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INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

PROPOSED CARD IMAGE FORMAT FOR MULTIGROUP CONSTANTS

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Abstract

Enclosed is a description of a proposed card image format for multigroup constants for use in the IAEA cross section processing code verification project. This format is only intended to serve the purpose of simplifying comparison of processing code output. In particular this format is not intended to be all-inclusive as far as considering all possible types of data required for multigroup calculations.

Please send all comments and suggestions
regarding this proposed format,
as well as all data in this format for verification
to P. Vertes.

Introduction

The growing interest in the verification of nuclear data processing codes by the intercomparison of calculated group constants indicates the need to establish an adequate computer-readable exchange format for the most widely used types of group averaged nuclear parameters. The existence of such a format would greatly simplify the task of automated computer intercomparison of the results obtained from a variety of processing codes.

Since the ENDF/B format is presently used for the international exchange of evaluated nuclear data and has already been successfully used for the intercomparison of infinite dilute multigroup cross sections it appears natural to base a format for multigroup data on the ENDF/B format by introducing a minimum number of modifications to allow the format to accommodate a variety of types of multigroup data.

The types of data which will be represented in the multigroup ENDF/B format include temperature and self-shielding dependent cross sections and parameters as well as group-to-group transfer matrices. Because of the similiarity of these multigroup data to evaluated data the ENDF/B formats for files 3 and 5 (i.e. MF=3 and 5 [1]) have been modified to accommodate these data.

It should be stressed that in order to meet the objectives for which the format is intended (i.e. intercomparison and verification) the format described herein is designed to be as simple and convenient to use as possible. In particular, compactness and efficiency of storage, while important, are considered to be less important than simplicity and convenience of use.

Overall Format Considerations

The format should be designed to allow computer codes to automatically distinguish between evaluated data in the ENDF/B format and multigroup data in the modified ENDF/B format. This has been accomplished by placing a flag in an up to now unused ENDF/B format field (indicated herein by the variable NZ).

In application codes interpolation in temperature T Bondarenko's σ_0 is often required. However, the interpolation methods actually used in codes are based on operating experience (i.e. there is no "optimum" way to interpolate) and do not necessarily correspond to any of the allowed ENDF/B interpolation laws. For comparison purposes the multigroup data will not be interpolated in energy, temperature nor degree of self-shielding. However, in order to keep the format modification to a minimum, the format fields for interpolation laws are maintained in the ENDF/B multigroup format, but in all cases only one interpolation region MUST be specified and the interpolation law must be 1 (histogram).

In the description of the formats the customary ENDF/B terminology is used. [1]

Temperature and self-shielding dependent multigroup cross sections

The ENDF/B formats for file 3 can already accommodate temperature dependent cross sections. For use with multigroup data it is merely a matter of extending the format to accommodate self-shielding by allowing σ_0 to be specified. The simplest way in which to extend the ENDF/B is to place the value of σ_0 (barns) in the Q - value field.

With this substitution the multigroup ENDF/B format for cross sections becomes

$$[MAT,3,MT/ZA,AWR,LIS,LFS,0,NZ]\ \text{HEAD}$$

$$[MAT,3,MT/T_0,\sigma_0^0,LT,LG,NR,NP/E_{int}/\sigma(E,T_0,\sigma_0^0)]\ \text{TAB1}$$

$$\left\{\left\{[MAT,3,MT/T_i,\sigma_0^j,0,0,NG,0/\sigma(E,T_i,\sigma_0^j)]\ \text{LIST},\ j=1,LG\right\},i=1,LT\right\}$$

$$[MAT,3,0/0.0,0.0,0,0,0,0]\ \text{SEND}$$

where

NZ=1 - indicates multigroup data. Note, in the normal ENDF/B format this field is always zero.

LT - the number of temperature values

LG - the number of extra σ_0 values

T_0 is the minimal temperature value

σ_0^0 is the maximal σ_0 value;
In the case of infinite dilute cross sections T=0.0 and σ_0^0=1.E8 should be given.

T_i temperature (Kelvin) in ascending order

σ_0^j Bondarenko's σ_0 (barns) in descending order

NR=1

NG - number of groups

NP - number of group boundaries (NP=NG+1)

$\sigma(E,T_i,\sigma_0^j)$ - temperature dependent, self-shielded multigroup cross-section

E - lower group boundary in eV (ascending, E_{NP} is the highest boundary of the group system, for this σ=0.0 is assigned)

Group - to - group transfer matrices

Multigroup transfer matrices are very similar to file 5 (MF=5) data using the arbitrary tabulated function (LF=1) option and in principle the format could be slightly modified to accommodate multigroup data.

In designing the multigroup format allowance has been made for both temperature and self-shielding effects and for different source and sink energy group structures (as occurs in neutron induced photon production). However, as in many cases no temperature and σ_0 dependence are required a simplified format without these parameters is also proposed.

Both formats will have the same HEAD record:

[MAT,5,MT/ZA,AWR,0,0,NK,NZ] HEAD

where

NK - number of Legendre moments

NZ=1 if no temperature and self-shielding dependence is given

NZ=2 in the case of temperature and self-shielding dependence

The following records are depending on the value of NZ.

NZ=1

$$\left\{ \left[\text{MAT},5,\text{MT}/0.0,0.0,0,\text{LF}=1,\text{NR},\text{NP}/E_{int}/p_k(E) \right] \text{ TAB1} \right.$$

$$\left[\text{MAT},5,\text{MT}/0.0,0.0,0,0,\text{NR},\text{NG}/E_{int} \right] \text{ TAB2}$$

$$\left\{ \left[\text{MAT},5,\text{MT}/0.0,E_1,0,0,\text{NR},\text{NF}/E'_{int}/g_k(E_1 \rightarrow E') \right] \text{ TAB1}, \right.$$

$$\left. 1=1,\text{NG} \right\}, k=1,\text{NK} \Big\}$$

NZ=2

$$\left[\text{MAT},5,\text{MT}/0.0,0.0,\text{LT},\text{LG},0,0 \right] \text{ CONT}$$

$$\left\{ \left\{ \left\{ \left[\text{MAT},5,\text{MT}/T_i,\sigma_0^j,\text{LF}=1,\text{NR},\text{NP}/E_{int}/p_k(E,T_i,\sigma_0^j) \right] \text{ TAB1} \right.\right.\right.$$

$$\left[\text{MAT},5,\text{MT}/0.0,0.0,0,0,\text{NR},\text{NG}/E_{int} \right] \text{ TAB2}$$

$$\left\{ \left[\text{MAT},5,\text{MT}/0.0,E_1,0,0,\text{NR},\text{NF}/E'_{int}/g_k(E_1 \rightarrow E',T_i,\sigma_0^j) \right] \text{ TAB1} \right.$$

$$\left. \left. 1=1,\text{NG} \right\}, k=1,\text{NK} \right\}, j=1,\text{LG} \left. \right\}, i=1,\text{LT} \Big\}$$

In both cases the last record is

$$\left[\text{MAT},5,0/0.0,0.0,0,0,0,0 \right] \text{ SEND}$$

where

NF - the number of sink groups for the source group 1

The quantities p and g are defined so that

$$\sigma_k(E_1 \rightarrow E') = p_k(E) \cdot g_k(E_1 \rightarrow E')$$

and

$$\sigma_k(E_1 \rightarrow E', T_i, \sigma_0^j) = p_k(E_1 \rightarrow E', T_i, \sigma_0^j) \cdot g_k(E_1 \rightarrow E, T_i, \sigma_0^j)$$

respectively, where

$\sigma_k(E_1 \rightarrow E')$ and $\sigma_k(E_1 \rightarrow E', T_i, \sigma_0^j)$ are the k-th moment of the group transfer cross section from group 1. Thus, g_k may be the group transfer probability and p_k is the reaction cross section.

Examples for the above specified formats are appended to this report.

Reference

1 R. Kinsey, ENDF-102, Data Formats and Procedures for the Evaluated Nuclear Data File, ENDF, Brookhaven, 1979

Example No. 1

Elastic, fission and capture cross sections for 26 groups (i.e. 27 groups boundaries), one temperature (0 Kelvin) and five values of σ_0 (infinity = 10^8, 10^4, 10^3, 10^2 and 10). Note, LT=1 indicating one temperature and LG=4 indicating four additional values of σ_0, i.e. σ_0 of infinity is indicated in the leading TAB1 record and this is followed by four LIST records each containing the cross sections for one of the extra values of σ_0 (10^4, 10^3, 10^2, 10).

```
9.3237E+04 2.3700E+02          0          0          0          11263 3 2     1
0.0        1.0000E+08          1          4          1         271263 3 2     2
        27          1          0          0          0          01263 3 2     3
1.0000E-03 1.6832E+01 2.1500E-01 1.4493E+01 4.6500E-01 1.4785E+011263 3 2     4
1.0000E+00 1.3776E+01 2.1500E+00 1.1761E+01 4.6500E+00 1.1062E+011263 3 2     5
1.0000E+01 1.1312E+01 2.1500E+01 1.4205E+01 4.6500E+01 1.5457E+011263 3 2     6
1.0000E+02 1.3824E+01 2.1500E+02 1.3440E+01 4.6500E+02 1.3192E+011263 3 2     7
1.0000E+03 1.2868E+01 2.1500E+03 1.2475E+01 4.6500E+03 1.2129E+011263 3 2     8
1.0000E+04 1.1752E+01 2.1500E+04 1.0952E+01 4.6500E+04 1.0042E+011263 3 2     9
1.0000E+05 8.8419E+00 2.0000E+05 7.3907E+00 4.0000E+05 5.7327E+001263 3 2    10
8.0000E+05 4.2736E+00 1.4000E+06 3.7596E+00 2.5000E+06 4.0049E+001263 3 2    11
4.0000E+06 3.8065E+00 6.5000E+06 3.1722E+00 1.0500E+07 0.0        1263 3 2    12
0.0        1.0000E+04          0          0         26          01263 3 2    13
1.6829E+01 1.4504E+01 1.4747E+01 1.3726E+01 1.1744E+01 1.0953E+011263 3 2    14
1.1199E+01 1.3691E+01 1.5045E+01 1.3702E+01 1.3349E+01 1.3140E+011263 3 2    15
1.2840E+01 1.2461E+01 1.2121E+01 1.1746E+01 1.0950E+01 1.0042E+011263 3 2    16
8.8419E+00 7.3907E+00 5.7328E+00 4.2736E+00 3.7596E+00 4.0049E+001263 3 2    17
3.8065E+00 3.1722E+00 0.0          0.0        0.0        0.0        1263 3 2    18
0.0        1.0000E+03          0          0         26          01263 3 2    19
1.6807E+01 1.4576E+01 1.4586E+01 1.3560E+01 1.1649E+01 1.0656E+011263 3 2    20
1.0748E+01 1.2207E+01 1.3629E+01 1.3083E+01 1.2824E+01 1.2791E+011263 3 2    21
1.2632E+01 1.2351E+01 1.2052E+01 1.1694E+01 1.0933E+01 1.0042E+011263 3 2    22
8.8417E+00 7.3905E+00 5.7326E+00 4.2736E+00 3.7596E+00 4.0049E+001263 3 2    23
3.8065E+00 3.1722E+00 0.0          0.0        0.0        0.0        1263 3 2    24
0.0        1.0000E+02          0          0         26          01263 3 2    25
1.6730E+01 1.4757E+01 1.4339E+01 1.3429E+01 1.1569E+01 1.0354E+011263 3 2    26
1.0226E+01 1.0885E+01 1.2061E+01 1.2036E+01 1.1747E+01 1.1849E+011263 3 2    27
1.1891E+01 1.1841E+01 1.1686E+01 1.1414E+01 1.0839E+01 1.0041E+011263 3 2    28
8.8402E+00 7.3889E+00 5.7313E+00 4.2732E+00 3.7596E+00 4.0049E+001263 3 2    29
3.8060E+00 3.1718E+00 0.0          0.0        0.0        0.0        1263 3 2    30
0.0        1.0000E+01          0          0         26          01263 3 2    31
1.6671E+01 1.4863E+01 1.4152E+01 1.3363E+01 1.1557E+01 1.0208E+011263 3 2    32
1.0024E+01 1.0338E+01 1.1332E+01 1.1526E+01 1.1153E+01 1.1217E+011263 3 2    33
1.1262E+01 1.1269E+01 1.1197E+01 1.1023E+01 1.0680E+01 1.0038E+011263 3 2    34
8.8329E+00 7.3806E+00 5.7241E+00 4.2708E+00 3.7594E+00 4.0045E+001263 3 2    35
3.8035E+00 3.1693E+00 0.0          0.0        0.0        0.0        1263 3 2    36
0.0        0.0                 0          0          0          01263 3 0    37
9.3237E+04 2.3700E+02          0          0          0          11263 3 18   38
0.0        1.0000E+08          1          4          1         271263 3 18   39
        27          1          0          0          0          01263 3 18   40
1.0000E-03 9.2593E-03 2.1500E-01 5.8144E-03 4.6500E-01 8.8650E-031263 3 18   41
1.0000E+00 9.1363E-03 2.1500E+00 5.1725E-03 4.6500E+00 8.7783E-031263 3 18   42
1.0000E+01 1.7841E-03 2.1500E+01 1.6841E-01 4.6500E+01 6.1364E-031263 3 18   43
1.0000E+02 8.9401E-02 2.1500E+02 3.9490E-02 4.6500E+02 2.9748E-021263 3 18   44
1.0000E+03 2.2565E-02 2.1500E+03 8.9550E-03 4.6500E+03 1.1738E-021263 3 18   45
1.0000E+04 1.1584E-02 2.1500E+04 1.1565E-02 4.6500E+04 1.4109E-021263 3 18   46
1.0000E+05 2.1594E-02 2.0000E+05 7.9527E-02 4.0000E+05 7.6060E-011263 3 18   47
8.0000E+05 1.4879E+00 1.4000E+06 1.6581E+00 2.5000E+06 1.6382E+001263 3 18   48
4.0000E+06 1.5626E+00 6.5000E+06 2.2557E+00 1.0500E+07 0.0        1263 3 18   49
0.0        1.0000E+04          0          0         26          01263 3 18   50
9.1761E-03 5.7449E-03 7.9736E-03 8.6568E-03 4.7936E-03 8.0025E-031263 3 18   51
1.6972E-03 1.6136E-01 5.5211E-03 8.6172E-02 3.8691E-02 2.9376E-021263 3 18   52
2.2392E-02 8.9161E-03 1.1703E-02 1.1557E-02 1.1555E-02 1.4109E-021263 3 18   53
2.1594E-02 7.9530E-02 7.6061E-01 1.4879E+00 1.6581E+00 1.6382E+001263 3 18   54
1.5626E+00 2.2557E+00 0.0          0.0        0.0        0.0        1263 3 18   55
0.0        1.0000E+03          0          0         26          01263 3 18   56
8.6526E-03 5.3196E-03 4.9972E-03 6.6028E-03 3.2972E-03 5.4848E-031263 3 18   57
1.3230E-03 1.3128E-01 3.8034E-03 7.3297E-02 3.3719E-02 2.6766E-021263 3 18   58
2.1068E-02 8.6001E-03 1.1412E-02 1.1331E-02 1.1474E-02 1.4109E-021263 3 18   59
2.1595E-02 7.9548E-02 7.6070E-01 1.4879E+00 1.6581E+00 1.6382E+001263 3 18   60
1.5627E+00 2.2558E+00 0.0          0.0        0.0        0.0        1263 3 18   61
0.0        1.0000E+02          0          0         26          01263 3 18   62
7.3726E-03 4.4294E-03 2.5382E-03 3.6903E-03 1.6049E-03 2.8226E-031263 3 18   63
7.9057E-04 7.6989E-02 2.0805E-03 4.4210E-02 2.1048E-02 1.8211E-021263 3 18   64
1.5606E-02 6.9573E-03 9.7135E-03 9.9866E-03 1.0952E-02 1.4114E-021263 3 18   65
2.1607E-02 7.9722E-02 7.6155E-01 1.4880E+00 1.6580E+00 1.6382E+001263 3 18   66
```

```
1.5628E+00 2.2560E+00 0.0          0.0          0.0          0.0          1263 3 18   67
0.0        1.0000E+01              0            26           01263 3 18   68
6.6808E-03 4.0469E-03 1.8581E-03 2.3911E-03 3.7066E-04 1.5999E-031263 3 18   69
4.9334E-04 4.2620E-02 1.2342E-03 2.5483E-02 1.2152E-02 1.0870E-021263 3 18   70
9.7718E-03 4.6732E-03 6.9339E-03 7.6260E-03 9.7651E-03 1.4135E-021263 3 18   71
2.1666E-02 8.0637E-02 7.6631E-01 1.4887E+00 1.6577E+00 1.6384E+001263 3 18   72
1.5638E+00 2.2575E+00 0.0          0.0          0.0          0.0          1263 3 18   73
0.0        0.0                     0            0            0            01263 3  0   74
9.3237E+04 2.3700E+02              0            0            0            11263 3102   75
0.0        1.0000E+08              1            4            1            271263 3102   76
        27           1              0            0            0            01263 3102   77
1.0000E-03 9.8664E+01 2.1500E-01 1.2176E+02 4.6500E-01 2.1775E+021263 3102   78
1.0000E+00 2.3883E+02 2.1500E+00 5.9247E+01 4.6500E+00 8.9933E+011263 3102   79
1.0000E+01 8.1508E+01 2.1500E+01 7.4918E+01 4.6500E+01 5.5246E+011263 3102   80
1.0000E+02 3.2565E+01 2.1500E+02 2.2318E+01 4.6500E+02 1.4518E+011263 3102   81
1.0000E+03 9.3268E+00 2.1500E+03 5.9412E+00 4.6500E+03 4.4436E+001263 3102   82
1.0000E+04 3.7068E+00 2.1500E+04 2.1833E+00 4.6500E+04 1.2630E+001263 3102   83
1.0000E+05 9.2255E-01 2.0000E+05 6.0709E-01 4.0000E+05 2.9168E-011263 3102   84
8.0000E+05 1.2571E-01 1.4000E+06 5.7336E-02 2.5000E+06 2.7463E-021263 3102   85
4.0000E+06 1.4125E-02 6.5000E+06 7.2057E-03 1.0500E+07 0.0          1263 3102   86
0.0        1.0000E+04              0            0            26           01263 3102   87
9.7952E+01 1.1936E+02 1.9412E+02 2.2060E+02 5.5007E+01 8.3204E+011263 3102   88
7.5742E+01 6.8344E+01 5.2063E+01 3.1582E+01 2.1846E+01 1.4326E+011263 3102   89
9.2525E+00 5.9142E+00 4.4299E+00 3.6956E+00 2.1800E+00 1.2630E+001263 3102   90
9.2255E-01 6.0709E-01 2.9169E-01 1.2571E-01 5.7387E-02 2.7463E-021263 3102   91
1.4125E-02 7.2057E-03 0.0          0.0          0.0          0.0          1263 3102   92
0.0        1.0000E+03              0            0            26           01263 3102   93
9.2743E+01 1.0827E+02 1.1532E+02 1.5370E+02 3.3177E+01 5.9122E+011263 3102   94
5.2589E+01 4.7322E+01 3.9291E+01 2.6150E+01 1.6947E+01 1.2994E+011263 3102   95
8.6992E+00 5.6964E+00 4.3154E+00 3.6099E+00 2.1525E+00 1.2630E+001263 3102   96
9.2251E-01 6.0705E-01 2.9166E-01 1.2570E-01 5.7389E-02 2.7464E-021263 3102   97
1.4124E-02 7.2053E-03 0.0          0.0          0.0          0.0          1263 3102   98
0.0        1.0000E+02              0            0            26           01263 3102   99
8.0358E+01 8.3842E+01 5.0525E+01 7.7932E+01 1.3630E+01 3.0536E+011263 3102  100
2.4524E+01 2.3969E+01 2.0973E+01 1.5099E+01 1.1723E+01 8.7494E+001263 3102  101
6.3932E+00 4.5917E+00 3.6491E+00 3.1034E+00 1.9855E+00 1.2677E+001263 3102  102
9.2219E-01 6.0671E-01 2.9146E-01 1.2567E-01 5.7415E-02 2.7469E-021263 3102  103
1.4117E-02 7.2019E-03 0.0          0.0          0.0          0.0          1263 3102  104
0.0        1.0000E+01              0            0            26           01263 3102  105
7.3749E+01 7.3109E+01 3.2389E+01 4.7399E+01 9.7644E+00 1.7088E+011263 3102  106
1.2097E+01 1.2710E+01 1.1627E+01 8.4566E+00 6.7356E+00 5.1895E+001263 3102  107
3.9891E+00 3.0604E+00 2.5708E+00 2.2603E+00 1.6704E+00 1.2664E+001263 3102  108
9.2061E-01 6.0492E-01 2.9031E-01 1.2543E-01 5.7564E-02 2.7497E-021263 3102  109
1.4074E-02 7.1804E-03 0.0          0.0          0.0          0.0          1263 3102  110
0.0        0.0                     0            0            0            01263 3  0  111
```

Example No. 2

Elastic transfer matrix for 26 groups (i.e. 27 group boundaries) using four Legendre moments (NK=4). The matrices are not temperature or self-shielding dependent (NZ=1).

```
0.9324E+05 0.2370E+03          0          0          4          11263 5 2  1
0.0        0.0                 0          1          1         271263 5 2  2
        27          1          0          0          0          01263 5 2  3
1.0000E-03 1.6938E+01 2.1500E-01 1.4453E+01 4.6500E-01 1.4824E+011263 5 2  4
1.0000E+00 1.3787E+01 2.1500E+00 1.1753E+01 4.6500E+00 1.1041E+011263 5 2  5
1.0000E+01 1.1314E+01 2.1500E+01 1.4223E+01 4.6500E+01 1.5471E+011263 5 2  6
1.0000E+02 1.3904E+01 2.1500E+02 1.3506E+01 4.6500E+02 1.3344E+011263 5 2  7
1.0000E+03 1.2948E+01 2.1500E+03 1.2565E+01 4.6500E+03 1.2142E+011263 5 2  8
1.0000E+04 1.1757E+01 2.1500E+04 1.0951E+01 4.6500E+04 1.0093E+011263 5 2  9
1.0000E+05 8.8751E+00 2.0000E+05 7.4206E+00 4.0000E+05 5.7531E+001263 5 2 10
8.0000E+05 4.2736E+00 1.4000E+06 3.7551E+00 2.5000E+06 3.9800E+001263 5 2 11
4.0000E+06 3.7914E+00 6.5000E+06 3.1849E+00 1.0500E+07 0.0         1263 5 2 12
0.0        0.0                 0          0          1         261263 5 2 13
        26          1          0          0          0          01263 5 2 14
0.0        0.1000E-02          0          0          1          11263 5 2 15
         1          1          0          0          0          01263 5 2 16
1.0000E-03 1.0000E+00 2.1500E-01 0.0        0.0        0.0         1263 5 2 17
0.0        0.2150E+00          0          0          1          21263 5 2 18
         2          1          0          0          0          01263 5 2 19
1.0000E-03 9.1992E-03 2.1500E-01 9.9180E-01 4.6500E-01 0.0         1263 5 2 20
0.0        0.4650E+00          0          0          1          21263 5 2 21
         2          1          0          0          0          01263 5 2 22
2.1500E-01 6.1374E-03 4.6500E-01 9.9386E-01 1.0000E+00 0.0         1263 5 2 23
0.0        0.1000E+01          0          0          1          21263 5 2 24
         2          1          0          0          0          01263 5 2 25
4.6500E-01 7.1216E-03 1.0000E+00 9.9283E-01 2.1500E+00 0.0         1263 5 2 26
0.0        0.2150E+01          0          0          1          21263 5 2 27
         2          1          0          0          0          01263 5 2 28
1.0000E+00 8.2167E-03 2.1500E+00 9.9173E-01 4.6500E+00 0.0         1263 5 2 29
0.0        0.4650E+01          0          0          1          21263 5 2 30
         2          1          0          0          0          01263 5 2 31
2.1500E+00 7.1799E-03 4.6500E+00 9.9282E-01 1.0000E+01 0.0         1263 5 2 32
0.0        0.1000E+02          0          0          1          21263 5 2 33
         2          1          0          0          0          01263 5 2 34
4.6500E+00 5.7506E-03 1.0000E+01 9.9425E-01 2.1500E+01 0.0         1263 5 2 35
0.0        0.2150E+02          0          0          1          21263 5 2 36
         2          1          0          0          0          01263 5 2 37
1.0000E+01 4.2293E-03 2.1500E+01 9.9577E-01 4.6500E+01 0.0         1263 5 2 38
0.0        0.4650E+02          0          0          1          21263 5 2 39
         2          1          0          0          0          01263 5 2 40
2.1500E+01 5.7811E-03 4.6500E+01 9.9422E-01 1.0000E+02 0.0         1263 5 2 41
0.0        0.1000E+03          0          0          1          21263 5 2 42
         2          1          0          0          0          01263 5 2 43
4.6500E+01 1.3503E-02 1.0000E+02 9.8650E-01 2.1500E+02 0.0         1263 5 2 44
0.0        0.2150E+03          0          0          1          21263 5 2 45
         2          1          0          0          0          01263 5 2 46
1.0000E+02 7.4281E-03 2.1500E+02 9.9257E-01 4.6500E+02 0.0         1263 5 2 47
0.0        0.4650E+03          0          0          1          21263 5 2 48
         2          1          0          0          0          01263 5 2 49
2.1500E+02 7.5752E-03 4.6500E+02 9.9242E-01 1.0000E+03 0.0         1263 5 2 50
0.0        0.1000E+04          0          0          1          21263 5 2 51
         2          1          0          0          0          01263 5 2 52
4.6500E+02 7.5895E-03 1.0000E+03 9.9241E-01 2.1500E+03 0.0         1263 5 2 53
0.0        0.2150E+04          0          0          1          21263 5 2 54
         2          1          0          0          0          01263 5 2 55
1.0000E+03 7.5333E-03 2.1500E+03 9.9247E-01 4.6500E+03 0.0         1263 5 2 56
0.0        0.4650E+04          0          0          1          21263 5 2 57
         2          1          0          0          0          01263 5 2 58
2.1500E+03 7.5641E-03 4.6500E+03 9.9244E-01 1.0000E+04 0.0         1263 5 2 59
0.0        0.1000E+05          0          0          1          21263 5 2 60
         2          1          0          0          0          01263 5 2 61
4.6500E+03 7.6403E-03 1.0000E+04 9.9236E-01 2.1500E+04 0.0         1263 5 2 62
0.0        0.2150E+05          0          0          1          21263 5 2 63
         2          1          0          0          0          01263 5 2 64
1.0000E+04 7.7517E-03 2.1500E+04 9.9225E-01 4.6500E+04 0.0         1263 5 2 65
0.0        0.4650E+05          0          0          1          21263 5 2 66
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         2           1           0           0           0          01263 5 2  67
2.1500E+04 7.7926E-03 4.6500E+04 9.9221E-01 1.0000E+05 0.0         1263 5 2  68
0.0        0.1000E+06          0           0           1          21263 5 2  69
         2           1           0           0           0          01263 5 2  70
4.6500E+04 9.3322E-03 1.0000E+05 9.9067E-01 2.0000E+05 0.0         1263 5 2  71
0.0        0.2000E+06          0           0           1          21263 5 2  72
         2           1           0           0           0          01263 5 2  73
1.0000E+05 9.5526E-03 2.0000E+05 9.9045E-01 4.0000E+05 0.0         1263 5 2  74
0.0        0.4000E+06          0           0           1          21263 5 2  75
         2           1           0           0           0          01263 5 2  76
2.0000E+05 9.9199E-03 4.0000E+05 9.9008E-01 8.0000E+05 0.0         1263 5 2  77
0.0        0.8000E+06          0           0           1          21263 5 2  78
         2           1           0           0           0          01263 5 2  79
4.0000E+05 1.3362E-02 8.0000E+05 9.8664E-01 1.4000E+06 0.0         1263 5 2  80
0.0        0.1400E+07          0           0           1          21263 5 2  81
         2           1           0           0           0          01263 5 2  82
8.0000E+05 1.1273E-02 1.4000E+06 9.8873E-01 2.5000E+06 0.0         1263 5 2  83
0.0        0.2500E+07          0           0           1          21263 5 2  84
         2           1           0           0           0          01263 5 2  85
1.4000E+06 1.3770E-02 2.5000E+06 9.8623E-01 4.0000E+06 0.0         1263 5 2  86
0.0        0.4000E+07          0           0           1          21263 5 2  87
         2           1           0           0           0          01263 5 2  88
2.5000E+06 1.4554E-02 4.0000E+06 9.8545E-01 6.5000E+06 0.0         1263 5 2  89
0.0        0.6500E+07          0           0           1          21263 5 2  90
         2           1           0           0           0          01263 5 2  91
4.0000E+06 1.5446E-02 6.5000E+06 9.8455E-01 1.0500E+07 0.0         1263 5 2  92
0.0        0.0                 0           1           1        271263 5 2  93
        27           1           0           0           0          01263 5 2  94
1.0000E-03 4.9875E-02 2.1500E-01 4.2542E-02 4.6500E-01 4.3661E-021263 5 2  95
1.0000E+00 4.0470E-02 2.1500E+00 3.4598E-02 4.6500E+00 3.2516E-021263 5 2  96
1.0000E+01 3.3250E-02 2.1500E+01 4.1731E-02 4.6500E+01 4.5514E-021263 5 2  97
1.0000E+02 4.0937E-02 2.1500E+02 3.9904E-02 4.6500E+02 3.9221E-021263 5 2  98
1.0000E+03 3.8136E-02 2.1500E+03 3.6869E-02 4.6500E+03 3.5721E-021263 5 2  99
1.0000E+04 3.4580E-02 2.1500E+04 3.2281E-02 4.6500E+04 3.7269E-011263 5 2 100
1.0000E+05 1.2068E+00 2.0000E+05 2.0518E+00 4.0000E+05 2.1081E+001263 5 2 101
8.0000E+05 1.8260E+00 1.4000E+06 2.0424E+00 2.5000E+06 2.8329E+001263 5 2 102
4.0000E+06 2.9305E+00 6.5000E+06 2.5756E+00 1.0500E+07 0.0         1263 5 2 103
0.0        0.0                 0           0           1        261263 5 2 104
        26           1           0           0           0          01263 5 2 105
0.0        0.1000E-02          0           0           1          11263 5 2 106
         1           1           0           0           0          01263 5 2 107
1.0000E-03 1.0000E+00 2.1500E-01 0.0         0.0         0.0       1263 5 2 108
0.0        0.2150E+00          0           0           1          21263 5 2 109
         2           1           0           0           0          01263 5 2 110
1.0000E-03 7.1488E-03 2.1500E-01 9.9285E-01 4.6500E-01 0.0         1263 5 2 111
0.0        0.4650E+00          0           0           1          21263 5 2 112
         2           1           0           0           0          01263 5 2 113
2.1500E-01-5.0951E-01 4.6500E-01 1.5095E+00 1.0000E+00 0.0         1263 5 2 114
0.0        0.1000E+01          0           0           1          21263 5 2 115
         2           1           0           0           0          01263 5 2 116
4.6500E-01 7.1522E-03 1.0000E+00 9.9285E-01 2.1500E+00 0.0         1263 5 2 117
0.0        0.2150E+01          0           0           1          21263 5 2 118
         2           1           0           0           0          01263 5 2 119
1.0000E+00 7.3576E-03 2.1500E+00 9.9264E-01 4.6500E+00 0.0         1263 5 2 120
0.0        0.4650E+01          0           0           1          21263 5 2 121
         2           1           0           0           0          01263 5 2 122
2.1500E+00 7.1267E-03 4.6500E+00 9.9287E-01 1.0000E+01 0.0         1263 5 2 123
0.0        0.1000E+02          0           0           1          21263 5 2 124
         2           1           0           0           0          01263 5 2 125
4.6500E+00-3.0576E-01 1.0000E+01 1.3058E+00 2.1500E+01 0.0         1263 5 2 126
0.0        0.2150E+02          0           0           1          21263 5 2 127
         2           1           0           0           0          01263 5 2 128
1.0000E+01-3.2317E-01 2.1500E+01 1.3232E+00 4.6500E+01 0.0         1263 5 2 129
0.0        0.4650E+02          0           0           1          21263 5 2 130
         2           1           0           0           0          01263 5 2 131
2.1500E+01-5.0100E-01 4.6500E+01 1.5010E+00 1.0000E+02 0.0         1263 5 2 132
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0.0          0.1000E+03           0           0           1          21263 5 2 133
         2           1           0           0           0          01263 5 2 134
4.6500E+01-1.4405E+00 1.0000E+02 2.4405E+00 2.1500E+02 0.0           1263 5 2 135
0.0          0.2150E+03           0           0           1          21263 5 2 136
         2           1           0           0           0          01263 5 2 137
1.0000E+02 6.7479E-03 2.1500E+02 9.9325E-01 4.6500E+02 0.0           1263 5 2 138
0.0          0.4650E+03           0           0           1          21263 5 2 139
         2           1           0           0           0          01263 5 2 140
2.1500E+02 2.2333E-03 4.6500E+02 9.9776E-01 1.0000E+03 0.0           1263 5 2 141
0.0          0.1000E+04           0           0           1          21263 5 2 142
         2           1           0           0           0          01263 5 2 143
4.6500E+02 7.0609E-03 1.0000E+03 9.9294E-01 2.1500E+03 0.0           1263 5 2 144
0.0          0.2150E+04           0           0           1          21263 5 2 145
         2           1           0           0           0          01263 5 2 146
1.0000E+03 6.4084E-03 2.1500E+03 9.9359E-01 4.6500E+03 0.0           1263 5 2 147
0.0          0.4650E+04           0           0           1          21263 5 2 148
         2           1           0           0           0          01263 5 2 149
2.1500E+03 7.0404E-03 4.6500E+03 9.9296E-01 1.0000E+04 0.0           1263 5 2 150
0.0          0.1000E+05           0           0           1          21263 5 2 151
         2           1           0           0           0          01263 5 2 152
4.6500E+03 3.6930E-03 1.0000E+04 9.9630E-01 2.1500E+04 0.0           1263 5 2 153
0.0          0.2150E+05           0           0           1          21263 5 2 154
         2           1           0           0           0          01263 5 2 155
1.0000E+04 6.3525E-03 2.1500E+04 9.9365E-01 4.6500E+04 0.0           1263 5 2 156
0.0          0.4650E+05           0           0           1          21263 5 2 157
         2           1           0           0           0          01263 5 2 158
2.1500E+04 6.1696E-04 4.6500E+04 9.9939E-01 1.0000E+05 0.0           1263 5 2 159
0.0          0.1000E+06           0           0           1          21263 5 2 160
         2           1           0           0           0          01263 5 2 161
4.6500E+04 5.3593E-03 1.0000E+05 9.9464E-01 2.0000E+05 0.0           1263 5 2 162
0.0          0.2000E+06           0           0           1          21263 5 2 163
         2           1           0           0           0          01263 5 2 164
1.0000E+05 6.4805E-03 2.0000E+05 9.9352E-01 4.0000E+05 0.0           1263 5 2 165
0.0          0.4000E+06           0           0           1          21263 5 2 166
         2           1           0           0           0          01263 5 2 167
2.0000E+05 8.4308E-03 4.0000E+05 9.9157E-01 8.0000E+05 0.0           1263 5 2 168
0.0          0.8000E+06           0           0           1          21263 5 2 169
         2           1           0           0           0          01263 5 2 170
4.0000E+05 1.2158E-02 8.0000E+05 9.8784E-01 1.4000E+06 0.0           1263 5 2 171
0.0          0.1400E+07           0           0           1          21263 5 2 172
         2           1           0           0           0          01263 5 2 173
8.0000E+05 8.9680E-03 1.4000E+06 9.9103E-01 2.5000E+06 0.0           1263 5 2 174
0.0          0.2500E+07           0           0           1          21263 5 2 175
         2           1           0           0           0          01263 5 2 176
1.4000E+06 1.2708E-02 2.5000E+06 9.8729E-01 4.0000E+06 0.0           1263 5 2 177
0.0          0.4000E+07           0           0           1          21263 5 2 178
         2           1           0           0           0          01263 5 2 179
2.5000E+06 1.4295E-02 4.0000E+06 9.8571E-01 6.5000E+06 0.0           1263 5 2 180
0.0          0.6500E+07           0           0           1          21263 5 2 181
         2           1           0           0           0          01263 5 2 182
4.0000E+06 1.4961E-02 6.5000E+06 9.8504E-01 1.0500E+07 0.0           1263 5 2 183
0.0          0.0                 0           1           1         271263 5 2 184
        27           1           0           0           0          01263 5 2 185
1.0000E-03-1.8404E-03 2.1500E-01-1.4813E-03 4.6500E-01-1.5466E-031263 5 2 186
1.0000E+00-1.3022E-03 2.1500E+00-1.2095E-03 4.6500E+00-1.1492E-031263 5 2 187
1.0000E+01-1.1062E-03 2.1500E+01-1.3258E-03 4.6500E+01-1.5700E-031263 5 2 188
1.0000E+02-1.4392E-03 2.1500E+02-1.2454E-03 4.6500E+02-1.3101E-031263 5 2 189
1.0000E+03-1.3534E-03 2.1500E+03-1.1740E-03 4.6500E+03-1.2267E-031263 5 2 190
1.0000E+04-1.1785E-03 2.1500E+04-1.1695E-03 4.6500E+04 8.6553E-021263 5 2 191
1.0000E+05 2.7715E-01 2.0000E+05 6.0759E-01 4.0000E+05 8.9633E-011263 5 2 192
8.0000E+05 1.0781E+00 1.4000E+06 1.4213E+00 2.5000E+06 2.2276E+001263 5 2 193
4.0000E+06 2.3987E+00 6.5000E+06 2.1532E+00 1.0500E+07 0.0           1263 5 2 194
0.0          0.0                 0           0           1         261263 5 2 195
        26           1           0           0           0          01263 5 2 196
0.0          0.1000E-02           0           0           1          11263 5 2 197
         1           1           0           0           0          01263 5 2 198
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1.0000E-03 1.0000E+00 2.1500E-01 0.0          0.0          0.0          1263 5 2 199
0.0        0.2150E+00          0          0          1                 21263 5 2 200
       2           1          0          0          0                 01263 5 2 201
1.0000E-03-2.1875E-02 2.1500E-01 1.0219E+00 4.6500E-01 0.0          1263 5 2 202
0.0        0.4650E+00          0          0          1                 21263 5 2 203
       2           1          0          0          0                 01263 5 2 204
2.1500E-01-1.3437E+00 4.6500E-01 2.3437E+00 1.0000E+00 0.0          1263 5 2 205
0.0        0.1000E+01          0          0          1                 21263 5 2 206
       2           1          0          0          0                 01263 5 2 207
4.6500E-01 8.0720E-03 1.0000E+00 9.9193E-01 2.1500E+00 0.0          1263 5 2 208
0.0        0.2150E+01          0          0          1                 21263 5 2 209
       2           1          0          0          0                 01263 5 2 210
1.0000E+00-1.6274E-02 2.1500E+00 1.0163E+00 4.6500E+00 0.0          1263 5 2 211
0.0        0.4650E+01          0          0          1                 21263 5 2 212
       2           1          0          0          0                 01263 5 2 213
2.1500E+00 5.6779E-03 4.6500E+00 9.9432E-01 1.0000E+01 0.0          1263 5 2 214
0.0        0.1000E+02          0          0          1                 21263 5 2 215
       2           1          0          0          0                 01263 5 2 216
4.6500E+00-5.3258E+00 1.0000E+01 6.3258E+00 2.1500E+01 0.0          1263 5 2 217
0.0        0.2150E+02          0          0          1                 21263 5 2 218
       2           1          0          0          0                 01263 5 2 219
1.0000E+01-2.9420E+00 2.1500E+01 3.9420E+00 4.6500E+01 0.0          1263 5 2 220
0.0        0.4650E+02          0          0          1                 21263 5 2 221
       2           1          0          0          0                 01263 5 2 222
2.1500E+01 1.8297E+00 4.6500E+01-8.2972E-01 1.0000E+02 0.0          1263 5 2 223
0.0        0.1000E+03          0          0          1                 21263 5 2 224
       2           1          0          0          0                 01263 5 2 225
4.6500E+01 9.7935E-01 1.0000E+02 2.0648E-02 2.1500E+02 0.0          1263 5 2 226
0.0        0.2150E+03          0          0          1                 21263 5 2 227
       2           1          0          0          0                 01263 5 2 228
1.0000E+02-1.4295E-02 2.1500E+02 1.0143E+00 4.6500E+02 0.0          1263 5 2 229
0.0        0.4650E+03          0          0          1                 21263 5 2 230
       2           1          0          0          0                 01263 5 2 231
2.1500E+02-1.5167E-01 4.6500E+02 1.1517E+00 1.0000E+03 0.0          1263 5 2 232
0.0        0.1000E+04          0          0          1                 21263 5 2 233
       2           1          0          0          0                 01263 5 2 234
4.6500E+02-7.2560E-03 1.0000E+03 1.0073E+00 2.1500E+03 0.0          1263 5 2 235
0.0        0.2150E+04          0          0          1                 21263 5 2 236
       2           1          0          0          0                 01263 5 2 237
1.0000E+03-2.7678E-02 2.1500E+03 1.0277E+00 4.6500E+03 0.0          1263 5 2 238
0.0        0.4650E+04          0          0          1                 21263 5 2 239
       2           1          0          0          0                 01263 5 2 240
2.1500E+03-7.6355E-03 4.6500E+03 1.0076E+00 1.0000E+04 0.0          1263 5 2 241
0.0        0.1000E+05          0          0          1                 21263 5 2 242
       2           1          0          0          0                 01263 5 2 243
4.6500E+03-1.0765E-01 1.0000E+04 1.1077E+00 2.1500E+04 0.0          1263 5 2 244
0.0        0.2150E+05          0          0          1                 21263 5 2 245
       2           1          0          0          0                 01263 5 2 246
1.0000E+04-3.0740E-02 2.1500E+04 1.0307E+00 4.6500E+04 0.0          1263 5 2 247
0.0        0.4650E+05          0          0          1                 21263 5 2 248
       2           1          0          0          0                 01263 5 2 249
2.1500E+04-7.5024E-05 4.6500E+04 1.0001E+00 1.0000E+05 0.0          1263 5 2 250
0.0        0.1000E+06          0          0          1                 21263 5 2 251
       2           1          0          0          0                 01263 5 2 252
4.6500E+04 6.0441E-03 1.0000E+05 9.9396E-01 2.0000E+05 0.0          1263 5 2 253
0.0        0.2000E+06          0          0          1                 21263 5 2 254
       2           1          0          0          0                 01263 5 2 255
1.0000E+05 4.9041E-03 2.0000E+05 9.9510E-01 4.0000E+05 0.0          1263 5 2 256
0.0        0.4000E+06          0          0          1                 21263 5 2 257
       2           1          0          0          0                 01263 5 2 258
2.0000E+05 6.5188E-03 4.0000E+05 9.9343E-01 8.0000E+05 0.0          1263 5 2 259
0.0        0.8000E+06          0          0          1                 21263 5 2 260
       2           1          0          0          0                 01263 5 2 261
4.0000E+05 1.0682E-02 8.0000E+05 9.8932E-01 1.4000E+06 0.0          1263 5 2 262
0.0        0.1400E+07          0          0          1                 21263 5 2 263
       2           1          0          0          0                 01263 5 2 264
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8.0000E+05 7.7663E-03 1.4000E+06 9.8223E-01 2.5000E+06 0.0          1263 5 2 265
0.0        0.2500E+07          0          0          1              21263 5 2 266
         2          1          0          0          0              01263 5 2 267
1.4000E+06 1.2178E-02 2.5000E+06 9.8782E-01 4.0000E+06 0.0          1263 5 2 268
0.0        0.4000E+07          0          0          1              21263 5 2 269
         2          1          0          0          0              01263 5 2 270
2.5000E+06 1.4169E-02 4.0000E+06 9.8533E-01 6.5000E+06 0.0          1263 5 2 271
0.0        0.6500E+07          0          0          1              21263 5 2 272
         2          1          0          0          0              01263 5 2 273
4.0000E+06 1.4747E-02 6.5000E+06 9.8525E-01 1.0500E+07 0.0          1263 5 2 274
0.0        0.0                 0          1          1             271263 5 2 275
        27          1          0          0          0              01263 5 2 276
1.0000E-03 1.9023E-03 2.1500E-01 1.5335E-03 4.6500E-01 1.6001E-031263 5 2 277
1.0000E+00 1.3523E-03 2.1500E+00 1.2521E-03 4.6500E+00 1.1882E-031263 5 2 278
1.0000E+01 1.1481E-03 2.1500E+01 1.3784E-03 4.6500E+01 1.6247E-031263 5 2 279
1.0000E+02 1.4891E-03 2.1500E+02 1.2948E-03 4.6500E+02 1.3583E-031263 5 2 280
1.0000E+03 1.4001E-03 2.1500E+03 1.2197E-03 4.6500E+03 1.2708E-031263 5 2 281
1.0000E+04 1.2213E-03 2.1500E+04 1.2093E-03 4.6500E+04 5.0255E-031263 5 2 282
1.0000E+05-1.1612E-02 2.0000E+05 1.1237E-01 4.0000E+05 3.0805E-011263 5 2 283
9.0000E+05 7.0442E-01 1.4000E+06 1.0971E+00 2.5000E+06 1.6921E+001263 5 2 284
4.0000E+06 1.9583E+00 6.5000E+06 1.9315E+00 1.0500E+07 0.0          1263 5 2 285
0.0        0.0                 0          0          1             261263 5 2 286
        26          1          0          0          0              01263 5 2 287
0.0        0.1000E-02          0          0          1              11263 5 2 288
         1          1          0          0          0              01263 5 2 289
1.0000E-03 1.0000E+00 2.1500E-01 0.0          0.0        0.0        1263 5 2 290
0.0        0.2150E+00          0          0          1              21263 5 2 291
         2          1          0          0          0              01263 5 2 292
1.0000E-03-2.0826E-02 2.1500E-01 1.0209E+00 4.6500E-01 0.0          1263 5 2 293
0.0        0.4650E+00          0          0          1              21263 5 2 294
         2          1          0          0          0              01263 5 2 295
2.1500E-01 3.3703E+00 4.6500E-01-2.3703E+00 1.0000E+00 0.0          1263 5 2 296
0.0        0.1000E+01          0          0          1              21263 5 2 297
         2          1          0          0          0              01263 5 2 298
4.6500E-01 8.0368E-03 1.0000E+00 9.9196E-01 2.1500E+00 0.0          1263 5 2 299
0.0        0.2150E+01          0          0          1              21263 5 2 300
         2          1          0          0          0              01263 5 2 301
1.0000E+00-1.5425E-02 2.1500E+00 1.0154E+00 4.6500E+00 0.0          1263 5 2 302
0.0        0.4650E+01          0          0          1              21263 5 2 303
         2          1          0          0          0              01263 5 2 304
2.1500E+00 5.7303E-03 4.6500E+00 9.9427E-01 1.0000E+01 0.0          1263 5 2 305
0.0        0.1000E+02          0          0          1              21263 5 2 306
         2          1          0          0          0              01263 5 2 307
4.6500E+00-1.4148E+00 1.0000E+01 2.4148E+00 2.1500E+01 0.0          1263 5 2 308
0.0        0.2150E+02          0          0          1              21263 5 2 309
         2          1          0          0          0              01263 5 2 310
1.0000E+01 1.0158E+00 2.1500E+01-1.5801E-02 4.6500E+01 0.0          1263 5 2 311
0.0        0.4650E+02          0          0          1              21263 5 2 312
         2          1          0          0          0              01263 5 2 313
2.1500E+01-1.0281E+00 4.6500E+01 2.0281E+00 1.0000E+02 0.0          1263 5 2 314
0.0        0.1000E+03          0          0          1              21263 5 2 315
         2          1          0          0          0              01263 5 2 316
4.6500E+01-7.3849E-01 1.0000E+02 1.7385E+00 2.1500E+02 0.0          1263 5 2 317
0.0        0.2150E+03          0          0          1              21263 5 2 318
         2          1          0          0          0              01263 5 2 319
1.0000E+02-1.3456E-02 2.1500E+02 1.0135E+00 4.6500E+02 0.0          1263 5 2 320
0.0        0.4650E+03          0          0          1              21263 5 2 321
         2          1          0          0          0              01263 5 2 322
2.1500E+02-1.4591E-01 4.6500E+02 1.1459E+00 1.0000E+03 0.0          1263 5 2 323
0.0        0.1000E+04          0          0          1              21263 5 2 324
         2          1          0          0          0              01263 5 2 325
4.6500E+02-6.7492E-03 1.0000E+03 1.0067E+00 2.1500E+03 0.0          1263 5 2 326
0.0        0.2150E+04          0          0          1              21263 5 2 327
         2          1          0          0          0              01263 5 2 328
1.0000E+03-2.6341E-02 2.1500E+03 1.0263E+00 4.6500E+03 0.0          1263 5 2 329
0.0        0.4650E+04          0          0          1              21263 5 2 330
```

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         2           1           0           0           0          01263 5 2 331
2.1500E+04-7.0997E-03 4.6500E+04 1.0071E+00 1.0000E+04 0.0         1263 5 2 332
0.0         0.1000E+05           0           0           1         21263 5 2 333
         2           1           0           0           0          01263 5 2 334
4.6500E+04-1.0354E-01 1.0000E+04 1.1035E+00 2.1500E+04 0.0         1263 5 2 335
0.0         0.2150E+05           0           0           1         21263 5 2 336
         2           1           0           0           0          01263 5 2 337
1.0000E+04-2.9447E-02 2.1500E+04 1.0294E+00 4.6500E+04 0.0         1263 5 2 338
0.0         0.4650E+05           0           0           1         21263 5 2 339
         2           1           0           0           0          01263 5 2 340
2.1500E+04 1.3492E-03 4.6500E+04 9.9866E-01 1.0000E+05 0.0         1263 5 2 341
0.0         0.1000E+06           0           0           1         21263 5 2 342
         2           1           0           0           0          01263 5 2 343
4.6500E+04-5.5193E-04 1.0000E+05 1.0006E+00 2.0000E+05 0.0         1263 5 2 344
0.0         0.2000E+06           0           0           1         21263 5 2 345
         2           1           0           0           0          01263 5 2 346
1.0000E+05-2.1496E-03 2.0000E+05 1.0021E+00 4.0000E+05 0.0         1263 5 2 347
0.0         0.4000E+06           0           0           1         21263 5 2 348
         2           1           0           0           0          01263 5 2 349
2.0000E+05 2.9127E-03 4.0000E+05 9.9709E-01 8.0000E+05 0.0         1263 5 2 350
0.0         0.8000E+06           0           0           1         21263 5 2 351
         2           1           0           0           0          01263 5 2 352
4.0000E+05 8.8024E-03 8.0000E+05 9.9120E-01 1.4000E+06 0.0         1263 5 2 353
0.0         0.1400E+07           0           0           1         21263 5 2 354
         2           1           0           0           0          01263 5 2 355
8.0000E+05 7.6258E-03 1.4000E+06 9.9237E-01 2.5000E+06 0.0         1263 5 2 356
0.0         0.2500E+07           0           0           1         21263 5 2 357
         2           1           0           0           0          01263 5 2 358
1.4000E+06 1.1438E-02 2.5000E+06 9.8856E-01 4.0000E+06 0.0         1263 5 2 359
0.0         0.4000E+07           0           0           1         21263 5 2 360
         2           1           0           0           0          01263 5 2 361
2.5000E+06 1.3734E-02 4.0000E+06 9.8627E-01 6.5000E+06 0.0         1263 5 2 362
0.0         0.6500E+07           0           0           1         21263 5 2 363
         2           1           0           0           0          01263 5 2 364
4.0000E+06 1.4594E-02 6.5000E+06 9.8541E-01 1.0500E+07 0.0         1263 5 2 365
0.5184E+28 0.5184E+28           0           0           0          01263 5 0 366
```

Example No. 3

Inelastic continuum (MT=91) transfer matrix for 26 groups (i.e. 27 group boundaries) using one Legendre moment (i.e. isotopic scattering). The matrices are not temperature or self-shielding dependent (NZ=1).

```
9.3237E+04 2.3700E+02          0          0          1          11263 5 91     1
0.0        0.0                 0          1          1         271263 5 91     1
        27          1          0          0          0          01263 5 91     2
1.0000E-03 0.0        2.1500E-01 0.0        4.6500E-01 0.0        1263 5 91     3
1.0000E+00 0.0        2.1500E+00 0.0        4.6500E+00 0.0        1263 5 91     4
1.0000E+01 0.0        2.1500E+01 0.0        4.6500E+01 0.0        1263 5 91     5
1.0000E+02 0.0        2.1500E+02 0.0        4.6500E+02 0.0        1263 5 91     6
1.0000E+03 0.0        2.1500E+03 0.0        4.6500E+03 0.0        1263 5 91     7
1.0000E+04 0.0        2.1500E+04 0.0        4.6500E+04 0.0        1263 5 91     8
1.0000E+05 0.0        2.0000E+05 1.4534E-02 4.0000E+05 1.4477E-011263 5 91     9
8.0000E+05 8.5176E-01 1.4000E+06 1.7333E+00 2.5000E+06 2.1822E+001263 5 91    10
4.0000E+06 2.0763E+00 6.5000E+06 4.7925E-01 1.0500E+07 0.0        1263 5 91    11
0.0        0.0                 0          0          1         261263 5 91    12
        26          1          0          0          0          01263 5 91    13
0.0        2.0000E+05          0          0          1         201263 5 91    14
        26          1          0          0          0          01263 5 91    15
1.0000E-03 1.8061E-12 2.1500E-01 6.6425E-12 4.6500E-01 3.0625E-111263 5 91    16
1.0000E+00 1.4154E-10 2.1500E+00 6.6424E-10 4.6500E+00 3.0623E-091263 5 91    17
1.0000E+01 1.4153E-08 2.1500E+01 6.6407E-08 4.6500E+01 3.0607E-071263 5 91    18
1.0000E+02 1.4137E-06 2.1500E+02 6.6245E-06 4.6500E+02 3.0446E-051263 5 91    19
1.0000E+03 1.3977E-04 2.1500E+03 6.4640E-04 4.6500E+03 2.8881E-031263 5 91    20
1.0000E+04 1.2480E-02 2.1500E+04 5.0650E-02 4.6500E+04 1.7144E-011263 5 91    21
1.0000E+05 3.6404E-01 2.0000E+05 3.9767E-01 4.0000E+05 0.0        1263 5 91    22
0.0        4.0000E+05          0          0          1         211263 5 91    23
        26          1          0          0          0          01263 5 91    24
1.0000E-03 9.9331E-13 2.1500E-01 3.6531E-12 4.6500E-01 1.6842E-111263 5 91    25
1.0000E+00 7.7843E-11 2.1500E+00 3.6530E-10 4.6500E+00 1.6842E-091263 5 91    26
1.0000E+01 7.7836E-09 2.1500E+01 3.6523E-08 4.6500E+01 1.6835E-071263 5 91    27
1.0000E+02 7.7765E-07 2.1500E+02 3.6451E-06 4.6500E+02 1.6763E-051263 5 91    28
1.0000E+03 7.7056E-05 2.1500E+03 3.5738E-04 4.6500E+03 1.6065E-031263 5 91    29
1.0000E+04 7.0331E-03 2.1500E+04 2.9358E-02 4.6500E+04 1.0549E-011263 5 91    30
1.0000E+05 2.5108E-01 2.0000E+05 4.0512E-01 4.0000E+05 1.9936E-011263 5 91    31
8.0000E+05 0.0        0.0        0.0        0.0        0.0        1263 5 91    32
0.0        8.0000E+05          0          0          1         221263 5 91    33
        26          1          0          0          0          01263 5 91    34
1.0000E-03 4.7501E-13 2.1500E-01 1.7470E-12 4.6500E-01 8.0544E-121263 5 91    35
1.0000E+00 3.7226E-11 2.1500E+00 1.7470E-10 4.6500E+00 8.0541E-101263 5 91    36
1.0000E+01 3.7224E-09 2.1500E+01 1.7467E-08 4.6500E+01 8.0516E-081263 5 91    37
1.0000E+02 3.7199E-07 2.1500E+02 1.7442E-06 4.6500E+02 8.0269E-061263 5 91    38
1.0000E+03 3.6954E-05 2.1500E+03 1.7195E-04 4.6500E+03 7.7837E-041263 5 91    39
1.0000E+04 3.4591E-03 2.1500E+04 1.4912E-02 4.6500E+04 5.7356E-021263 5 91    40
1.0000E+05 1.5520E-01 2.0000E+05 3.1833E-01 4.0000E+05 3.5310E-011263 5 91    41
8.0000E+05 9.6636E-02 1.4000E+06 0.0        0.0        0.0        1263 5 91    42
0.0        1.4000E+06          0          0          1         231263 5 91    43
        26          1          0          0          0          01263 5 91    44
1.0000E-03 2.7675E-13 2.1500E-01 1.0178E-12 4.6500E-01 4.6925E-121263 5 91    45
1.0000E+00 2.1688E-11 2.1500E+00 1.0178E-10 4.6500E+00 4.6924E-101263 5 91    46
1.0000E+01 2.1687E-09 2.1500E+01 1.0177E-08 4.6500E+01 4.6913E-081263 5 91    47
1.0000E+02 2.1676E-07 2.1500E+02 1.0165E-06 4.6500E+02 4.6800E-061263 5 91    48
1.0000E+03 2.1564E-05 2.1500E+03 1.0053E-04 4.6500E+03 4.5693E-041263 5 91    49
1.0000E+04 2.0483E-03 2.1500E+04 8.9970E-03 4.6500E+04 3.6013E-021263 5 91    50
1.0000E+05 1.0514E-01 2.0000E+05 2.4919E-01 4.0000E+05 3.6244E-011263 5 91    51
8.0000E+05 1.9604E-01 1.4000E+06 3.9519E-02 2.5000E+06 0.0        1263 5 91    52
0.0        2.5000E+06          0          0          1         241263 5 91    53
        26          1          0          0          0          01263 5 91    54
1.0000E-03 1.6332E-13 2.1500E-01 6.0064E-13 4.6500E-01 2.7692E-121263 5 91    55
1.0000E+00 1.2799E-11 2.1500E+00 6.0064E-11 4.6500E+00 2.7692E-101263 5 91    56
1.0000E+01 1.2798E-09 2.1500E+01 6.0059E-09 4.6500E+01 2.7687E-081263 5 91    57
1.0000E+02 1.2793E-07 2.1500E+02 6.0007E-07 4.6500E+02 2.7636E-061263 5 91    58
1.0000E+03 1.2743E-05 2.1500E+03 5.9496E-05 4.6500E+03 2.7132E-041263 5 91    59
1.0000E+04 1.2249E-03 2.1500E+04 5.4630E-03 4.6500E+04 2.2589E-021263 5 91    60
1.0000E+05 7.0152E-02 2.0000E+05 1.8695E-01 4.0000E+05 3.3852E-011263 5 91    61
8.0000E+05 2.5915E-01 1.4000E+06 1.0687E-01 2.5000E+06 8.7316E-031263 5 91    62
4.0000E+06 0.0        0.0        0.0        0.0        0.0        1263 5 91    63
0.0        4.0000E+06          0          0          1         251263 5 91    64
        26          1          0          0          0          01263 5 91    65
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1.0000E-03 1.0241E-13 2.1500E-01 3.7812E-13 4.6500E-01 1.7433E-121263 5 91    66
1.0000E+00 1.0572E-12 2.1500E+00 3.7812E-11 4.6500E+00 1.7433E-101263 5 91    67
1.0000E+01 1.0570E-11 2.1500E+01 3.7803E-09 4.6500E+01 1.7430E-081263 5 91    68
1.0000E+02 1.0544E-08 2.1500E+02 3.7783E-07 4.6500E+02 1.7405E-061263 5 91    69
1.0000E+03 1.0291E-06 2.1500E+03 3.7523E-05 4.6500E+03 1.7152E-041263 5 91    70
1.0000E+04 7.7808E-04 2.1500E+04 3.5063E-03 4.6500E+04 1.4827E-021263 5 91    71
1.0000E+05 4.8052E-02 2.0000E+05 1.3899E-01 4.0000E+05 2.9437E-011263 5 91    72
8.0000E+05 2.8990E-01 1.4000E+06 1.7565E-01 2.5000E+06 3.1650E-021263 5 91    73
4.0000E+06 2.0486E-03 6.5000E+06 0.0        0.0        0.0         1263 5 91    74
0.0        6.5000E+06          0          0          1          261263 5 91    75
        26          1          0          0          0           01263 5 91    76
1.0000E-03 7.0147E-14 2.1500E-01 2.5798E-13 4.6500E-01 1.1894E-121263 5 91    77
1.0000E+00 5.4972E-12 2.1500E+00 2.5798E-11 4.6500E+00 1.1894E-101263 5 91    78
1.0000E+01 5.4971E-10 2.1500E+01 2.5796E-09 4.6500E+01 1.1892E-081263 5 91    79
1.0000E+02 5.4957E-08 2.1500E+02 2.5782E-07 4.6500E+02 1.1878E-061263 5 91    80
1.0000E+03 5.4815E-06 2.1500E+03 2.5638E-05 4.6500E+03 1.1736E-041263 5 91    81
1.0000E+04 5.3415E-04 2.1500E+04 2.4246E-03 4.6500E+04 1.0409E-021263 5 91    82
1.0000E+05 3.4731E-02 2.0000E+05 1.0626E-01 4.0000E+05 2.5068E-011263 5 91    83
8.0000E+05 2.9324E-01 1.4000E+06 2.3153E-01 2.5000E+06 6.2168E-021263 5 91    84
4.0000E+06 7.7382E-03 6.5000E+06 1.3377E-04 1.0500E+07 0.0         1263 5 91    85
0.0        0.0                 0          0          0           01263 5  0    86
```