- 4	3.38495+ 0	1.00000- 3	3.38723+ 0	3.00000- 3	3.38840+ 0	102	3	2	79
1.00000- 2	3.38912+ 0	2.53000- 2	3.38945+ 0	1.00000- 1	3.38972+ 0	102	3	2	80
3.00000- 1	3.38984+ 0	1.00000+ 0	3.38991+ 0	3.00000+ 0	3.38995+ 0	102	3	2	81
1.00000+ 1	3.38997+ 0	3.00000+ 1	3.38998+ 0	1.00000+ 2	3.38999+ 0	102	3	2	82
1.30000+ 2	3.38999+ 0	2.00000+ 2	3.38869+ 0	3.00000+ 2	3.38746+ 0	102	3	2	83
4.00000+ 2	3.38659+ 0	5.00000+ 2	3.38591+ 0	6.00000+ 2	3.38536+ 0	102	3	2	84
7.00000+ 2	3.38489+ 0	8.00000+ 2	3.38448+ 0	9.00000+ 2	3.38413+ 0	102	3	2	85
1.00000+ 3	3.38381+ 0	1.50000+ 3	3.38258+ 0	2.00000+ 3	3.38171+ 0	102	3	2	86
2.50000+ 3	3.38104+ 0	3.00000+ 3	3.38049+ 0	3.50000+ 3	3.38002+ 0	102	3	2	87
4.00000+ 3	3.37962+ 0	4.78160+ 3	3.37908+ 0	5.00000+ 3	3.37896+ 0	102	3	2	88
6.00000+ 3	3.37849+ 0	7.00000+ 3	3.37809+ 0	7.12452+ 3	3.37805+ 0	102	3	2	89
8.00000+ 3	3.37710+ 0	9.00000+ 3	3.37614+ 0	9.46746+ 3	3.37573+ 0	102	3	2	90
1.00000+ 4	3.37470+ 0	1.10000+ 4	3.37290+ 0	1.20000+ 4	3.37126+ 0	102	3	2	91
1.50000+ 4	3.36707+ 0	1.70000+ 4	3.36471+ 0	1.87256+ 4	3.36290+ 0	102	3	2	92
2.00000+ 4	3.36057+ 0	2.50000+ 4	3.35271+ 0	2.79838+ 4	3.34875+ 0	102	3	2	93
3.00000+ 4	3.34582+ 0	3.50000+ 4	3.33934+ 0	3.72420+ 4	3.33674+ 0	102	3	2	94
4.00000+ 4	3.33468+ 0	4.97088+ 4	3.29317+ 0	5.00000+ 4	3.29234+ 0	102	3	2	95
5.74441+ 4	3.27285+ 0	6.00000+ 4	3.26497+ 0	6.51794+ 4	3.25004+ 0	102	3	2	96
7.00000+ 4	3.24021+ 0	7.29147+ 4	3.23461+ 0	8.00000+ 4	3.22379+ 0	102	3	2	97
9.00000+ 4	3.21011+ 0	9.16821+ 4	3.20797+ 0	1.00000+ 5	3.19224+ 0	102	3	2	98
1.10449+ 5	3.17435+ 0	1.29217+ 5	3.14158+ 0	1.47984+ 5	3.11753+ 0	102	3	2	99
1.50000+ 5	3.11551+ 0	1.79382+ 5	3.08902+ 0	2.00000+ 5	3.07083+ 0	102	3	2	100
2.10781+ 5	3.06209+ 0	2.42179+ 5	3.03896+ 0	2.50000+ 5	3.03449+ 0	102	3	2	101
2.73577+ 5	3.02185+ 0	3.00000+ 5	3.01333+ 0	3.50000+ 5	2.99915+ 0	102	3	2	102
3.73788+ 5	2.99312+ 0	4.00000+ 5	2.99008+ 0	4.73999+ 5	2.98248+ 0	102	3	2	103
5.00000+ 5	2.98048+ 0	5.74209+ 5	2.97532+ 0	6.00000+ 5	2.97031+ 0	102	3	2	104

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........10........20........30........40........50........60......MAT MF MT  SEQ
 6.74421+ 5 2.95701+ 0 7.00000+ 5 2.95055+ 0 7.39563+ 5 2.94102+ 0 102 3  2  105
 8.00000+ 5 2.92893+ 0 8.04706+ 5 2.92802+ 0 8.69849+ 5 2.91439+ 0 102 3  2  106
 9.00000+ 5 2.90596+ 0 9.34992+ 5 2.89654+ 0 9.59498+ 5 2.89148+ 0 102 3  2  107
 9.84005+ 5 2.88985+ 0 1.00000+ 6 2.88865+ 0 1.00851+ 6 2.88801+ 0 102 3  2  108
 1.03302+ 6 2.88237+ 0 1.12462+ 6 2.85195+ 0 1.21623+ 6 2.82486+ 0 102 3  2  109
 1.30783+ 6 2.79916+ 0 1.39944+ 6 2.77288+ 0 1.48668+ 6 2.74404+ 0 102 3  2  110
 1.50000+ 6 2.73885+ 0 1.57392+ 6 2.71102+ 0 1.66117+ 6 2.67633+ 0 102 3  2  111
 1.74841+ 6 2.64246+ 0 1.86296+ 6 2.59975+ 0 1.97751+ 6 2.55681+ 0 102 3  2  112
 2.00000+ 6 2.54794+ 0 2.09206+ 6 2.51296+ 0 2.20661+ 6 2.46751+ 0 102 3  2  113
 2.50000+ 6 2.34940+ 0 2.54258+ 6 2.33386+ 0 2.87854+ 6 2.20614+ 0 102 3  2  114
 3.00000+ 6 2.16005+ 0 3.21451+ 6 2.08518+ 0 3.33872+ 6 2.04120+ 0 102 3  2  115
 3.50000+ 6 1.98511+ 0 3.55048+ 6 1.96837+ 0 3.92774+ 6 1.85101+ 0 102 3  2  116
 4.00000+ 6 1.83108+ 0 4.04574+ 6 1.81874+ 0 4.30500+ 6 1.74882+ 0 102 3  2  117
 4.68225+ 6 1.65883+ 0 4.96815+ 6 1.59620+ 0 5.00000+ 6 1.58947+ 0 102 3  2  118
 5.05951+ 6 1.57706+ 0 5.61545+ 6 1.46724+ 0 5.89056+ 6 1.41829+ 0 102 3  2  119
 6.00000+ 6 1.39957+ 0 6.17139+ 6 1.37127+ 0 6.72732+ 6 1.28588+ 0 102 3  2  120
 6.81297+ 6 1.27329+ 0 7.00000+ 6 1.24644+ 0 7.28326+ 6 1.20780+ 0 102 3  2  121
 7.73539+ 6 1.14992+ 0 8.00000+ 6 1.11831+ 0 8.03102+ 6 1.11471+ 0 102 3  2  122
 8.77878+ 6 1.03474+ 0 9.00000+ 6 1.01256+ 0 9.52654+ 6 9.62973- 1 102 3  2  123
 9.58021+ 6 9.57769- 1 1.00000+ 7 9.19071- 1 1.02743+ 7 8.95158- 1 102 3  2  124
 1.09804+ 7 8.32318- 1 1.10000+ 7 8.30578- 1 1.14250+ 7 7.94105- 1 102 3  2  125
 1.16865+ 7 7.73459- 1 1.20000+ 7 7.49201- 1 1.23926+ 7 7.20353- 1 102 3  2  126
 1.30000+ 7 6.79573- 1 1.30988+ 7 6.73251- 1 1.32699+ 7 6.63224- 1 102 3  2  127
 1.35877+ 7 6.45310- 1 1.38741+ 7 6.30192- 1 1.40000+ 7 6.24308- 1 102 3  2  128
 1.41000+ 7 6.19696- 1 1.43025+ 7 6.10514- 1 1.46495+ 7 5.96655- 1 102 3  2  129
 1.50000+ 7 5.84649- 1 1.51147+ 7 5.80816- 1 1.54249+ 7 5.71312- 1 102 3  2  130
 1.60000+ 7 5.53341- 1 1.69595+ 7 5.25643- 1 1.70000+ 7 5.24523- 1 102 3  2  131
 1.71088+ 7 5.21535- 1 1.80000+ 7 4.84333- 1 1.80174+ 7 4.83644- 1 102 3  2  132
 1.89259+ 7 4.51208- 1 1.90000+ 7 4.50235- 1 2.00000+ 7 4.37602- 1 102 3  2  133
                                                                   102 3  0  134
 1.00200+ 3 1.99700+ 0           0           0           0           0 102 3 16  135
 0.0    + 0-2.22463+ 6           0           0           1          14 102 3 16  136
         14          3           0           0           0           0 102 3 16  137
 3.33872+ 6 0.0    + 0 4.04574+ 6 1.08174- 2 4.96815+ 6 3.50845- 2 102 3 16  138
 5.89056+ 6 5.76744- 2 6.81297+ 6 7.85382- 2 7.73539+ 6 9.76269- 2 102 3 16  139
 9.58021+ 6 1.30284- 1 1.14250+ 7 1.55254- 1 1.32699+ 7 1.72147- 1 102 3 16  140
 1.35877+ 7 1.74668- 1 1.43025+ 7 1.79060- 1 1.51147+ 7 1.80572- 1 102 3 16  141
 1.69595+ 7 1.80136- 1 2.00000+ 7 1.80137- 1                       102 3 16  142
                                                                   102 3  0  143
 1.00200+ 3 1.99700+ 0           0           0           0           0 102 3102  144
 0.0    + 0 6.25733+ 6           0           0           1          83 102 3102  145
         83          5           0           0           0           0 102 3102  146
 1.00000- 5 2.76644- 2 3.00000- 5 1.59721- 2 1.00000- 4 8.74826- 3 102 3102  147
 3.00000- 4 5.05081- 3 1.00000- 3 2.76645- 3 3.00000- 3 1.59721- 3 102 3102  148
 1.00000- 2 8.74827- 4 2.53000- 2 5.50000- 4 1.00000- 1 2.76646- 4 102 3102  149
 3.00000- 1 1.59724- 4 1.00000+ 0 8.74888- 5 3.00000+ 0 5.05188- 5 102 3102  150
 1.00000+ 1 2.76839- 5 3.00000+ 1 1.60058- 5 1.00000+ 2 8.80983- 6 102 3102  151
 2.00000+ 2 6.27302- 6 3.00000+ 2 5.15744- 6 4.00000+ 2 4.49726- 6 102 3102  152
 5.00000+ 2 4.04999- 6 6.00000+ 2 3.72225- 6 7.00000+ 2 3.46940- 6 102 3102  153
 8.00000+ 2 3.26710- 6 9.00000+ 2 3.10077- 6 1.00000+ 3 2.96111- 6 102 3102  154
 1.50000+ 3 2.49720- 6 2.00000+ 3 2.23146- 6 2.50000+ 3 2.05743- 6 102 3102  155
 3.00000+ 3 1.93435- 6 3.50000+ 3 1.84287- 6 4.00000+ 3 1.77249- 6 102 3102  156
 5.00000+ 3 1.67238- 6 6.00000+ 3 1.60611- 6 7.00000+ 3 1.56051- 6 102 3102  157
 8.00000+ 3 1.52851- 6 9.00000+ 3 1.50590- 6 1.00000+ 4 1.49014- 6 102 3102  158
 1.50000+ 4 1.46772- 6 2.00000+ 4 1.48837- 6 2.50000+ 4 1.52546- 6 102 3102  159
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........10........20........30........40........50........60......MAT MF MT   SEQ
 3.00000+ 4 1.56981- 6 3.50000+ 4 1.61738- 6 4.00000+ 4 1.66624- 6 102 3102  160
 5.00000+ 4 1.76448- 6 6.00000+ 4 1.86074- 6 7.00000+ 4 1.95387- 6 102 3102  161
 8.00000+ 4 2.04374- 6 9.00000+ 4 2.13035- 6 1.00000+ 5 2.21395- 6 102 3102  162
 1.50000+ 5 2.59269- 6 2.00000+ 5 2.92176- 6 2.50000+ 5 3.21528- 6 102 3102  163
 3.00000+ 5 3.48175- 6 3.50000+ 5 3.72696- 6 4.00000+ 5 3.95473- 6 102 3102  164
 5.00000+ 5 4.36854- 6 6.00000+ 5 4.73845- 6 7.00000+ 5 5.07417- 6 102 3102  165
 8.00000+ 5 5.38189- 6 9.00000+ 5 5.66633- 6 1.00000+ 6 5.93056- 6 102 3102  166
 1.50000+ 6 7.02678- 6 2.00000+ 6 7.85886- 6 2.50000+ 6 8.50971- 6 102 3102  167
 3.00000+ 6 9.02604- 6 3.50000+ 6 9.43672- 6 4.00000+ 6 9.76169- 6 102 3102  168
 5.00000+ 6 1.02128- 5 6.00000+ 6 1.04637- 5 7.00000+ 6 1.05709- 5 102 3102  169
 8.00000+ 6 1.05722- 5 9.00000+ 6 1.04960- 5 1.00000+ 7 1.03628- 5 102 3102  170
 1.10000+ 7 1.01884- 5 1.20000+ 7 9.98433- 6 1.30000+ 7 9.75941- 6 102 3102  171
 1.40000+ 7 9.52062- 6 1.41000+ 7 9.49613- 6 1.50000+ 7 9.27327- 6 102 3102  172
 1.60000+ 7 9.02164- 6 1.70000+ 7 8.76841- 6 1.80000+ 7 8.51637- 6 102 3102  173
 1.90000+ 7 8.26685- 6 2.00000+ 7 8.02152- 6                       102 3102  174
                                                                   102 3  0  175
 1.00200+ 3 1.99700+ 0          0          0          0          0 102 3251  176
 0.0    + 0 0.0    + 0          0          0          1         83 102 3251  177
         83          2          0          0          0          0 102 3251  178
 1.00000- 5 3.33472- 1 3.00000- 5 3.33472- 1 1.00000- 4 3.33472- 1 102 3251  179
 3.00000- 4 3.33472- 1 1.00000- 3 3.33472- 1 3.00000- 3 3.33472- 1 102 3251  180
 1.00000- 2 3.33472- 1 2.53000- 2 3.33472- 1 1.00000- 1 3.33472- 1 102 3251  181
 3.00000- 1 3.33472- 1 1.00000+ 0 3.33471- 1 3.00000+ 0 3.33470- 1 102 3251  182
 1.00000+ 1 3.33464- 1 3.00000+ 1 3.33448- 1 1.00000+ 2 3.33392- 1 102 3251  183
 2.00000+ 2 3.33311- 1 3.00000+ 2 3.33231- 1 4.00000+ 2 3.33151- 1 102 3251  184
 5.00000+ 2 3.33071- 1 6.00000+ 2 3.32991- 1 7.00000+ 2 3.32911- 1 102 3251  185
 8.00000+ 2 3.32830- 1 9.00000+ 2 3.32750- 1 1.00000+ 3 3.32670- 1 102 3251  186
 1.50000+ 3 3.32270- 1 2.00000+ 3 3.31870- 1 2.50000+ 3 3.31470- 1 102 3251  187
 3.00000+ 3 3.31070- 1 3.50000+ 3 3.30670- 1 4.00000+ 3 3.30271- 1 102 3251  188
 5.00000+ 3 3.29474- 1 6.00000+ 3 3.28678- 1 7.00000+ 3 3.27882- 1 102 3251  189
 8.00000+ 3 3.27088- 1 9.00000+ 3 3.26296- 1 1.00000+ 4 3.25503- 1 102 3251  190
 1.50000+ 4 3.21562- 1 2.00000+ 4 3.17648- 1 2.50000+ 4 3.13764- 1 102 3251  191
 3.00000+ 4 3.09909- 1 3.50000+ 4 3.06084- 1 4.00000+ 4 3.02290- 1 102 3251  192
 5.00000+ 4 2.94795- 1 6.00000+ 4 2.87426- 1 7.00000+ 4 2.80186- 1 102 3251  193
 8.00000+ 4 2.73080- 1 8.99999+ 4 2.66106- 1 1.00000+ 5 2.59269- 1 102 3251  194
 1.50000+ 5 2.27181- 1 2.00000+ 5 1.98669- 1 2.50000+ 5 1.73749- 1 102 3251  195
 3.00000+ 5 1.52314- 1 3.50000+ 5 1.34204- 1 4.00000+ 5 1.19187- 1 102 3251  196
 5.00000+ 5 9.73895- 2 6.00000+ 5 8.47490- 2 7.00000+ 5 7.91832- 2 102 3251  197
 8.00000+ 5 7.89020- 2 9.00000+ 5 8.24460- 2 1.00000+ 6 8.86813- 2 102 3251  198
 1.50000+ 6 1.36547- 1 2.00000+ 6 1.85630- 1 2.50000+ 6 2.26063- 1 102 3251  199
 3.00000+ 6 2.57866- 1 3.50000+ 6 2.82468- 1 4.00000+ 6 3.01631- 1 102 3251  200
 5.00000+ 6 3.32785- 1 6.00000+ 6 3.59082- 1 7.00000+ 6 3.85706- 1 102 3251  201
 8.00000+ 6 4.04767- 1 9.00000+ 6 4.27533- 1 1.00000+ 7 4.47851- 1 102 3251  202
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 1.60000+ 7 5.28316- 1 1.70000+ 7 5.39448- 1 1.80000+ 7 5.49680- 1 102 3251  205
 1.90000+ 7 5.59025- 1 2.00000+ 7 5.67535- 1                       102 3251  206
                                                                   102 3  0  207
                                                                   102 0  0  208
 1.00200+ 3 1.99700+ 0          1          1          0          0 102 4  2  209
 0.0    + 0 1.99700+ 0          0          2        121         10 102 4  2  210
 1.00000+ 0 3.33834- 1 5.21164- 2-6.99586- 8 0.0    + 0 0.0    + 0 102 4  2  211
 0.0    + 0 0.0    + 0 0.0    + 0 0.0    + 0 0.0    + 0 0.0    + 0 102 4  2  212
 8.49549- 1 5.55864- 1 1.71940- 1 0.0    + 0 0.0    + 0 0.0    + 0 102 4  2  213
 0.0    + 0 0.0    + 0 0.0    + 0 0.0    + 0 0.0    + 0-2.62083- 1 102 4  2  214
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 0.0     + 0 0.0     + 0 0.0     + 0-5.45771- 2 2.19811- 1-3.92406- 1 102 4  2  218
 2.56951- 1 1.15629- 1 3.89843- 2 0.0     + 0 0.0     + 0 0.0     + 0 102 4  2  219
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 0.0     + 0-1.29632- 2 6.70572- 2-1.93379- 1 3.50574- 1-3.23763- 1 102 4  2  222
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 6.39657- 3-3.61985- 2 1.19633- 1-2.65825- 1 3.65709- 1-2.22727- 1 102 4  2  224
-5.72884- 2-5.26775- 3 4.63717- 3 5.28295- 4 0.0     + 0-3.16873- 3 102 4  2  225
 1.93335- 2-7.10789- 2 1.83204- 1-3.20930- 1 3.34576- 1-1.16636- 1 102 4  2  226
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 4.08951- 2-1.19352- 1 2.46603- 1-3.45831- 1 2.67670- 1-1.67037- 2 102 4  2  228
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 7.37902- 2-1.75875- 1 2.98455- 1-3.35216- 1 1.75287- 1 6.05706- 2 102 4  2  230
-7.41360- 2                                                         102 4  2  231
 0.0     + 0 0.0     + 0           0           0           1          83 102 4  2  232
        83           2           0           0           0           0 102 4  2  233
 0.0     + 0 1.00000- 5           0           0          10           0 102 4  2  234
-9.43670-12-8.27130-10-9.56040-18-4.35720-10-1.91360-17 3.65520-19 102 4  2  235
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 1.79020-27 9.16820-20-4.19660-27 4.82756-35                         102 4  2  239
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 2.88590-26 9.16820-20 1.25900-26 4.34500-34                         102 4  2  248
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-9.43680- 9-8.27130-10 8.92570-18-4.35720-10 6.99150-17 3.65520-19 102 4  2  253
-6.73380-26 9.16820-20-2.93760-26 2.36560-33                         102 4  2  254
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 1.87390-37 9.16820-20 7.79498-38 3.08480-56                         102 4  2  257
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-9.43680- 8-8.27120-10 7.01180-17-4.35720-10 9.62790-17 3.65510-19 102 4  2  259
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-2.83100- 7-8.27090-10 3.25190-16-4.35720-10 1.35730-16 3.65510-19 102 4  2  262
-7.09180-26 9.16820-20-2.09830-26 1.20690-33                         102 4  2  263
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-9.43680- 7-8.26720-10 1.12220-15-4.35720-10 5.51310-16 3.65300-19 102 4  2  265
-3.50980-25 9.16820-20-1.13310-25 3.51940-32                         102 4  2  266
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-2.83100- 6-8.23460-10 3.42190-15-4.35720-10 1.64440-15 3.63520-19 102 4  2  268
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-3.54560-24 9.16820-20-1.13310-24 3.51950-30                          102 4  2  272
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-2.83100- 5-4.61130-10 3.14950-14-4.35710-10 1.65300-14 1.63810-19 102 4  2  274
-9.76380-24 9.16809-20-3.39510-24 3.15970-29                          102 4  2  275
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-9.43600- 5 3.23910- 9 8.76120-15-4.35690-10 5.50240-14-1.87060-18 102 4  2  277
 2.11510-24 9.16790-20-1.12850-23 3.49110-28                          102 4  2  278
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-1.88700- 4 1.54360- 8-6.17800-13-4.35660-10 1.10040-13-8.57890-18 102 4  2  280
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 9.20670-22 9.16730-20-3.38810-23 3.14710-27                          102 4  2  284
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-3.77350- 4 6.42110- 8-6.31590-12-4.35600-10 2.20160-13-3.54340-17 102 4  2  286
 2.29420-21 9.16700-20-4.51800-23 5.59628-27                          102 4  2  287
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-4.71640- 4 1.00790- 7-1.26560-11-4.35560-10 2.75140-13-5.55520-17 102 4  2  289
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-5.65930- 4 1.45480- 7-2.21680-11-4.35530-10 3.30100-13-8.01330-17 102 4  2  292
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 1.28050-20 9.16590-20-7.90237-23 1.71230-26                          102 4  2  296
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 1.91950-20 9.16540-20-9.02812-23 2.23500-26                          102 4  2  299
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 2.74150-20 9.16489-20-1.01570-22 2.82910-26                          102 4  2  302
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-9.42900- 4 4.05420- 7-1.04600-10-4.35390-10 5.50010-13-2.23160-16 102 4  2  304
 3.76820-20 9.16428-20-1.12850-22 3.49200-26                          102 4  2  305
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-1.88430- 3 1.62250- 6-8.42260-10-4.34700-10 1.09890-12-8.92710-16 102 4  2  310
 3.03050-19 9.15040-20-2.25470-22 1.39490-25                          102 4  2  311
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-2.35440- 3 2.53430- 6-1.64530- 9-4.33970-10 1.37280-12-1.39420-15 102 4  2  313
 5.91810-19 9.13218-20-2.81650-22 2.17800-25                          102 4  2  314
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-2.82410- 3 3.64790- 6-2.84220- 9-4.32760-10 1.64580-12-2.00610-15 102 4  2  316
 1.02190-18 9.10068-20-3.37630-22 3.13290-25                          102 4  2  317
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-3.29340- 3 4.96300- 6-4.51100- 9-4.30860-10 1.91790-12-2.72820-15 102 4  2  319
 1.62130-18 9.04980-20-3.93420-22 4.25980-25                          102 4  2  320
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-3.76240- 3 6.47920- 6-6.72930- 9-4.28040-10 2.18860-12-3.55970-15 102 4  2  322
 2.41730-18 8.97280-20-4.48880-22 5.55720-25                          102 4  2  323
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-5.63430- 3 1.45500- 5-2.26450- 8-4.01310-10 3.24160-12-7.94970-15 102 4  2  328
 8.09500-18 8.23190-20-6.63870-22 1.23990-24                      102 4  2  329
 0.0     + 0 7.00000+ 3           0           0          10           0 102 4  2  330
-6.56790- 3 1.97840- 5-3.59020- 8-3.73350-10 3.73450-12-1.07470-14 102 4  2  331
 1.27710-17 7.45680-20-7.63630-22 1.67490-24                      102 4  2  332
 0.0     + 0 8.00000+ 3           0           0          10           0 102 4  2  333
-7.49990- 3 2.58140- 5-5.35040- 8-3.30730-10 4.18720-12-1.38990-14 102 4  2  334
 1.88900-17 6.28360-20-8.54210-22 2.16400-24                      102 4  2  335
 0.0     + 0 9.00000+ 3           0           0          10           0 102 4  2  336
-8.43040- 3 3.26370- 5-7.60560- 8-2.69070-10 4.58070-12-1.73470-14 102 4  2  337
 2.65620-17 4.60680-20-9.31480-22 2.69760-24                      102 4  2  338
 0.0     + 0 1.00000+ 4           0           0          10           0 102 4  2  339
-9.35940- 3 4.02510- 5-1.04160- 7-1.83390-10 4.89080-12-2.10060-14 102 4  2  340
 3.58240-17 2.32080-20-9.90310-22 3.26180-24                      102 4  2  341
 0.0     + 0 1.50000+ 4           0           0          10           0 102 4  2  342
-1.39800- 2 9.01000- 5-3.48630- 7 8.17180-10 3.89840-12-3.68830-14 102 4  2  343
 9.84060-17-2.04750-19-7.86479-22 5.71330-24                      102 4  2  344
 0.0     + 0 2.00000+ 4           0           0          10           0 102 4  2  345
-1.85610- 2 1.59350- 4-8.19480- 7 3.47260- 9-6.86400-12-1.76300-14 102 4  2  346
 9.73760-17-4.58700-19 5.26030-22 4.33010-24                      102 4  2  347
 0.0     + 0 2.50000+ 4           0           0          10           0 102 4  2  348
-2.31020- 2 2.47680- 4-1.58720- 6 8.99450- 9-3.97800-11 1.26520-13 102 4  2  349
-3.50840-16 6.48770-19-3.67050-22 6.29500-26                      102 4  2  350
 0.0     + 0 3.00000+ 4           0           0          10           0 102 4  2  351
-2.76030- 2 3.54790- 4-2.71960- 6 1.88980- 8-1.14620-10 5.76880-13 102 4  2  352
-2.25960-15 8.17410-18-2.32920-20 4.10790-23                      102 4  2  353
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-3.20620- 2 4.80360- 4-4.28230- 6 3.49830- 8-2.60030-10 1.65160-12 102 4  2  355
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-2.10600-14 1.12760-16-5.20120-19 1.73080-21                      102 4  2  359
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-4.51880- 2 9.64690- 4-1.21710- 5 1.42240- 7-1.56570- 9 1.49940-11 102 4  2  361
-1.02760-13 6.99670-16-4.18650-18 1.85780-20                      102 4  2  362
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-5.37260- 2 1.37410- 3-2.06750- 5 2.88920- 7-3.82400- 9 4.41540-11 102 4  2  364
-3.62240-13 2.96730-15-2.15110-17 1.16690-19                      102 4  2  365
 0.0     + 0 7.00000+ 4           0           0          10           0 102 4  2  366
-6.20920- 2 1.84090- 3-3.22730- 5 5.23850- 7-8.07300- 9 1.08700-10 102 4  2  367
-1.03580-12 9.88300-15-8.36950-17 5.32360-19                      102 4  2  368
 0.0     + 0 8.00000+ 4           0           0          10           0 102 4  2  369
-7.02810- 2 2.38950- 3-4.73530- 5 8.74300- 7-1.53450- 8 2.35540-10 102 4  2  370
-2.55200-12 2.77400-14-2.68000-16 1.94820-18                      102 4  2  371
 0.0     + 0 8.99999+ 4           0           0          10           0 102 4  2  372
-7.82940- 2 2.99050- 3-6.62680- 5 1.36990- 6-2.69370- 8 4.63580-10 102 4  2  373
-5.62020-12 6.84650-14-7.41780-16 6.05340-18                      102 4  2  374
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-1.13360-11 1.52800-13-1.83250-15 1.65630-17                      102 4  2  377
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-1.81800- 1 1.90470- 2-1.07060- 3 5.70940- 5-2.89740- 6 1.29760- 7 102 4  2  385
-4.01340- 9 1.26720-10-3.55650-12 7.53500-14                        102 4  2  386
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-1.20490- 8 4.47150-10-1.47400-11 3.66920-13                        102 4  2  389
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-2.23840- 1 3.28430- 2-2.45520- 3 1.75780- 4-1.19600- 5 7.21320- 7 102 4  2  391
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-6.39440- 8 3.03990- 9-1.28210-10 4.08570-12                        102 4  2  395
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-2.59830- 1 5.50390- 2-5.47990- 3 5.29240- 4-4.84240- 5 3.95090- 6 102 4  2  397
-2.18750- 7 1.25140- 8-6.34260-10 2.43040-11                        102 4  2  398
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-2.69860- 1 6.94880- 2-7.95500- 3 8.90200- 4-9.41260- 5 8.90700- 6 102 4  2  400
-5.69770- 7 3.77140- 8-2.20910- 9 9.78946-11                        102 4  2  401
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-2.71800- 1 8.30610- 2-1.06590- 2 1.34670- 3-1.60280- 4 1.71300- 5 102 4  2  403
-1.23450- 6 9.20600- 8-6.06830- 9 3.02850-10                        102 4  2  404
 0.0    + 0 8.00000+ 5          0          0          10          0 102 4  2  405
-2.67840- 1 9.55250- 2-1.34950- 2 1.88940- 3-2.48350- 4 2.94090- 5 102 4  2  406
-2.34500- 6 1.93260- 7-1.40640- 8 7.75440-10                        102 4  2  407
 0.0    + 0 9.00000+ 5          0          0          10          0 102 4  2  408
-2.59730- 1 1.06810- 1-1.63870- 2 2.50700- 3-3.58820- 4 4.64050- 5 102 4  2  409
-4.03890- 6 3.62580- 7-2.87110- 8 1.72390- 9                        102 4  2  410
 0.0    + 0 1.00000+ 6          0          0          10          0 102 4  2  411
-2.48810- 1 1.16920- 1-1.92790- 2 3.18820- 3-4.91380- 4 6.86320- 5 102 4  2  412
-6.45210- 6 6.23820- 7-5.31560- 8 3.43700- 9                        102 4  2  413
 0.0    + 0 1.50000+ 6          0          0          10          0 102 4  2  414
-1.79150- 1 1.52900- 1-3.27450- 2 7.20840- 3-1.44860- 3 2.67340- 4 102 4  2  415
-3.33990- 5 4.20410- 6-4.64990- 7 3.91630- 8                        102 4  2  416
 0.0    + 0 2.00000+ 6          0          0          10          0 102 4  2  417
-1.13370- 1 1.72600- 1-4.37780- 2 1.16490- 2-2.76910- 3 6.11860- 4 102 4  2  418
-9.22170- 5 1.36840- 5-1.78270- 6 1.77320- 7                        102 4  2  419
 0.0    + 0 2.50000+ 6          0          0          10          0 102 4  2  420
-6.08030- 2 1.83500- 1-5.25050- 2 1.60550- 2-4.29280- 3 1.07960- 3 102 4  2  421
-1.86250- 4 3.09720- 5-4.52450- 6 5.05570- 7                        102 4  2  422
 0.0    + 0 3.00000+ 6          0          0          10          0 102 4  2  423
-2.01630- 2 1.89540- 1-5.93590- 2 2.02240- 2-5.90260- 3 1.63890- 3 102 4  2  424
-3.13270- 4 5.66550- 5-9.01730- 6 1.09880- 6                        102 4  2  425
 0.0    + 0 3.50000+ 6          0          0          10          0 102 4  2  426
 1.09870- 2 1.93000- 1-6.47790- 2 2.40960- 2-7.52690- 3 2.26160- 3 102 4  2  427
-4.68700- 4 9.04140- 5-1.53900- 5 2.00590- 6                        102 4  2  428
 0.0    + 0 4.00000+ 6          0          0          10          0 102 4  2  429
 3.51550- 2 1.95170- 1-6.90400- 2 2.76580- 2-9.12130- 3 2.92420- 3 102 4  2  430
-6.47350- 4 1.31430- 4-2.36210- 5 3.24930- 6                        102 4  2  431
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 7.35760- 2 1.96510- 1-7.42990- 2 3.36370- 2-1.20280- 2 4.26970- 3 102 4  2  433
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-1.46420- 3 3.38990- 4-7.03960- 5 1.11280- 5                            102 4  2  437
 0.0     + 0 7.00000+ 6           0           0           10           0 102 4  2  438
 1.36300- 1 1.94600- 1-7.56520- 2 4.14970- 2-1.63420- 2 6.68430- 3 102 4  2  439
-1.86290- 3 4.49800- 4-9.79030- 5 1.61670- 5                            102 4  2  440
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 1.59430- 1 1.96250- 1-7.46390- 2 4.44860- 2-1.80210- 2 7.76290- 3 102 4  2  442
-2.25990- 3 5.64200- 4-1.27470- 4 2.17770- 5                            102 4  2  443
 0.0     + 0 9.00000+ 6           0           0           10           0 102 4  2  444
 1.86040- 1 1.96140- 1-7.19100- 2 4.65540- 2-1.92400- 2 8.69180- 3 102 4  2  445
-2.61870- 3 6.72120- 4-1.56510- 4 2.74780- 5                            102 4  2  446
 0.0     + 0 1.00000+ 7           0           0           10           0 102 4  2  447
 2.09440- 1 1.95690- 1-6.81520- 2 4.78600- 2-2.00350- 2 9.43480- 3 102 4  2  448
-2.92290- 3 7.67930- 4-1.83340- 4 3.29190- 5                            102 4  2  449
 0.0     + 0 1.10000+ 7           0           0           10           0 102 4  2  450
 2.27300- 1 1.97420- 1-6.45610- 2 4.91070- 2-2.06990- 2 1.01000- 2 102 4  2  451
-3.20200- 3 8.58410- 4-2.09290- 4 3.82880- 5                            102 4  2  452
 0.0     + 0 1.20000+ 7           0           0           10           0 102 4  2  453
 2.43720- 1 2.00670- 1-6.11200- 2 5.04570- 2-2.13150- 2 1.07500- 2 102 4  2  454
-3.47350- 3 9.47980- 4-2.35280- 4 4.37330- 5                            102 4  2  455
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 2.60420- 1 2.03800- 1-5.73820- 2 5.16260- 2-2.17730- 2 1.13400- 2 102 4  2  457
-3.72110- 3 1.03200- 3-2.60070- 4 4.90100- 5                            102 4  2  458
 0.0     + 0 1.40000+ 7           0           0           10           0 102 4  2  459
 2.76720- 1 2.06690- 1-5.33960- 2 5.25890- 2-2.20680- 2 1.18580- 2 102 4  2  460
-3.94010- 3 1.10910- 3-2.83160- 4 5.40050- 5                            102 4  2  461
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-3.96050- 3 1.11640- 3-2.85370- 4 5.44880- 5                            102 4  2  464
 0.0     + 0 1.50000+ 7           0           0           10           0 102 4  2  465
 2.92160- 1 2.09410- 1-4.92740- 2 5.33950- 2-2.22250- 2 1.23120- 2 102 4  2  466
-4.13220- 3 1.17930- 3-3.04500- 4 5.86950- 5                            102 4  2  467
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 3.06600- 1 2.12040- 1-4.50960- 2 5.40860- 2-2.22690- 2 1.27110- 2 102 4  2  469
-4.29990- 3 1.24320- 3-3.24150- 4 6.30810- 5                            102 4  2  470
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 3.19970- 1 2.14650- 1-4.09230- 2 5.46990- 2-2.22230- 2 1.30630- 2 102 4  2  472
-4.44620- 3 1.30150- 3-3.42220- 4 6.71780- 5                            102 4  2  473
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 3.32290- 1 2.17290- 1-3.67980- 2 5.52640- 2-2.21060- 2 1.33770- 2 102 4  2  475
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 3.43590- 1 2.19990- 1-3.27530- 2 5.58090- 2-2.19340- 2 1.36600- 2 102 4  2  478
-4.68550- 3 1.40430- 3-3.74240- 4 7.46030- 5                            102 4  2  479
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 3.53950- 1 2.22800- 1-2.88080- 2 5.63550- 2-2.17220- 2 1.39210- 2 102 4  2  481
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                                                                        102 4  0  483
 1.00200+ 3 1.99700+ 0           0           2           0           0 102 4 16  484
 0.0     + 0 1.99700+ 0           0           1           0           0 102 4 16  485
 0.0     + 0 0.0     + 0           0           0           1          18 102 4 16  486
          18          2           0           0           0           0 102 4 16  487
 0.0     + 0 4.00000+ 6           0           0           1          19 102 4 16  488
          19          2           0           0           0           0 102 4 16  489
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-2.32050- 8 0.0     + 0 1.73650- 1 0.0     + 0 3.42020- 1 0.0     + 0 102 4 16  493
 5.00000- 1 0.0     + 0 6.42790- 1 4.35308- 1 7.66040- 1 8.93960- 1 102 4 16  494
 8.66030- 1 2.03308+ 0 9.39690- 1 5.00545+ 0 9.84810- 1 9.32415+ 0 102 4 16  495
 1.00000+ 0 1.15007+ 1                                             102 4 16  496
 0.0     + 0 5.00000+ 6           0           0           1          19 102 4 16  497
          19         2           0           0           0           0 102 4 16  498
-1.00000+ 0 2.79895- 3-9.84810- 1 2.83962- 3-9.39690- 1 2.92473- 3 102 4 16  499
-8.66030- 1 2.99077- 3-7.66040- 1 3.49736- 3-6.42790- 1 5.17526- 3 102 4 16  500
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-2.32050- 8 7.08883- 2 1.73650- 1 1.68206- 1 3.42020- 1 2.36914- 1 102 4 16  502
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 8 66030- 1 2.08157+ 0 9.39690- 1 4.24612+ 0 9.84810- 1 6.86100+ 0 102 4 16  504
 1.00000+ 0 8.15160+ 0                                             102 4 16  505
 0.0     + 0 6.00000+ 6           0           0           1          19 102 4 16  506
          19         2           0           0           0           0 102 4 16  507
-1.00000+ 0 1.86272- 2-9.84810- 1 1.85360- 2-9.39690- 1 1.82587- 2 102 4 16  508
-8.66030- 1 1.78125- 2-7.66040- 1 4.26853- 2-6.42790- 1 4.67741- 2 102 4 16  509
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-2.32050- 8 1.55926- 1 1.73650- 1 1.91945- 1 3.42020- 1 2.35781- 1 102 4 16  511
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 8.66030- 1 2.03525+ 0 9.39690- 1 3.74784+ 0 9.84810- 1 5.76136+ 0 102 4 16  513
 1.00000+ 0 6.73428+ 0                                             102 4 16  514
 0.0     + 0 7.00000+ 6           0           0           1          19 102 4 16  515
          19         2           0           0           0           0 102 4 16  516
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-8.66030- 1 3.97739- 2-7.66040- 1 8.20526- 2-6.42790- 1 7.88250- 2 102 4 16  518
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 8.66030- 1 1.99792+ 0 9.39690- 1 3.45012+ 0 9.84810- 1 5.07297+ 0 102 4 16  522
 1.00000+ 0 5.94144+ 0                                             102 4 16  523
 0.0     + 0 8.00000+ 6           0           0           1          19 102 4 16  524
          19         2           0           0           0           0 102 4 16  525
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 8.66030- 1 1.95612+ 0 9.39690- 1 3.22486+ 0 9.84810- 1 4.66614+ 0 102 4 16  531
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          19         2           0           0           0           0 102 4 16  534
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          19           2           0           0           0           0 102 4 16  570
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          19           2           0           0           0           0 102 4 16  624
-1.00000+ 0 1.23972- 1-9.84810- 1 1.23542- 1-9.39690- 1 1.22224- 1 102 4 16  625
-8.66030- 1 1.40679- 1-7.66040- 1 1.43905- 1-6.42790- 1 1.53771- 1 102 4 16  626
-5.00000- 1 1.62400- 1-3.42020- 1 1.67223- 1-1.73650- 1 1.80116- 1 102 4 16  627
-2.32050- 8 2.07499- 1 1.73650- 1 2.74348- 1 3.42020- 1 3.95614- 1 102 4 16  628
 5.00000- 1 5.80064- 1 6.42790- 1 8.62791- 1 7.66040- 1 1.26049+ 0 102 4 16  629
 8.66030- 1 1.67673+ 0 9.39690- 1 2.06081+ 0 9.84810- 1 2.55783+ 0 102 4 16  630
 1.00000+ 0 2.83446+ 0                                             102 4 16  631
 0.0     + 0 1.90000+ 7           0           0           1          19 102 4 16  632
          19           2           0           0           0           0 102 4 16  633
-1.00000+ 0 1.34770- 1-9.84810- 1 1.39579- 1-9.39690- 1 1.38494- 1 102 4 16  634
-8.66030- 1 1.43373- 1-7.66040- 1 1.55421- 1-6.42790- 1 1.53758- 1 102 4 16  635
-5.00000- 1 1.60479- 1-3.42020- 1 1.72228- 1-1.73650- 1 1.85093- 1 102 4 16  636
-2.32050- 8 2.12176- 1 1.73650- 1 2.78889- 1 3.42020- 1 3.99410- 1 102 4 16  637
 5.00000- 1 5.85200- 1 6.42790- 1 8.77750- 1 7.66040- 1 1.26774+ 0 102 4 16  638
 8.66030- 1 1.65228+ 0 9.39690- 1 1.99889+ 0 9.84810- 1 2.44079+ 0 102 4 16  639
 1.00000+ 0 2.71869+ 0                                             102 4 16  640
 0.0     + 0 2.00000+ 7           0           0           1          19 102 4 16  641
          19           2           0           0           0           0 102 4 16  642
-1.00000+ 0 1.36337- 1-9.84810- 1 1.35928- 1-9.39690- 1 1.41548- 1 102 4 16  643
-8.66030- 1 1.39714- 1-7.66040- 1 1.51710- 1-6.42790- 1 1.63048- 1 102 4 16  644
-5.00000- 1 1.67661- 1-3.42020- 1 1.69245- 1-1.73650- 1 1.80853- 1 102 4 16  645
-2.32050- 8 2.15893- 1 1.73650- 1 2.83992- 1 3.42020- 1 4.06261- 1 102 4 16  646
 5.00000- 1 6.00694- 1 6.42790- 1 8.83729- 1 7.66040- 1 1.27759+ 0 102 4 16  647
 8.66030- 1 1.65021+ 0 9.39690- 1 1.93317+ 0 9.84810- 1 2.36388+ 0 102 4 16  648
 1.00000+ 0 2.59861+ 0                                             102 4 16  649
                                                                   102 4  0  650
                                                                   102 0  0  651
 1.00200+ 3 1.99700+ 0           0           0           1           0 102 5 16  652
 0.0     + 0 0.0     + 0           0           1           1           2 102 5 16  653
           2           2           0           0           0           0 102 5 16  654
```

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........10........20........30........40........50........60......MAT MF MT   SEQ
 4.00000+ 6 1.00000+ 0 2.00000+ 7 1.00000+ 0                        102 5 16  655
 0.0     + 0 0.0     + 0           0           0           1          18 102 5 16  656
          18           2           0           0           0           0 102 5 16  657
 0.0     + 0 4.00000+ 6           0           0           1          16 102 5 16  658
          16           2           0           0           0           0 102 5 16  659
 0.0     + 0 0.0     + 0 1.00000+ 5 5.66280- 7 2.00000+ 5 6.18020- 7 102 5 16  660
 3.00000+ 5 6.79160- 7 4.00000+ 5 7.19550- 7 5.00000+ 5 8.91290- 7 102 5 16  661
 6.00000+ 5 1.05330- 6 7.00000+ 5 1.16230- 6 8.00000+ 5 1.18680- 6 102 5 16  662
 9.00000+ 5 9.53470- 7 1.00000+ 6 8.14090- 7 1.10000+ 6 6.46170- 7 102 5 16  663
 1.20000+ 6 4.21850- 7 1.30000+ 6 2.59660- 7 1.40000+ 6 2.80460- 8 102 5 16  664
 1.50000+ 6 0.0     + 0                                             102 5 16  665
 0.0     + 0 5.00000+ 6           0           0           1          27 102 5 16  666
          27           2           0           0           0           0 102 5 16  667
 0.0     + 0 0.0     + 0 1.00000+ 5 5.71140- 7 2.00000+ 5 4.66860- 7 102 5 16  668
 3.00000+ 5 4.39520- 7 4.00000+ 5 4.26690- 7 5.00000+ 5 4.03900- 7 102 5 16  669
 6.00000+ 5 4.15410- 7 7.00000+ 5 4.51780- 7 8.00000+ 5 5.12750- 7 102 5 16  670
 9.00000+ 5 5.53270- 7 1.00000+ 6 5.58380- 7 1.10000+ 6 5.92150- 7 102 5 16  671
 1.20000+ 6 6.06820- 7 1.30000+ 6 5.87960- 7 1.40000+ 6 5.60860- 7 102 5 16  672
 1.50000+ 6 5.31820- 7 1.60000+ 6 4.89270- 7 1.70000+ 6 4.32540- 7 102 5 16  673
 1.80000+ 6 3.18370- 7 1.90000+ 6 2.76760- 7 2.00000+ 6 2.26540- 7 102 5 16  674
 2.10000+ 6 1.79200- 7 2.20000+ 6 1.23000- 7 2.30000+ 6 9.03820- 8 102 5 16  675
 2.40000+ 6 5.96200- 8 2.50000+ 6 7.29280- 9 2.60000+ 6 0.0     + 0 102 5 16  676
 0.0     + 0 6.00000+ 6           0           0           1          38 102 5 16  677
          38           2           0           0           0           0 102 5 16  678
 0.0     + 0 0.0     + 0 1.00000+ 5 5.52110- 7 2.00000+ 5 4.99160- 7 102 5 16  679
 3.00000+ 5 4.23860- 7 4.00000+ 5 3.65670- 7 5.00000+ 5 3.22860- 7 102 5 16  680
 6.00000+ 5 3.09710- 7 7.00000+ 5 3.06730- 7 8.00000+ 5 3.15530- 7 102 5 16  681
 9.00000+ 5 3.17420- 7 1.00000+ 6 3.46130- 7 1.10000+ 6 3.64150- 7 102 5 16  682
 1.20000+ 6 3.82420- 7 1.30000+ 6 3.98240- 7 1.40000+ 6 4.17120- 7 102 5 16  683
 1.50000+ 6 4.28740- 7 1.60000+ 6 4.27840- 7 1.70000+ 6 3.98840- 7 102 5 16  684
 1.80000+ 6 3.92420- 7 1.90000+ 6 3.79810- 7 2.00000+ 6 3.55040- 7 102 5 16  685
 2.10000+ 6 3.32240- 7 2.20000+ 6 3.04890- 7 2.30000+ 6 2.82920- 7 102 5 16  686
 2.40000+ 6 2.59620- 7 2.50000+ 6 2.29900- 7 2.60000+ 6 1.70710- 7 102 5 16  687
 2.70000+ 6 1.54140- 7 2.80000+ 6 1.37160- 7 2.90000+ 6 1.18370- 7 102 5 16  688
 3.00000+ 6 9.51050- 8 3.10000+ 6 6.81270- 8 3.20000+ 6 5.80890- 8 102 5 16  689
 3.30000+ 6 4.41340- 8 3.40000+ 6 3.27180- 8 3.50000+ 6 8.07910- 9 102 5 16  690
 3.60000+ 6 0.0     + 0 3.70000+ 6 0.0     + 0                     102 5 16  691
 0.0     + 0 7.00000+ 6           0           0           1          25 102 5 16  692
          25           2           0           0           0           0 102 5 16  693
 0.0     + 0 0.0     + 0 2.00000+ 5 4.56100- 7 4.00000+ 5 3.58090- 7 102 5 16  694
 6.00000+ 5 2.86210- 7 8.00000+ 5 2.74670- 7 1.00000+ 6 2.57320- 7 102 5 16  695
 1.20000+ 6 2.67800- 7 1.40000+ 6 2.82450- 7 1.60000+ 6 3.06970- 7 102 5 16  696
 1.80000+ 6 3.15830- 7 2.00000+ 6 3.19880- 7 2.20000+ 6 3.09000- 7 102 5 16  697
 2.40000+ 6 2.72130- 7 2.60000+ 6 2.49740- 7 2.80000+ 6 2.15890- 7 102 5 16  698
 3.00000+ 6 1.85240- 7 3.20000+ 6 1.60210- 7 3.40000+ 6 1.31620- 7 102 5 16  699
 3.60000+ 6 9.03870- 8 3.80000+ 6 7.25200- 8 4.00000+ 6 5.28340- 8 102 5 16  700
 4.20000+ 6 3.38980- 8 4.40000+ 6 2.12610- 8 4.60000+ 6 0.0     + 0 102 5 16  701
 4.80000+ 6 0.0     + 0                                             102 5 16  702
 0.0     + 0 8.00000+ 6           0           0           1          30 102 5 16  703
          30           2           0           0           0           0 102 5 16  704
 0.0     + 0 0.0     + 0 2.00000+ 5 4.42620- 7 4.00000+ 5 3.62090- 7 102 5 16  705
 6.00000+ 5 2.73950- 7 8.00000+ 5 2.36420- 7 1.00000+ 6 2.21400- 7 102 5 16  706
 1.20000+ 6 2.08790- 7 1.40000+ 6 2.21380- 7 1.60000+ 6 2.35510- 7 102 5 16  707
 1.80000+ 6 2.40650- 7 2.00000+ 6 2.55730- 7 2.20000+ 6 2.55930- 7 102 5 16  708
 2.40000+ 6 2.56070- 7 2.60000+ 6 2.53170- 7 2.80000+ 6 2.38060- 7 102 5 16  709
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........10........20........30........40........50........60......MAT MF MT  SEQ
3.00000+ 6 2.06680- 7 3.20000+ 6 1.90670- 7 3.40000+ 6 1.72100- 7 102 5 16  710
3.60000+ 6 1.49930- 7 3.80000+ 6 1.29700- 7 4.00000+ 6 1.14370- 7 102 5 16  711
4.20000+ 6 9.61440- 8 4.40000+ 6 6.77840- 8 4.60000+ 6 5.78180- 8 102 5 16  712
4.80000+ 6 4.31610- 8 5.00000+ 6 2.94980- 8 5.20000+ 6 2.39050- 8 102 5 16  713
5.40000+ 6 1.64700- 8 5.60000+ 6 0.0     + 0 5.80000+ 6 0.0     + 0 102 5 16  714
0.0     + 0 9.00000+ 6           0           0           1          46 102 5 16  715
         46          2           0           0           0           0 102 5 16  716
0.0     + 0 0.0     + 0 1.50000+ 5 3.68620- 7 3.00000+ 5 3.91310- 7 102 5 16  717
4.50000+ 5 3.29950- 7 6.00000+ 5 2.58520- 7 7.50000+ 5 2.29650- 7 102 5 16  718
9.00000+ 5 1.94840- 7 1.05000+ 6 1.87070- 7 1.20000+ 6 1.85890- 7 102 5 16  719
1.35000+ 6 1.82260- 7 1.50000+ 6 1.91240- 7 1.65000+ 6 1.93240- 7 102 5 16  720
1.80000+ 6 1.97720- 7 1.95000+ 6 2.07900- 7 2.10000+ 6 2.11140- 7 102 5 16  721
2.25000+ 6 2.07210- 7 2.40000+ 6 2.13170- 7 2.55000+ 6 2.17600- 7 102 5 16  722
2.70000+ 6 2.11760- 7 2.85000+ 6 2.08550- 7 3.00000+ 6 2.06390- 7 102 5 16  723
3.15000+ 6 2.02060- 7 3.30000+ 6 1.95500- 7 3.45000+ 6 1.83360- 7 102 5 16  724
3.60000+ 6 1.60930- 7 3.75000+ 6 1.52540- 7 3.90000+ 6 1.43910- 7 102 5 16  725
4.05000+ 6 1.34990- 7 4.20000+ 6 1.20840- 7 4.35000+ 6 1.08220- 7 102 5 16  726
4.50000+ 6 1.00810- 7 4.65000+ 6 9.34730- 8 4.80000+ 6 8.61220- 8 102 5 16  727
4.95000+ 6 7.57930- 8 5.10000+ 6 5.59290- 8 5.25000+ 6 5.12980- 8 102 5 16  728
5.40000+ 6 4.67180- 8 5.55000+ 6 4.19670- 8 5.70000+ 6 3.32560- 8 102 5 16  729
5.85000+ 6 2.41090- 8 6.00000+ 6 2.19210- 8 6.15000+ 6 1.94660- 8 102 5 16  730
6.30000+ 6 1.44540- 8 6.45000+ 6 4.96620- 9 6.60000+ 6 0.0     + 0 102 5 16  731
6.75000+ 6 0.0     + 0                                              102 5 16  732
0.0     + 0 1.00000+ 7           0           0           1          40 102 5 16  733
         40          2           0           0           0           0 102 5 16  734
0.0     + 0 0.0     + 0 2.00000+ 5 3.45150- 7 4.00000+ 5 3.41170- 7 102 5 16  735
6.00000+ 5 2.61320- 7 8.00000+ 5 2.17120- 7 1.00000+ 6 1.92320- 7 102 5 16  736
1.20000+ 6 1.68760- 7 1.40000+ 6 1.66310- 7 1.60000+ 6 1.70460- 7 102 5 16  737
1.80000+ 6 1.70780- 7 2.00000+ 6 1.72750- 7 2.20000+ 6 1.77360- 7 102 5 16  738
2.40000+ 6 1.85340- 7 2.60000+ 6 1.87910- 7 2.80000+ 6 1.82590- 7 102 5 16  739
3.00000+ 6 1.85550- 7 3.20000+ 6 1.78900- 7 3.40000+ 6 1.73780- 7 102 5 16  740
3.60000+ 6 1.69310- 7 3.80000+ 6 1.62830- 7 4.00000+ 6 1.50720- 7 102 5 16  741
4.20000+ 6 1.30370- 7 4.40000+ 6 1.22120- 7 4.60000+ 6 1.13830- 7 102 5 16  742
4.80000+ 6 1.04620- 7 5.00000+ 6 9.25460- 8 5.20000+ 6 8.14230- 8 102 5 16  743
5.40000+ 6 7.46010- 8 5.60000+ 6 6.77960- 8 5.80000+ 6 5.85050- 8 102 5 16  744
6.00000+ 6 4.24470- 8 6.20000+ 6 3.82840- 8 6.40000+ 6 3.42030- 8 102 5 16  745
6.60000+ 6 2.63450- 8 6.80000+ 6 1.88170- 8 7.00000+ 6 1.70690- 8 102 5 16  746
7.20000+ 6 1.22270- 8 7.40000+ 6 4.37570- 9 7.60000+ 6 0.0     + 0 102 5 16  747
7.80000+ 6 0.0     + 0                                              102 5 16  748
0.0     + 0 1.10000+ 7           0           0           1          45 102 5 16  749
         45          2           0           0           0           0 102 5 16  750
0.0     + 0 0.0     + 0 2.00000+ 5 3.15440- 7 4.00000+ 5 3.10290- 7 102 5 16  751
6.00000+ 5 2.69530- 7 8.00000+ 5 2.12970- 7 1.00000+ 6 1.82780- 7 102 5 16  752
1.20000+ 6 1.64620- 7 1.40000+ 6 1.46670- 7 1.60000+ 6 1.45790- 7 102 5 16  753
1.80000+ 6 1.47780- 7 2.00000+ 6 1.47360- 7 2.20000+ 6 1.48630- 7 102 5 16  754
2.40000+ 6 1.51470- 7 2.60000+ 6 1.57870- 7 2.80000+ 6 1.63370- 7 102 5 16  755
3.00000+ 6 1.63570- 7 3.20000+ 6 1.57550- 7 3.40000+ 6 1.59030- 7 102 5 16  756
3.60000+ 6 1.58240- 7 3.80000+ 6 1.50890- 7 4.00000+ 6 1.44920- 7 102 5 16  757
4.20000+ 6 1.40150- 7 4.40000+ 6 1.34410- 7 4.60000+ 6 1.24320- 7 102 5 16  758
4.80000+ 6 1.07760- 7 5.00000+ 6 1.01610- 7 5.20000+ 6 9.54710- 8 102 5 16  759
5.40000+ 6 8.93700- 8 5.60000+ 6 7.89730- 8 5.80000+ 6 6.98280- 8 102 5 16  760
6.00000+ 6 6.48430- 8 6.20000+ 6 5.98960- 8 6.40000+ 6 5.49240- 8 102 5 16  761
6.60000+ 6 4.77940- 8 6.80000+ 6 3.49140- 8 7.00000+ 6 3.19170- 8 102 5 16  762
7.20000+ 6 2.90460- 8 7.40000+ 6 2.24750- 8 7.60000+ 6 1.61190- 8 102 5 16  763
7.80000+ 6 1.48720- 8 8.00000+ 6 1.38830- 8 8.20000+ 6 1.01860- 8 102 5 16  764
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........10........20........30........40........50........60......MAT MF MT  SEQ
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0.0     + 0 1.20000+ 7          0          0          1          50 102 5 16  766
         50          2          0          0          0           0 102 5 16  767
0.0     + 0 0.0     + 0 2.00000+ 5 3.00270- 7 4.00000+ 5 2.95010- 7 102 5 16  768
6.00000+ 5 2.67510- 7 8.00000+ 5 2.12740- 7 1.00000+ 6 1.85690- 7 102 5 16  769
1.20000+ 6 1.60510- 7 1.40000+ 6 1.46560- 7 1.60000+ 6 1.32010- 7 102 5 16  770
1.80000+ 6 1.31080- 7 2.00000+ 6 1.32360- 7 2.20000+ 6 1.31360- 7 102 5 16  771
2.40000+ 6 1.37380- 7 2.60000+ 6 1.37180- 7 2.80000+ 6 1.38620- 7 102 5 16  772
3.00000+ 6 1.43060- 7 3.20000+ 6 1.46910- 7 3.40000+ 6 1.45850- 7 102 5 16  773
3.60000+ 6 1.39660- 7 3.80000+ 6 1.40340- 7 4.00000+ 6 1.40220- 7 102 5 16  774
4.20000+ 6 1.33080- 7 4.40000+ 6 1.27890- 7 4.60000+ 6 1.24240- 7 102 5 16  775
4.80000+ 6 1.19810- 7 5.00000+ 6 1.14940- 7 5.20000+ 6 1.06470- 7 102 5 16  776
5.40000+ 6 9.25020- 8 5.60000+ 6 8.77920- 8 5.80000+ 6 8.31160- 8 102 5 16  777
6.00000+ 6 7.84970- 8 6.20000+ 6 7.28120- 8 6.40000+ 6 6.55290- 8 102 5 16  778
6.60000+ 6 5.81820- 8 6.80000+ 6 5.44560- 8 7.00000+ 6 5.07380- 8 102 5 16  779
7.20000+ 6 4.69480- 8 7.40000+ 6 4.12090- 8 7.60000+ 6 3.02310- 8 102 5 16  780
7.80000+ 6 2.79940- 8 8.00000+ 6 2.58510- 8 8.20000+ 6 2.36580- 8 102 5 16  781
8.40000+ 6 1.85610- 8 8.60000+ 6 1.34700- 8 8.80000+ 6 1.27450- 8 102 5 16  782
9.00000+ 6 1.20550- 8 9.20000+ 6 9.20470- 9 9.40000+ 6 3.71270- 9 102 5 16  783
9.60000+ 6 0.0     + 0 9.80000+ 6 0.0     + 0                     102 5 16  784
0.0     + 0 1.30000+ 7          0          0          1          55 102 5 16  785
         55          2          0          0          0           0 102 5 16  786
0.0     + 0 0.0     + 0 2.00000+ 5 2.84260- 7 4.00000+ 5 2.79740- 7 102 5 16  787
6.00000+ 5 2.52370- 7 8.00000+ 5 2.20590- 7 1.00000+ 6 1.79010- 7 102 5 16  788
1.20000+ 6 1.44190- 7 1.40000+ 6 1.35010- 7 1.60000+ 6 1.30500- 7 102 5 16  789
1.80000+ 6 1.18650- 7 2.00000+ 6 1.17680- 7 2.20000+ 6 1.21580- 7 102 5 16  790
2.40000+ 6 1.22620- 7 2.60000+ 6 1.21380- 7 2.80000+ 6 1.25990- 7 102 5 16  791
3.00000+ 6 1.24740- 7 3.20000+ 6 1.25170- 7 3.40000+ 6 1.28200- 7 102 5 16  792
3.60000+ 6 1.30860- 7 3.80000+ 6 1.29140- 7 4.00000+ 6 1.23100- 7 102 5 16  793
4.20000+ 6 1.23320- 7 4.40000+ 6 1.22940- 7 4.60000+ 6 1.20800- 7 102 5 16  794
4.80000+ 6 1.14650- 7 5.00000+ 6 1.09540- 7 5.20000+ 6 1.06130- 7 102 5 16  795
5.40000+ 6 1.02340- 7 5.60000+ 6 9.83770- 8 5.80000+ 6 9.13510- 8 102 5 16  796
6.00000+ 6 7.95340- 8 6.20000+ 6 7.59470- 8 6.40000+ 6 7.23940- 8 102 5 16  797
6.60000+ 6 6.88820- 8 6.80000+ 6 6.53370- 8 7.00000+ 6 5.83280- 8 102 5 16  798
7.20000+ 6 5.18600- 8 7.40000+ 6 4.90720- 8 7.60000+ 6 4.62750- 8 102 5 16  799
7.80000+ 6 4.34640- 8 8.00000+ 6 4.05480- 8 8.20000+ 6 3.58490- 8 102 5 16  800
8.40000+ 6 2.63420- 8 8.60000+ 6 2.46700- 8 8.80000+ 6 2.30590- 8 102 5 16  801
9.00000+ 6 2.15600- 8 9.20000+ 6 1.67760- 8 9.40000+ 6 1.21170- 8 102 5 16  802
9.60000+ 6 1.15450- 8 9.80000+ 6 1.12360- 8 1.00000+ 7 8.23160- 9 102 5 16  803
1.02000+ 7 3.18110- 9 1.04000+ 7 3.58840- 9 1.06000+ 7 0.0     + 0 102 5 16  804
1.08000+ 7 0.0     + 0                                             102 5 16  805
0.0     + 0 1.40000+ 7          0          0          1          60 102 5 16  806
         60          2          0          0          0           0 102 5 16  807
0.0     + 0 0.0     + 0 2.00000+ 5 2.74560- 7 4.00000+ 5 2.71040- 7 102 5 16  808
6.00000+ 5 2.44150- 7 8.00000+ 5 2.17970- 7 1.00000+ 6 1.85730- 7 102 5 16  809
1.20000+ 6 1.50860- 7 1.40000+ 6 1.31590- 7 1.60000+ 6 1.21640- 7 102 5 16  810
1.80000+ 6 1.19300- 7 2.00000+ 6 1.09350- 7 2.20000+ 6 1.08370- 7 102 5 16  811
2.40000+ 6 1.11500- 7 2.60000+ 6 1.11920- 7 2.80000+ 6 1.10450- 7 102 5 16  812
3.00000+ 6 1.13850- 7 3.20000+ 6 1.12850- 7 3.40000+ 6 1.12840- 7 102 5 16  813
3.60000+ 6 1.15210- 7 3.80000+ 6 1.17310- 7 4.00000+ 6 1.19160- 7 102 5 16  814
4.20000+ 6 1.17090- 7 4.40000+ 6 1.11220- 7 4.60000+ 6 1.11170- 7 102 5 16  815
4.80000+ 6 1.10650- 7 5.00000+ 6 1.09770- 7 5.20000+ 6 1.03490- 7 102 5 16  816
5.40000+ 6 9.89420- 8 5.60000+ 6 9.62320- 8 5.80000+ 6 9.31960- 8 102 5 16  817
6.00000+ 6 8.99980- 8 6.20000+ 6 8.67600- 8 6.40000+ 6 8.07880- 8 102 5 16  818
6.60000+ 6 7.04620- 8 6.80000+ 6 6.76570- 8 7.00000+ 6 6.48790- 8 102 5 16  819
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........10........20........30........40........50........60......MAT MF MT  SEQ
 7.20000+ 6 6.21290- 8 7.40000+ 6 5.93850- 8 7.60000+ 6 5.47460- 8 102 5 16  820
 7.80000+ 6 5.06620- 8 8.00000+ 6 4.51270- 8 8.20000+ 6 4.29570- 8 102 5 16  821
 8.40000+ 6 4.07680- 8 8.60000+ 6 3.85560- 8 8.80000+ 6 3.62070- 8 102 5 16  822
 9.00000+ 6 3.21980- 8 9.20000+ 6 2.36500- 8 9.40000+ 6 2.23560- 8 102 5 16  823
 9.60000+ 6 2.11000- 8 9.80000+ 6 1.99400- 8 1.00000+ 7 1.81130- 8 102 5 16  824
 1.02000+ 7 1.46700- 8 1.04000+ 7 1.06420- 8 1.06000+ 7 1.03370- 8 102 5 16  825
 1.08000+ 7 1.03500- 8 1.10000+ 7 7.58520- 9 1.12000+ 7 3.03280- 9 102 5 16  826
 1.14000+ 7 3.55540- 9 1.16000+ 7 0.0     + 0 1.18000+ 7 0.0     + 0 102 5 16  827
 0.0     + 0 1.41000+ 7           0           0           1          61 102 5 16  828
          61           2           0           0           0           0 102 5 16  829
 0.0     + 0 0.0     + 0 2.00000+ 5 2.70930- 7 4.00000+ 5 2.67560- 7 102 5 16  830
 6.00000+ 5 2.41000- 7 8.00000+ 5 2.15040- 7 1.00000+ 6 1.84530- 7 102 5 16  831
 1.20000+ 6 1.48580- 7 1.40000+ 6 1.29460- 7 1.60000+ 6 1.20850- 7 102 5 16  832
 1.80000+ 6 1.17010- 7 2.00000+ 6 1.10030- 7 2.20000+ 6 1.09490- 7 102 5 16  833
 2.40000+ 6 1.09130- 7 2.60000+ 6 1.09540- 7 2.80000+ 6 1.08080- 7 102 5 16  834
 3.00000+ 6 1.11310- 7 3.20000+ 6 1.14070- 7 3.40000+ 6 1.12930- 7 102 5 16  835
 3.60000+ 6 1.12710- 7 3.80000+ 6 1.14760- 7 4.00000+ 6 1.16620- 7 102 5 16  836
 4.20000+ 6 1.14700- 7 4.40000+ 6 1.09010- 7 4.60000+ 6 1.09020- 7 102 5 16  837
 4.80000+ 6 1.08590- 7 5.00000+ 6 1.07790- 7 5.20000+ 6 1.01860- 7 102 5 16  838
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 6.00000+ 6 8.89680- 8 6.20000+ 6 8.58360- 8 6.40000+ 6 8.00170- 8 102 5 16  840
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 9.60000+ 6 2.11940- 8 9.80000+ 6 2.00260- 8 1.00000+ 7 1.89450- 8 102 5 16  846
 1.02000+ 7 1.47200- 8 1.04000+ 7 1.06170- 8 1.06000+ 7 1.02460- 8 102 5 16  847
 1.08000+ 7 1.01060- 8 1.10000+ 7 9.87250- 9 1.12000+ 7 7.63590- 9 102 5 16  848
 1.14000+ 7 3.20450- 9 1.16000+ 7 3.00250- 9 1.18000+ 7 0.0     + 0 102 5 16  849
 1.20000+ 7 0.0     + 0                                             102 5 16  850
 0.0     + 0 1.50000+ 7           0           0           1          65 102 5 16  851
          65           2           0           0           0           0 102 5 16  852
 0.0     + 0 0.0     + 0 2.00000+ 5 2.61340- 7 4.00000+ 5 2.59070- 7 102 5 16  853
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 1.20000+ 6 1.50870- 7 1.40000+ 6 1.35050- 7 1.60000+ 6 1.17700- 7 102 5 16  855
 1.80000+ 6 1.08060- 7 2.00000+ 6 1.02470- 7 2.20000+ 6 1.02350- 7 102 5 16  856
 2.40000+ 6 1.01610- 7 2.60000+ 6 1.01150- 7 2.80000+ 6 1.01350- 7 102 5 16  857
 3.00000+ 6 9.97870- 8 3.20000+ 6 1.02280- 7 3.40000+ 6 1.04980- 7 102 5 16  858
 3.60000+ 6 1.03390- 7 3.80000+ 6 1.02900- 7 4.00000+ 6 1.04540- 7 102 5 16  859
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 4.80000+ 6 9.94970- 8 5.00000+ 6 9.92930- 8 5.20000+ 6 9.87380- 8 102 5 16  861
 5.40000+ 6 9.78980- 8 5.60000+ 6 9.51010- 8 5.80000+ 6 9.06630- 8 102 5 16  862
 6.00000+ 6 8.63670- 8 6.20000+ 6 8.39490- 8 6.40000+ 6 8.13790- 8 102 5 16  863
 6.60000+ 6 7.87630- 8 6.80000+ 6 7.61550- 8 7.00000+ 6 7.11050- 8 102 5 16  864
 7.20000+ 6 6.21110- 8 7.40000+ 6 5.99230- 8 7.60000+ 6 5.77550- 8 102 5 16  865
 7.80000+ 6 5.56040- 8 8.00000+ 6 5.34590- 8 8.20000+ 6 5.11990- 8 102 5 16  866
 8.40000+ 6 4.60280- 8 8.60000+ 6 4.09570- 8 8.80000+ 6 3.92860- 8 102 5 16  867
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 9.60000+ 6 3.22100- 8 9.80000+ 6 2.87900- 8 1.00000+ 7 2.11080- 8 102 5 16  869
 1.02000+ 7 2.01040- 8 1.04000+ 7 1.91250- 8 1.06000+ 7 1.82090- 8 102 5 16  870
 1.08000+ 7 1.73620- 8 1.10000+ 7 1.34480- 8 1.12000+ 7 9.66020- 9 102 5 16  871
 1.14000+ 7 9.38750- 9 1.16000+ 7 9.30440- 9 1.18000+ 7 9.53200- 9 102 5 16  872
 1.20000+ 7 6.98080- 9 1.22000+ 7 2.87330- 9 1.24000+ 7 3.47450- 9 102 5 16  873
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6.00000+ 5 2.27830- 7 8.00000+ 5 2.02190- 7 1.00000+ 6 1.80810- 7 102 5 16  878
1.20000+ 6 1.56440- 7 1.40000+ 6 1.35560- 7 1.60000+ 6 1.22350- 7 102 5 16  879
1.80000+ 6 1.08010- 7 2.00000+ 6 1.00070- 7 2.20000+ 6 9.53580- 8 102 5 16  880
2.40000+ 6 9.64040- 8 2.60000+ 6 9.44990- 8 2.80000+ 6 9.39390- 8 102 5 16  881
3.00000+ 6 9.61130- 8 3.20000+ 6 9.59860- 8 3.40000+ 6 9.43090- 8 102 5 16  882
3.60000+ 6 9.62920- 8 3.80000+ 6 9.84480- 8 4.00000+ 6 9.64560- 8 102 5 16  883
4.20000+ 6 9.56590- 8 4.40000+ 6 9.68130- 8 4.60000+ 6 9.77970- 8 102 5 16  884
4.80000+ 6 9.86800- 8 5.00000+ 6 9.64370- 8 5.20000+ 6 9.11230- 8 102 5 16  885
5.40000+ 6 9.08390- 8 5.60000+ 6 9.02830- 8 5.80000+ 6 8.94860- 8 102 5 16  886
6.00000+ 6 8.85180- 8 6.20000+ 6 8.32060- 8 6.40000+ 6 7.93160- 8 102 5 16  887
6.60000+ 6 7.73330- 8 6.80000+ 6 7.52120- 8 7.00000+ 6 7.30320- 8 102 5 16  888
7.20000+ 6 7.08610- 8 7.40000+ 6 6.87080- 8 7.60000+ 6 6.43140- 8 102 5 16  889
7.80000+ 6 5.62510- 8 8.00000+ 6 5.44910- 8 8.20000+ 6 5.27460- 8 102 5 16  890
8.40000+ 6 5.10110- 8 8.60000+ 6 4.92780- 8 8.80000+ 6 4.75100- 8 102 5 16  891
9.00000+ 6 4.27360- 8 9.20000+ 6 3.79590- 8 9.40000+ 6 3.66410- 8 102 5 16  892
9.60000+ 6 3.52990- 8 9.80000+ 6 3.39300- 8 1.00000+ 7 3.25350- 8 102 5 16  893
1.02000+ 7 3.11030- 8 1.04000+ 7 2.94560- 8 1.06000+ 7 2.64540- 8 102 5 16  894
1.08000+ 7 1.93380- 8 1.10000+ 7 1.85350- 8 1.12000+ 7 1.77450- 8 102 5 16  895
1.14000+ 7 1.69970- 8 1.16000+ 7 1.63380- 8 1.18000+ 7 1.25700- 8 102 5 16  896
1.20000+ 7 8.94050- 9 1.22000+ 7 8.70400- 9 1.24000+ 7 8.57720- 9 102 5 16  897
1.26000+ 7 8.68030- 9 1.28000+ 7 8.62770- 9 1.30000+ 7 6.61090- 9 102 5 16  898
1.32000+ 7 2.79100- 9 1.34000+ 7 3.46270- 9 1.36000+ 7 0.0     + 0 102 5 16  899
1.38000+ 7 0.0     + 0                                               102 5 16  900
0.0     + 0 1.70000+ 7          0          0          1          75 102 5 16  901
         75          2          0          0          0           0 102 5 16  902
0.0     + 0 0.0     + 0 2.00000+ 5 2.43840- 7 4.00000+ 5 2.44030- 7 102 5 16  903
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1.20000+ 6 1.56930- 7 1.40000+ 6 1.29760- 7 1.60000+ 6 1.15430- 7 102 5 16  905
1.80000+ 6 1.04250- 7 2.00000+ 6 9.88010- 8 2.20000+ 6 9.22330- 8 102 5 16  906
2.40000+ 6 8.82420- 8 2.60000+ 6 8.92200- 8 2.80000+ 6 8.74150- 8 102 5 16  907
3.00000+ 6 8.68090- 8 3.20000+ 6 8.85060- 8 3.40000+ 6 8.83100- 8 102 5 16  908
3.60000+ 6 8.66530- 8 3.80000+ 6 8.81730- 8 4.00000+ 6 8.97730- 8 102 5 16  909
4.20000+ 6 8.81930- 8 4.40000+ 6 8.72750- 8 4.60000+ 6 8.82330- 8 102 5 16  910
4.80000+ 6 8.90330- 8 5.00000+ 6 8.96980- 8 5.20000+ 6 9.03020- 8 102 5 16  911
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6.60000+ 6 7.60090- 8 6.80000+ 6 7.24850- 8 7.00000+ 6 7.08580- 8 102 5 16  914
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8.40000+ 6 5.08670- 8 8.60000+ 6 4.94500- 8 8.80000+ 6 4.80440- 8 102 5 16  917
9.00000+ 6 4.66430- 8 9.20000+ 6 4.52410- 8 9.40000+ 6 4.38200- 8 102 5 16  918
9.60000+ 6 4.22170- 8 9.80000+ 6 3.81690- 8 1.00000+ 7 3.39230- 8 102 5 16  919
1.02000+ 7 3.28630- 8 1.04000+ 7 3.17770- 8 1.06000+ 7 3.06640- 8 102 5 16  920
1.08000+ 7 2.95220- 8 1.10000+ 7 2.83380- 8 1.12000+ 7 2.68830- 8 102 5 16  921
1.14000+ 7 2.42690- 8 1.16000+ 7 1.76750- 8 1.18000+ 7 1.70310- 8 102 5 16  922
1.20000+ 7 1.63930- 8 1.22000+ 7 1.57800- 8 1.24000+ 7 1.52300- 8 102 5 16  923
1.26000+ 7 1.45550- 8 1.28000+ 7 1.12900- 8 1.30000+ 7 8.01240- 9 102 5 16  924
1.32000+ 7 7.87990- 9 1.34000+ 7 7.87780- 9 1.36000+ 7 8.14660- 9 102 5 16  925
1.38000+ 7 5.82760- 9 1.40000+ 7 2.34580- 9 1.42000+ 7 2.70020- 9 102 5 16  926
1.44000+ 7 3.41970- 9 1.46000+ 7 0.0     + 0 1.48000+ 7 0.0     + 0 102 5 16  927
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1.20000+ 6 1.53970- 7 1.40000+ 6 1.34140- 7 1.60000+ 6 1.17520- 7 102 5 16  932
1.80000+ 6 1.05810- 7 2.00000+ 6 9.38620- 8 2.20000+ 6 8.91390- 8 102 5 16  933
2.40000+ 6 8.64990- 8 2.60000+ 6 8.30240- 8 2.80000+ 6 8.38420- 8 102 5 16  934
3.00000+ 6 8.22180- 8 3.20000+ 6 8.15830- 8 3.40000+ 6 8.29080- 8 102 5 16  935
3.60000+ 6 8.26940- 8 3.80000+ 6 8.10530- 8 4.00000+ 6 8.22760- 8 102 5 16  936
4.20000+ 6 8.34960- 8 4.40000+ 6 8.48570- 8 4.60000+ 6 8.30060- 8 102 5 16  937
4.80000+ 6 8.19460- 8 5.00000+ 6 8.26350- 8 5.20000+ 6 8.31920- 8 102 5 16  938
5.40000+ 6 8.36390- 8 5.60000+ 6 8.40530- 8 5.80000+ 6 8.18950- 8 102 5 16  939
6.00000+ 6 7.71140- 8 6.20000+ 6 7.67730- 8 6.40000+ 6 7.62630- 8 102 5 16  940
6.60000+ 6 7.55970- 8 6.80000+ 6 7.48070- 8 7.00000+ 6 7.39290- 8 102 5 16  941
7.20000+ 6 6.94130- 8 7.40000+ 6 6.60400- 8 7.60000+ 6 6.45640- 8 102 5 16  942
7.80000+ 6 6.30290- 8 8.00000+ 6 6.14780- 8 8,20000+ 6 5.99430- 8 102 5 16  943
8.40000+ 6 5.84460- 8 8.60000+ 6 5.69420- 8 8.80000+ 6 5.35490- 8 102 5 16  944
9.00000+ 6 4.69350- 8 9.20000+ 6 4.57690- 8 9.40000+ 6 4.46110- 8 102 5 16  945
9.60000+ 6 4.34570- 8 9.80000+ 6 4.22970- 8 1.00000+ 7 4.11220- 8 102 5 16  946
1.02000+ 7 3.98830- 8 1.04000+ 7 3.59920- 8 1.06000+ 7 3.19080- 8 102 5 16  947
1.08000+ 7 3.10530- 8 1.10000+ 7 3.01750- 8 1.12000+ 7 2.92730- 8 102 5 16  948
1.14000+ 7 2.83430- 8 1.16000+ 7 2.73800- 8 1.18000+ 7 2.63720- 8 102 5 16  949
1.20000+ 7 2.50060- 8 1.22000+ 7 2.27170- 8 1.24000+ 7 1.64740- 8 102 5 16  950
1.26000+ 7 1.59440- 8 1.28000+ 7 1.54170- 8 1.30000+ 7 1.49050- 8 102 5 16  951
1.32000+ 7 1.44330- 8 1.34000+ 7 1.40250- 8 1.36000+ 7 1.06810- 8 102 5 16  952
1.38000+ 7 7.49170- 9 1.40000+ 7 7.36720- 9 1.42000+ 7 7.32060- 9 102 5 16  953
1.44000+ 7 7.42980- 9 1.46000+ 7 7.84720- 9 1.48000+ 7 5.53330- 9 102 5 16  954
1.50000+ 7 2.26580- 9 1.52000+ 7 2.66040- 9 1.54000+ 7 3.41950- 9 102 5 16  955
1.56000+ 7 0.0     + 0 1.58000+ 7 0.0     + 0                     102 5 16  956
0.0     + 0 1.90000+ 7           0           0           1          85 102 5 16  957
         85           2           0           0           0           0 102 5 16  958
0.0     + 0 0.0     + 0 2.00000+ 5 2.28290- 7 4.00000+ 5 2.30680- 7 102 5 16  959
6.00000+ 5 2.09660- 7 8.00000+ 5 1.85980- 7 1.00000+ 6 1.65160- 7 102 5 16  960
1.20000+ 6 1.48270- 7 1.40000+ 6 1.34890- 7 1.60000+ 6 1.18870- 7 102 5 16  961
1.80000+ 6 1.05400- 7 2.00000+ 6 9.59790- 8 2.20000+ 6 8.59970- 8 102 5 16  962
2.40000+ 6 8.21420- 8 2.60000+ 6 7.99580- 8 2.80000+ 6 7.69470- 8 102 5 16  963
3.00000+ 6 7.76040- 8 3.20000+ 6 7.61750- 8 3.40000+ 6 7.55400- 8 102 5 16  964
3.60000+ 6 7.65790- 8 3.80000+ 6 7.78210- 8 4.00000+ 6 7.73850- 8 102 5 16  965
4.20000+ 6 7.57460- 8 4.40000+ 6 7.67040- 8 4.60000+ 6 7.76930- 8 102 5 16  966
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7.20000+ 6 6.84750- 8 7.40000+ 6 6.77140- 8 7.60000+ 6 6.37350- 8 102 5 16  971
7.80000+ 6 6.06710- 8 8.00000+ 6 5.94390- 8 8.20000+ 6 5.81510- 8 102 5 16  972
8.40000+ 6 5.68430- 8 8.60000+ 6 5.55410- 8 8.80000+ 6 5.42650- 8 102 5 16  973
9.00000+ 6 5.30260- 8 9.20000+ 6 5.17600- 8 9.40000+ 6 4.87830- 8 102 5 16  974
9.60000+ 6 4.27990- 8 9.80000+ 6 4.18510- 8 1.00000+ 7 4.09060- 8 102 5 16  975
1.02000+ 7 3.99620- 8 1.04000+ 7 3.90120- 8 1.06000+ 7 3.80500- 8 102 5 16  976
1.08000+ 7 3.70490- 8 1.10000+ 7 3.57980- 8 1.12000+ 7 3.25570- 8 102 5 16  977
1.14000+ 7 2.88760- 8 1.16000+ 7 2.81760- 8 1.18000+ 7 2.74540- 8 102 5 16  978
1.20000+ 7 2.67070- 8 1.22000+ 7 2.59340- 8 1.24000+ 7 2.51270- 8 102 5 16  979
1.26000+ 7 2.42700- 8 1.28000+ 7 2.29230- 8 1.30000+ 7 2.10150- 8 102 5 16  980
1.32000+ 7 1.51690- 8 1.34000+ 7 1.47370- 8 1.36000+ 7 1.43060- 8 102 5 16  981
1.38000+ 7 1.38820- 8 1.40000+ 7 1.34830- 8 1.42000+ 7 1.31400- 8 102 5 16  982
1.44000+ 7 1.02420- 8 1.46000+ 7 9.72420- 9 1.48000+ 7 6.78930- 9 102 5 16  983
1.50000+ 7 6.72830- 9 1.52000+ 7 6.75740- 9 1.54000+ 7 6.96910- 9 102 5 16  984
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 1.68000+ 7 0.0     + 0                                             102 5 16   987
 0.0     + 0 2.00000+ 7           0           0           1          90 102 5 16   988
          90           2           0           0           0           0 102 5 16   989
 0.0     + 0 0.0     + 0 2.00000+ 5 2.24440- 7 4.00000+ 5 2.27890- 7 102 5 16   990
 6.00000+ 5 2.07720- 7 8.00000+ 5 1.84410- 7 1.00000+ 6 1.63610- 7 102 5 16   991
 1.20000+ 6 1.46530- 7 1.40000+ 6 1.32970- 7 1.60000+ 6 1.19290- 7 102 5 16   992
 1.80000+ 6 1.02000- 7 2.00000+ 6 9.30090- 8 2.20000+ 6 8.56960- 8 102 5 16   993
 2.40000+ 6 8.10170- 8 2.60000+ 6 7.77460- 8 2.80000+ 6 7.58660- 8 102 5 16   994
 3.00000+ 6 7.31650- 8 3.20000+ 6 7.37020- 8 3.40000+ 6 7.24070- 8 102 5 16   995
 3.60000+ 6 7.17690- 8 3.80000+ 6 7.26150- 8 4.00000+ 6 7.36020- 8 102 5 16   996
 4.20000+ 6 7.32120- 8 4.40000+ 6 7.16200- 8 4.60000+ 6 7.24150- 8 102 5 16   997
 4.80000+ 6 7.31970- 8 5.00000+ 6 7.40530- 8 5.20000+ 6 7.24100- 8 102 5 16   998
 5.40000+ 6 7.12610- 8 5.60000+ 6 7.16930- 8 5.80000+ 6 7.20300- 8 102 5 16   999
 6.00000+ 6 7.22740- 8 6.20000+ 6 7.24500- 8 6.40000+ 6 7.26320- 8 102 5 16  1000
 6.60000+ 6 7.06410- 8 6.80000+ 6 6.63630- 8 7.00000+ 6 6.60250- 8 102 5 16  1001
 7.20000+ 6 6.55810- 8 7.40000+ 6 6.50330- 8 7.60000+ 6 6.43970- 8 102 5 16  1002
 7.80000+ 6 6.37030- 8 8.00000+ 6 6.29550- 8 8.20000+ 6 5.91040- 8 102 5 16  1003
 8.40000+ 6 5.61680- 8 8.60000+ 6 5.50550- 8 8.80000+ 6 5.39190- 8 102 5 16  1004
 9.00000+ 6 5.27820- 8 9.20000+ 6 5.16650- 8 9.40000+ 6 5.05750- 8 102 5 16  1005
 9.60000+ 6 4.95190- 8 9.80000+ 6 4.84110- 8 1.00000+ 7 4.57260- 8 102 5 16  1006
 1.02000+ 7 4.01560- 8 1.04000+ 7 3.93590- 8 1.06000+ 7 3.85650- 8 102 5 16  1007
 1.08000+ 7 3.77690- 8 1.10000+ 7 3.69690- 8 1.12000+ 7 3.61560- 8 102 5 16  1008
 1.14000+ 7 3.53140- 8 1.16000+ 7 3.43880- 8 1.18000+ 7 3.11330- 8 102 5 16  1009
 1.20000+ 7 2.75350- 8 1.22000+ 7 2.69620- 8 1.24000+ 7 2.63700- 8 102 5 16  1010
 1.26000+ 7 2.57550- 8 1.28000+ 7 2.51160- 8 1.30000+ 7 2.44510- 8 102 5 16  1011
 1.32000+ 7 2.37510- 8 1.34000+ 7 2.29940- 8 1.36000+ 7 2.14730- 8 102 5 16  1012
 1.38000+ 7 2.00040- 8 1.40000+ 7 1.43690- 8 1.42000+ 7 1.40070- 8 102 5 16  1013
 1.44000+ 7 1.36430- 8 1.46000+ 7 1.32830- 8 1.48000+ 7 1.29370- 8 102 5 16  1014
 1.50000+ 7 1.26290- 8 1.52000+ 7 1.22920- 8 1.54000+ 7 9.31890- 9 102 5 16  1015
 1.56000+ 7 6.42470- 9 1.58000+ 7 6.36130- 9 1.60000+ 7 6.35400- 9 102 5 16  1016
 1.62000+ 7 6.45350- 9 1.64000+ 7 6.77270- 9 1.66000+ 7 4.70330- 9 102 5 16  1017
 1.68000+ 7 1.89110- 9 1.70000+ 7 2.12750- 9 1.72000+ 7 2.58610- 9 102 5 16  1018
 1.74000+ 7 3.32190- 9 1.76000+ 7 0.0     + 0 1.78000+ 7 0.0     + 0 102 5 16  1019
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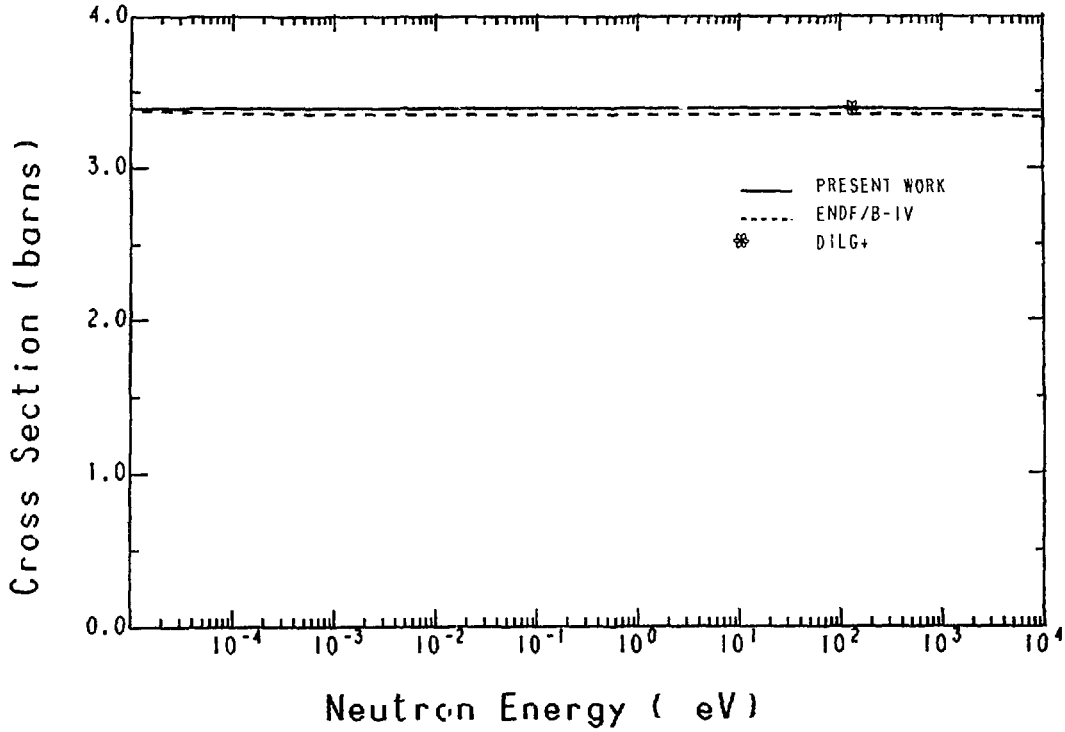

Fig. 1 Measured and evaluated total cross sections from 10^{-5} eV to 10keV.

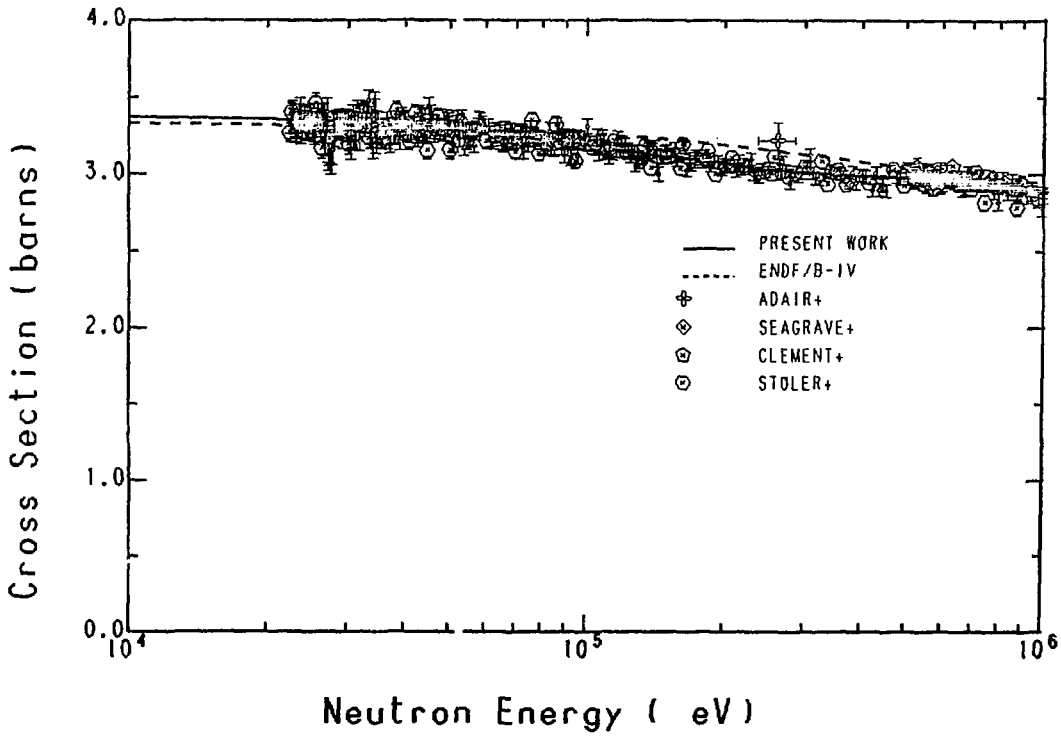

Fig. 2 Measured and evaluated total cross sections from 10 keV to 1 MeV.

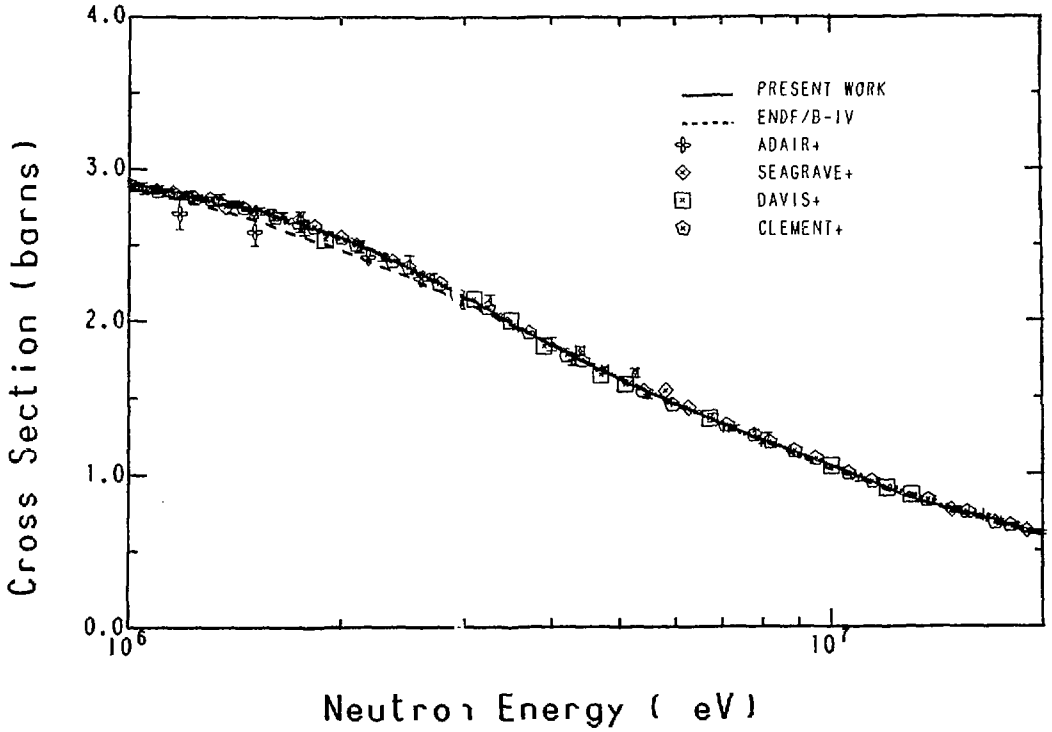

Fig. 3 Measured and evaluated total cross sections from 1 MeV to 20 MeV.

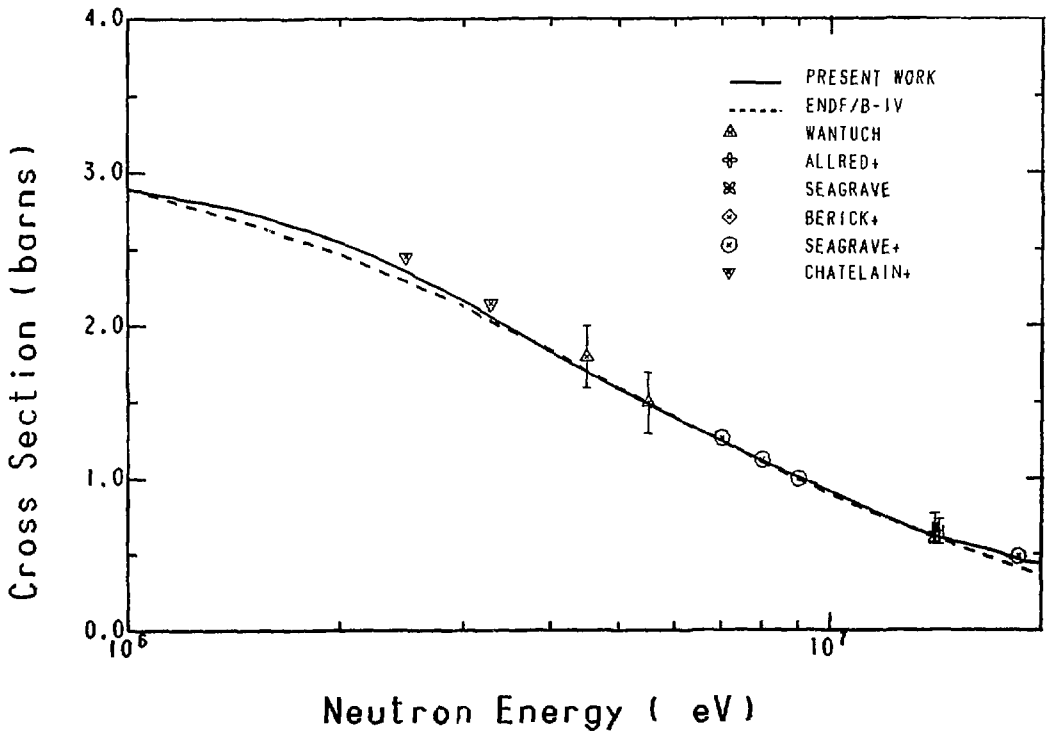

Fig. 4 Measured and evaluated lastic scattering cross sections from 1 MeV to 20 MeV.

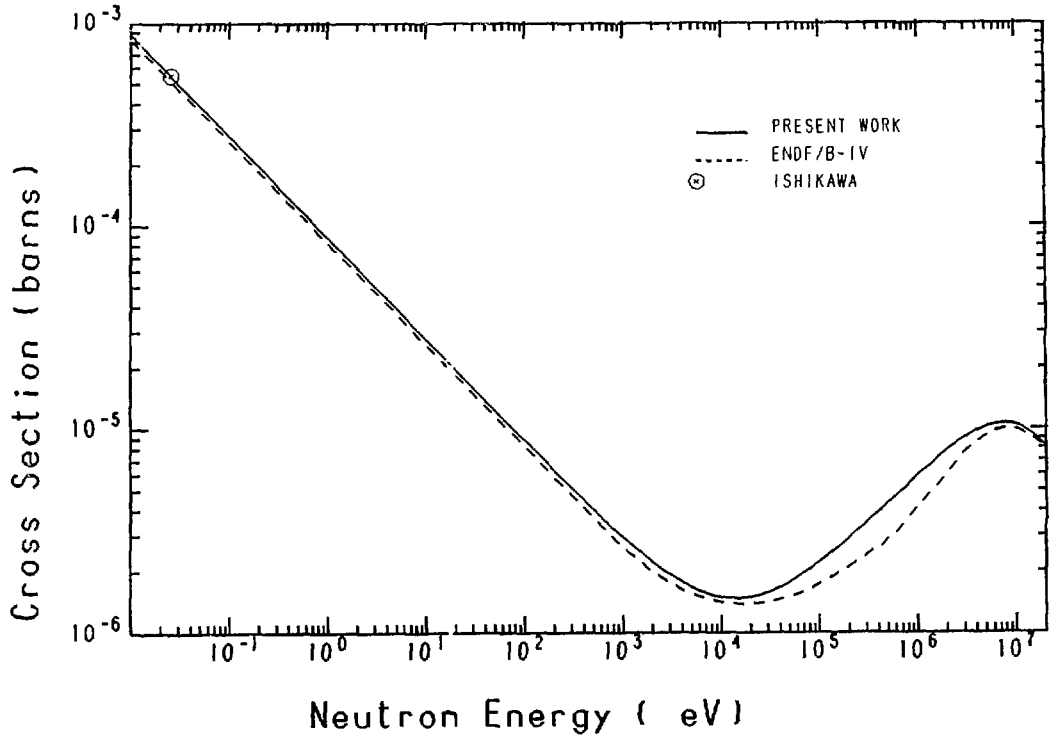

Fig. 5 Measured and evaluated capture cross sections.

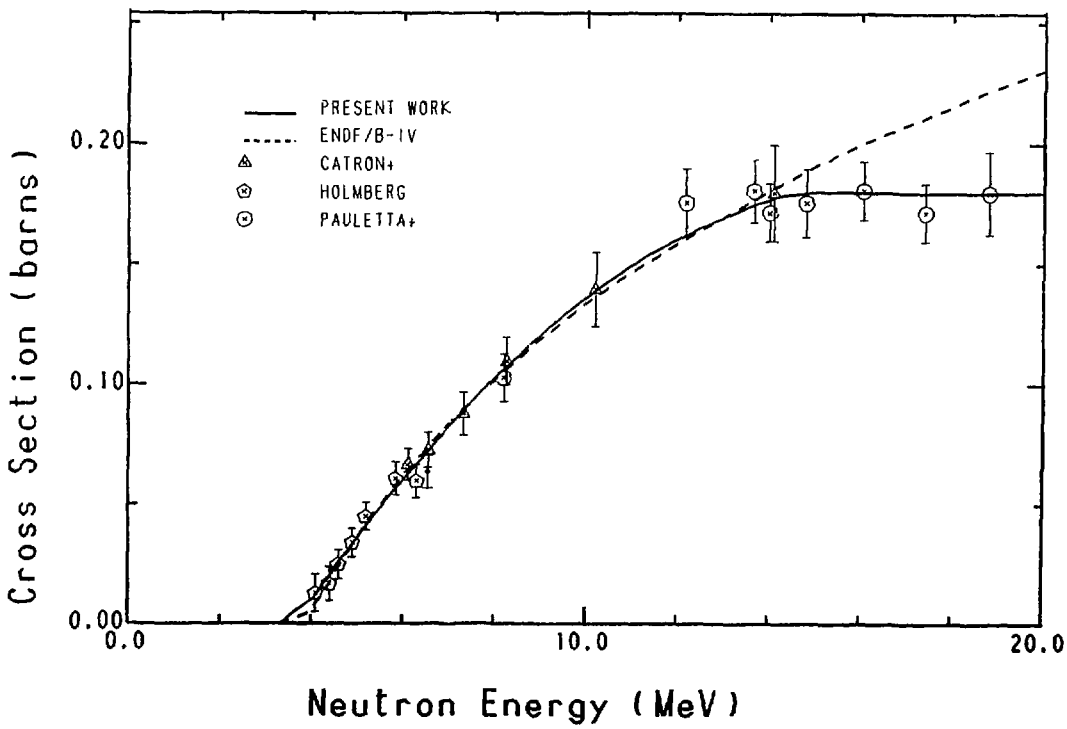

Fig. 6 Measured and evaluated (n,2n) reaction cross sections.

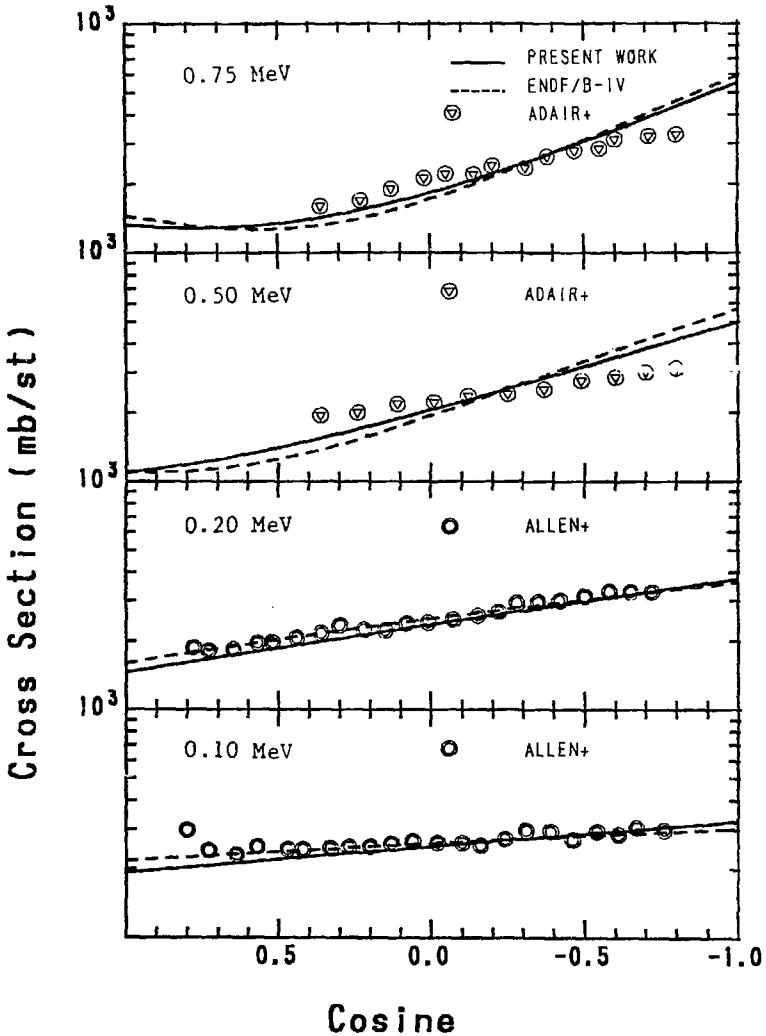

Fig. 7 Measured and evaluated elastic angular distributions from 0.1 to 0.75 MeV.

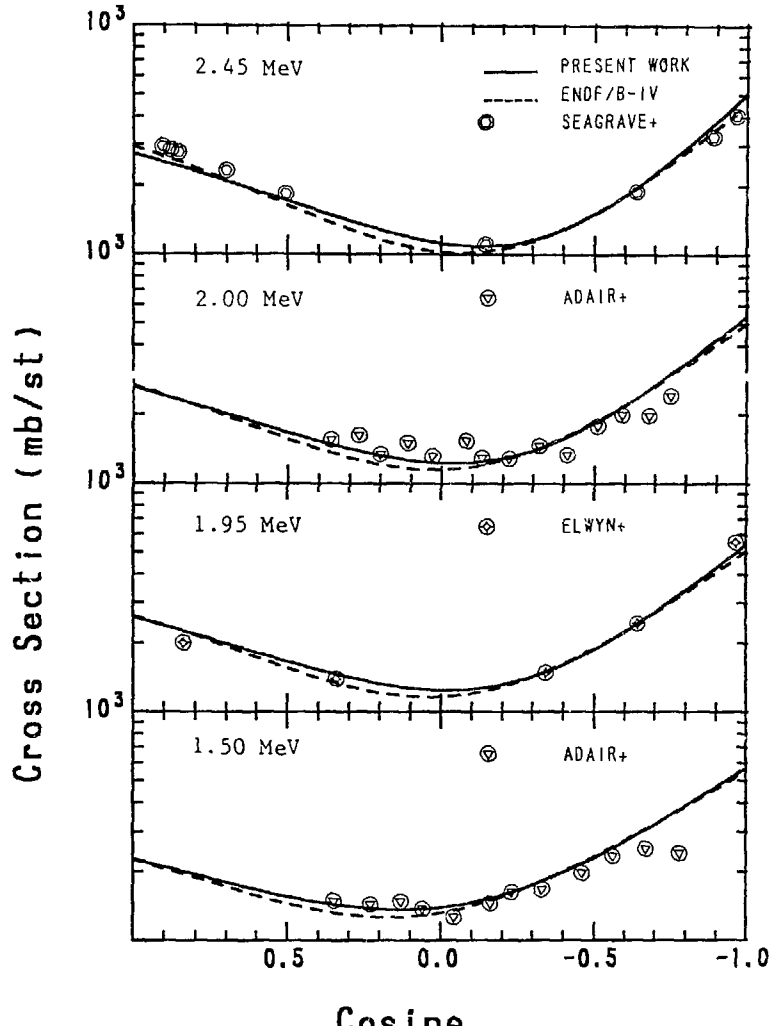

Fig. 8 Measured and evaluated elastic angular distributions from 1.5 to 2.45 MeV.

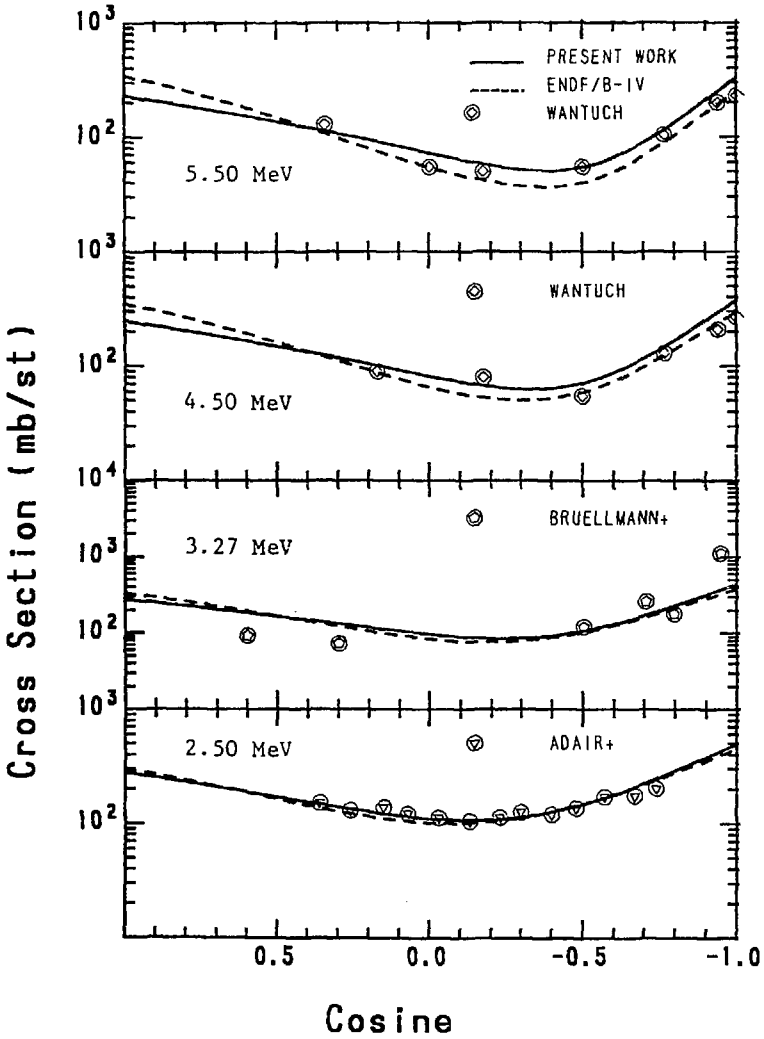

Fig. 9 Measured and evaluated elastic angular distributions from 2.5 to 5.5 MeV.

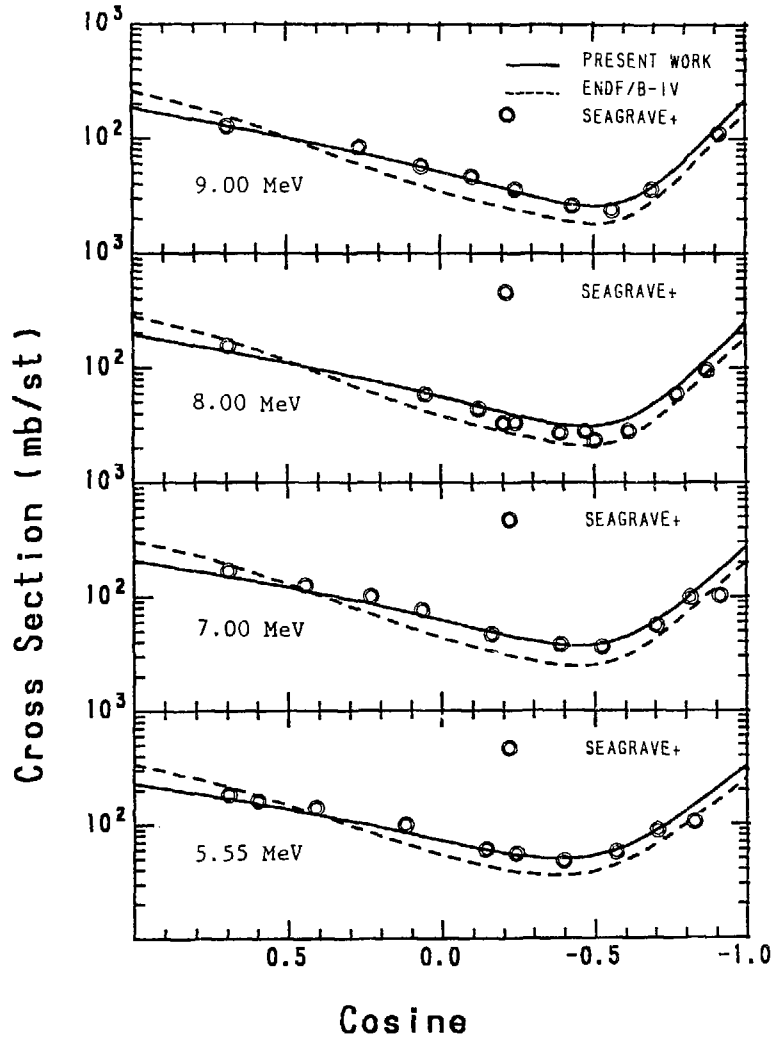

Fig. 10 Measured and evaluated elastic angular distributions from 5.55 to 9.0 MeV.

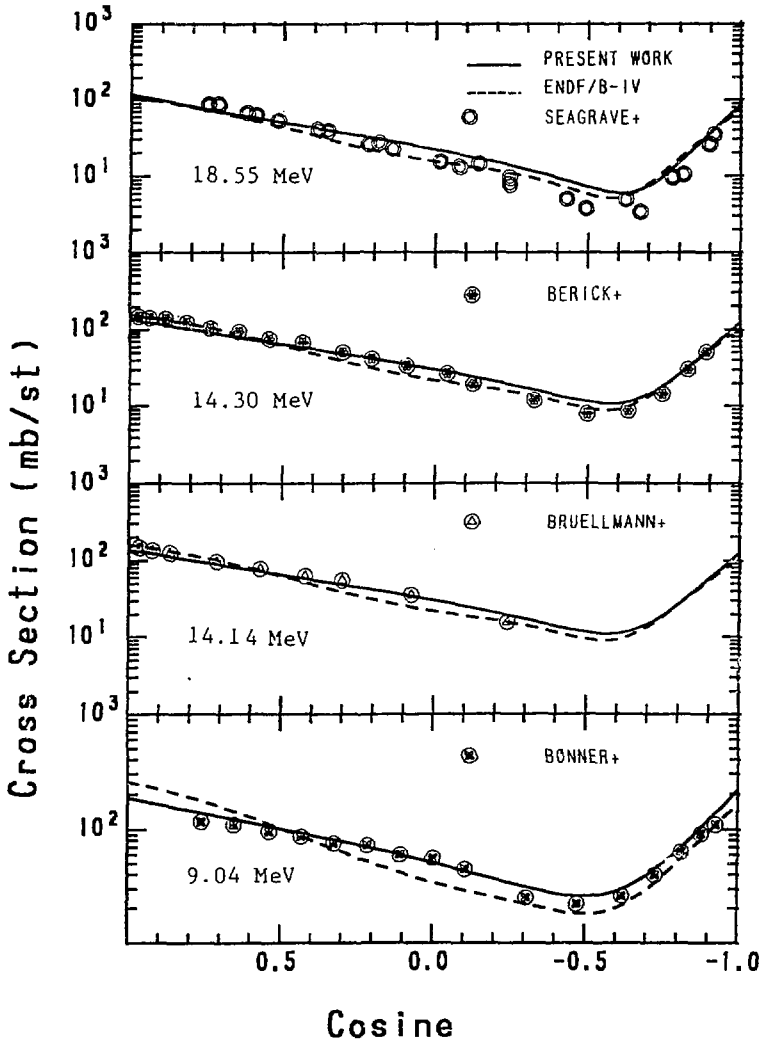

Fig. 11 Measured and evaluated elastic angular distributions from 9.04 to 18.55 MeV.

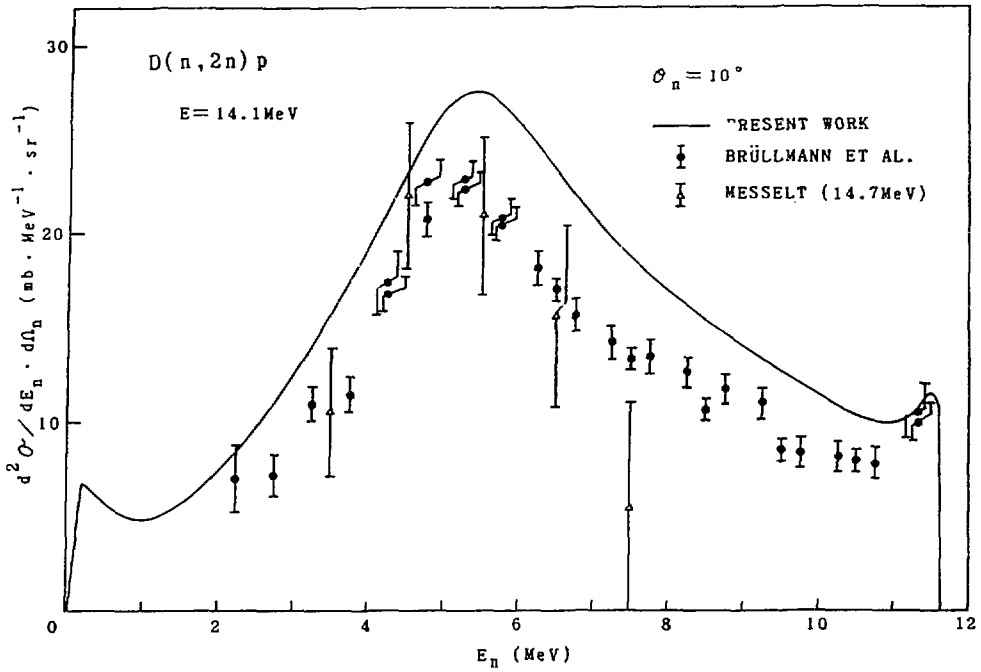

Fig. 12 Measured and evaluated double-differential cross sections for the (n,2n) reaction at 10°.

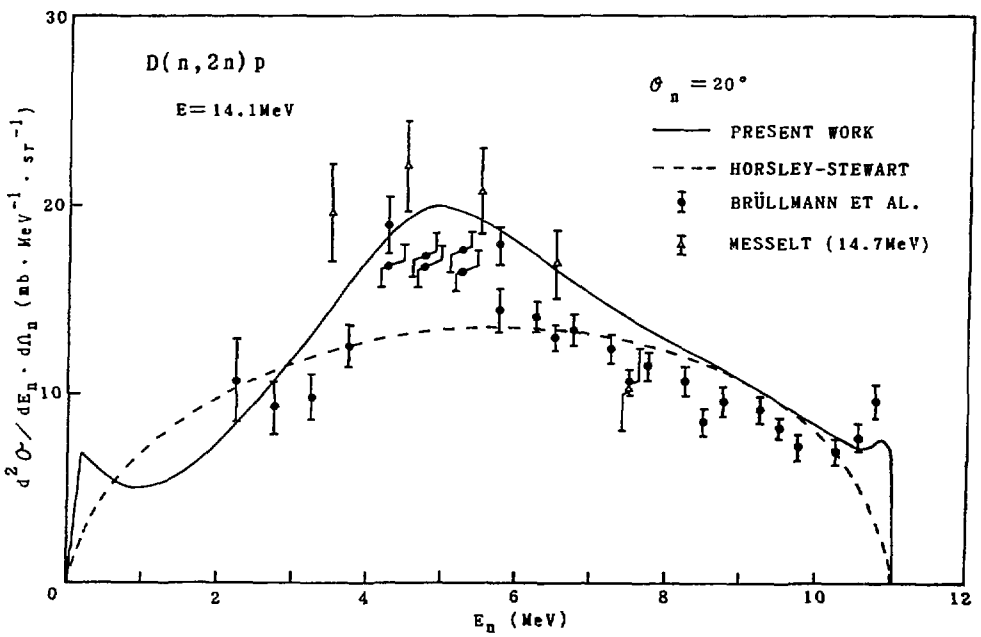

Fig. 13 Measured and evaluated double-differential cross sections for the (n,2n) reaction at 20°. The dashed curve is the evaluation of Horsley and Stewart[1].

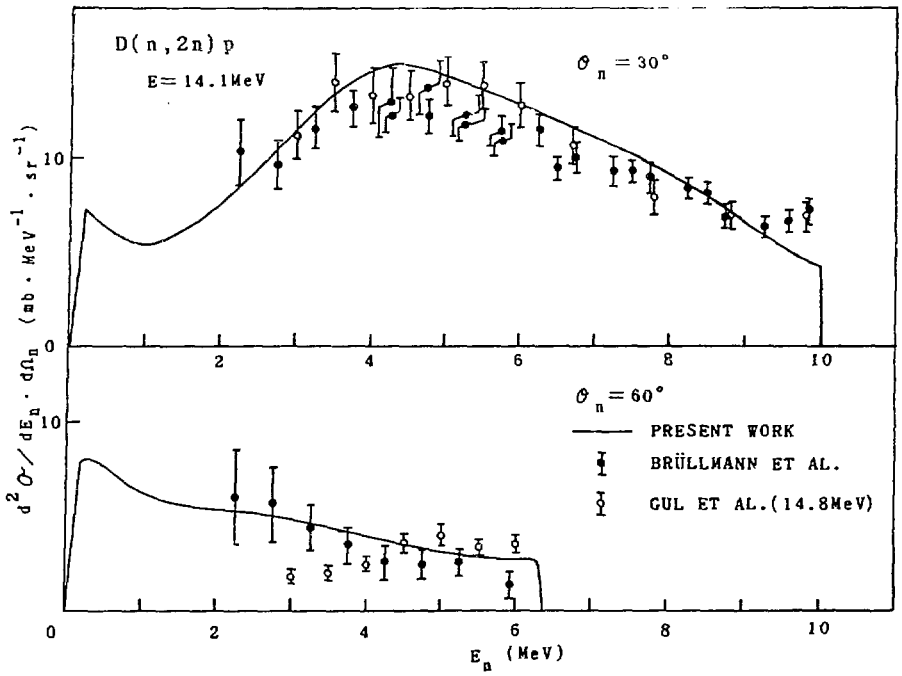

Fig. 14 Measured and evaluated double-differential cross sections for the (n,2n) reaction at 30° and 60°.