======================================================================= Spectra

Spectra

PROGRAM SPECTRA Spectra

=============== Spectra

An extension of LINEAR to linearize ALl MF=5 spectra. Spectra

05/28/2012 - Added MF=15 neutron induced, photon spectra. Spectra

Spectra

First released in 2010 - Earlier below dates refer to LINEAR. Spectra

Spectra

VERSION 74-1 (MAY 1974) Spectra

VERSION 75-1 (APRIL 1975) Spectra

VERSION 76-2 (OCTOBER 1976) Spectra

VERSION 77-1 (JANUARY 1977) Spectra

VERSION 78-1 (JULY 1978) Spectra

VERSION 79-1 (JULY 1979) CDC-7600 AND CRAY-1 VERSION. Spectra

VERSION 80-1 (MAY 1980) IBM, CDC AND CRAY VERSION. Spectra

VERSION 80-2 (DECEMBER 1980) Spectra

VERSION 81-1 (MARCH 1981) Spectra

VERSION 82-1 (JANUARY 1982) IMPROVED COMPUTER COMPATIBILITY. Spectra

VERSION 83-1 (JANUARY 1983) \*MAJOR RE-DESIGN. Spectra

\*PAGE SIZE INCREASED - 1002 TO 3006. Spectra

\*ELIMINATED COMPUTER DEPENDENT CODING. Spectra

\*NEW, MORE COMPATIBLE I/O UNIT NUMBER. Spectra

\*ADDED OPTION TO KEEP ALL ORIGINAL Spectra

ENERGY POINTS FROM EVALUATION. Spectra

\*ADDED STANDARD ALLOWABLE ERROR OPTION Spectra

(CURRENTLY 0.1 PER-CENT). Spectra

VERSION 83-2 (OCTOBER 1983) IMPROVED BASED ON USER COMMENTS. Spectra

VERSION 84-1 (APRIL 1984) IMPROVED BASED ON USER COMMENTS. Spectra

VERSION 84-2 (JUNE 1984) \*UPDATED FOR ENDF/B-VI FORMATS. Spectra

\*SPECIAL I/O ROUTINES TO GUARANTEE Spectra

ACCURACY OF ENERGY. Spectra

\*DOUBLE PRECISION TREATMENT OF ENERGY Spectra

(REQUIRED FOR NARROW RESONANCES). Spectra

VERSION 85-1 (AUGUST 1985) \*FORTRAN-77/H VERSION Spectra

VERSION 86-1 (JANUARY 1986)\*ENDF/B-VI FORMAT Spectra

VERSION 87-1 (JANUARY 1987)\*DOUBLE PRECISION TREATMENT OF CROSS Spectra

SECTION Spectra

VERSION 88-1 (JULY 1988) \*OPTION...INTERNALLY DEFINE ALL I/O Spectra

FILE NAMES (SEE, SUBROUTINE FILEIO Spectra

FOR DETAILS). Spectra

\*IMPROVED BASED ON USER COMMENTS. Spectra

VERSION 89-1 (JANUARY 1989)\*PSYCHOANALYZED BY PROGRAM FREUD TO Spectra

INSURE PROGRAM WILL NOT DO ANYTHING Spectra

CRAZY. Spectra

\*UPDATED TO USE NEW PROGRAM CONVERT Spectra

KEYWORDS. Spectra

\*ADDED LIVERMORE CIVIC COMPILER Spectra

CONVENTIONS. Spectra

VERSION 90-1 (JUNE 1990) \*EXTENDED TO LINEARIZE PHOTON Spectra

INTERACTION DATA, MF=23 AND 27 Spectra

\*ADDED FORTRAN SAVE OPTION Spectra

\*UPDATED BASED ON USER COMMENTS. Spectra

\*NEW MORE CONSISTENT ENERGY OUTPUT Spectra

ROUTINE. Spectra

\*WARNING...INPUT PARAMETER FORMAT Spectra

HAS BEEN CHANGED...SEE DESCRIPTION Spectra

BELOW. Spectra

VERSION 91-1 (JULY 1991) \*ADDED INTERPOLATION LAW 6 - ONLY USED Spectra

FOR CHARGED PARTICLE CROSS SECTIONS Spectra

FOR COULOMB PENETRABILITIES. Spectra

VERSION 92-1 (JANUARY 1992)\*ADDED NU-BAR (TOTAL, DELAYED, PROMPT) Spectra

POLYNOMIAL OR TABULATED ALL CONVERTED Spectra

TO LINEARLY INTERPOLABLE Spectra

\*INCREASED PAGE SIZE FROM 3006 TO 5010 Spectra

POINTS. Spectra

\*ALL ENERGIES INTERNALLY ROUNDED PRIOR Spectra

TO CALCULATIONS. Spectra

\*COMPLETELY CONSISTENT I/O AND ROUNDING Spectra

ROUTINES - TO MINIMIZE COMPUTER Spectra

DEPENDENCE. Spectra

VERSION 92-2 (JULY 1992) \*CORRECTED CONVERSION OF NU-BAR FROM Spectra

POLYNOMIAL TO TABULATED - COPY Spectra

SPONTANEOUS NU-BAR (BY DEFINITION Spectra

THE SPONTANEOUS NU-BAR IS NOT AN Spectra

ENERGY DEPENDENT QUANTITY). Spectra

VERSION 93-1 (MARCH 1993) \*UPDATED FOR USE WITH LAHEY COMPILER Spectra

ON IBM-PCS. Spectra

\*INCREASED PAGE SIZE FROM 5010 TO Spectra

30000 POINTS Spectra

VERSION 94-1 (JANUARY 1994)\*VARIABLE ENDF/B DATA FILENAMES Spectra

TO ALLOW ACCESS TO FILE STRUCTURES Spectra

(WARNING - INPUT PARAMETER FORMAT Spectra

HAS BEEN CHANGED) Spectra

\*CLOSE ALL FILES BEFORE TERMINATING Spectra

(SEE, SUBROUTINE ENDIT) Spectra

VERSION 96-1 (JANUARY 1996) \*COMPLETE RE-WRITE Spectra

\*IMPROVED COMPUTER INDEPENDENCE Spectra

\*ALL DOUBLE PRECISION Spectra

\*ON SCREEN OUTPUT Spectra

\*UNIFORM TREATMENT OF ENDF/B I/O Spectra

\*IMPROVED OUTPUT PRECISION Spectra

\*DEFINED SCRATCH FILE NAMES Spectra

\*ALWAYS INCLUDE THERMAL VALUE Spectra

\*INCREASED PAGE SIZE FROM 30000 TO Spectra

60000 POINTS Spectra

VERSION 99-1 (MARCH 1999) \*CORRECTED CHARACTER TO FLOATING Spectra

POINT READ FOR MORE DIGITS Spectra

\*UPDATED TEST FOR ENDF/B FORMAT Spectra

VERSION BASED ON RECENT FORMAT CHANGE Spectra

\*GENERAL IMPROVEMENTS BASED ON Spectra

USER FEEDBACK Spectra

VERSION 99-2 (JUNE 1999) \*ASSUME ENDF/B-VI, NOT V, IF MISSING Spectra

MF=1, MT-451. Spectra

VERS. 2000-1 (FEBRUARY 2000)\*ADDED MF = 9 AND 10 LINEARIZATION Spectra

\*GENERAL IMPROVEMENTS BASED ON Spectra

USER FEEDBACK Spectra

VERS. 2002-1 (MAY 2002) \*OPTIONAL INPUT PARAMETERS Spectra

VERS. 2004-1 (JAN. 2004) \*GENERAL UPDATE BASED ON USER FEEDBACK Spectra

VERS. 2005-1 (JAN. 2005) \*ALWAYS KEEP ORIGINAL TABULATED Spectra

NU-BAR POINTS. Spectra

VERS. 2006-1 (FEB. 2006) \*CORRECTED INT=6 NEAR THRESHOLD Spectra

\*NO SUBDIVIDE BELOW MINIMUM XCMIN Spectra

VERS. 2007-1 (JAN. 2007) \*CHECKED AGAINST ALL ENDF/B-VII. Spectra

\*INCREASED PAGE SIZE FROM 60,000 TO Spectra

600,000 POINTS Spectra

VERS. 2010-1 (JUNE 2010) \*ADDED MF = 5 - MF = 6 STILL PLANNED. Spectra

\*72 CHARACTER FILE NAMES. Spectra

\*ONLY PROCESS MF=5 - SKIP ALL OTHERS Spectra

TO PREVENT CONFLICT WITH LINEAR Spectra

THINNING. Spectra

VERS. 2012-1 (Aug. 2012) \*Added MF=15, neutron induced photon Spectra

spectra. Spectra

\*Added CODENAME Spectra

\*32 and 64 bit Compatible Spectra

\*Added ERROR stop Spectra

VERS. 2015-1 (Jan. 2015) \*Extended OUT9. Spectra

\*Replaced ALL 3 way IF Statements. Spectra

\*Corrected MF=15 Data - it was adding Spectra

SEND between sub-sections. Spectra

\*Deleted unused parts, e.g., NUBAR. Spectra

Spectra

OWNED, MAINTAINED AND DISTRIBUTED BY Spectra

------------------------------------ Spectra

THE NUCLEAR DATA SECTION Spectra

INTERNATIONAL ATOMIC ENERGY AGENCY Spectra

P.O. BOX 100 Spectra

A-1400, VIENNA, AUSTRIA Spectra

EUROPE Spectra

Spectra

ORIGINALLY WRITTEN BY Spectra

------------------------------------ Spectra

Dermott E. Cullen Spectra

Spectra

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Spectra

AUTHORS MESSAGE Spectra

--------------- Spectra

THE REPORT DESCRIBED ABOVE IS THE LATEST PUBLISHED DOCUMENTATION Spectra

FOR THIS PROGRAM. HOWEVER, THE COMMENTS BELOW SHOULD BE CONSIDERED Spectra

THE LATEST DOCUMENTATION INCLUDING ALL RECENT IMPROVEMENTS. PLEASE Spectra

READ ALL OF THESE COMMENTS BEFORE IMPLEMENTATION. Spectra

Spectra

AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER Spectra

INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE Spectra

OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT Spectra

IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY Spectra

COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO Spectra

IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF Spectra

THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR Spectra

COMPUTER. Spectra

Spectra

PURPOSE Spectra

------- Spectra

THIS PROGRAM IS DESIGNED TO CONVERT ENDF/B FILE 3, 23 AND 27 DATA Spectra

TO LINEAR-LINEAR INTERPOLABLE FORM. ANY SECTION THAT IS ALREADY Spectra

LINEAR-LINEAR INTERPOLABLE WILL BE THINNED. Spectra

Spectra

IN THE FOLLOWING DISCUSSION FOR SIMPLICITY THE ENDF/B TERMINOLOGY Spectra

---ENDF/B TAPE---WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE Spectra

TAPE, CARDS, DISK OR ANY OTHER MEDIUM. Spectra

Spectra

ENDF/B FORMAT Spectra

------------- Spectra

THIS PROGRAM ONLY USES THE ENDF/B BCD OR CARD IMAGE FORMAT (AS Spectra

OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION Spectra

OF THE ENDF/B FORMAT (I.E., ENDF/B-I, II,III, IV, V OR VI FORMAT). Spectra

Spectra

IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF/B Spectra

FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS Spectra

ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE Spectra

NUMBERS (COLUMNS 76-80) ARE IGNORED ON INPUT, BUT WILL BE Spectra

CORRECTLY OUTPUT ON ALL LINES. THE FORMAT OF SECTION MF=1, MT=451 Spectra

AND ALL SECTIONS OF MF=3 MUST BE CORRECT. THE PROGRAM COPIES ALL Spectra

OTHER SECTION OF DATA AS HOLLERITH AND AS SUCH IS INSENSITIVE TO Spectra

THE CORRECTNESS OR INCORRECTNESS OF ALL OTHER SECTIONS. Spectra

Spectra

OUTPUT FORMAT Spectra

------------- Spectra

IN THIS VERSION OF LINEAR ALL ENERGIES WILL BE OUTPUT IN Spectra

F (INSTEAD OF E) FORMAT IN ORDER TO ALLOW ENERGIES TO BE WRITTEN Spectra

WITH UP TO 9 DIGITS OF ACCURACY. IN PREVIOUS VERSIONS THIS WAS AN Spectra

OUTPUT OPTION. HOWEVER USE OF THIS OPTION TO COMPARE THE RESULTS Spectra

OF ENERGIES WRITTEN IN THE NORMAL ENDF/B CONVENTION OF 6 DIGITS Spectra

TO THE 9 DIGIT OUTPUT FROM THIS PROGRAM DEMONSTRATED THAT FAILURE Spectra

TO USE THE 9 DIGIT OUTPUT CAN LEAD TO LARGE ERRORS IN THE DATA Spectra

DUE TO TRUNCATION OF ENERGIES TO 6 DIGITS DURING OUTPUT. Spectra

Spectra

CONTENTS OF OUTPUT Spectra

------------------ Spectra

ENTIRE EVALUATIONS ARE OUTPUT, NOT JUST THE LINEARIZED DATA Spectra

CROSS SECTIONS, E.G. ANGULAR AND ENERGY DISTRIBUTIONS ARE ALSO Spectra

INCLUDED. Spectra

Spectra

DOCUMENTATION Spectra

------------- Spectra

THE FACT THAT THIS PROGRAM HAS OPERATED ON THE DATA IS DOCUMENTED Spectra

BY THE ADDITION OF 3 COMMENT LINES AT THE END OF EACH HOLLERITH Spectra

SECTION IN THE FORM Spectra

Spectra

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* PROGRAM SPECTRA (2015-1) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Spectra

FOR ALL DATA GREATER THAN 1.00000-10 IN ABSOLUTE VALUE Spectra

DATA LINEARIZED TO WITHIN AN ACCURACY OF 0.1 PER-CENT Spectra

Spectra

THE ORDER OF SIMILAR COMMENTS (FROM RECENT, SIGMA1 AND GROUPIE) Spectra

REPRESENTS A COMPLETE HISTORY OF ALL OPERATIONS PERFORMED ON Spectra

THE DATA BY THESE PROGRAMS. Spectra

Spectra

THESE COMMENT LINES ARE ONLY ADDED TO EXISTING HOLLERITH SECTIONS, Spectra

I.E., THIS PROGRAM WILL NOT CREATE A HOLLERITH SECTION. THE FORMAT Spectra

OF THE HOLLERITH SECTION IN ENDF/B-V DIFFERS FROM THE THAT OF Spectra

EARLIER VERSIONS OF ENDF/B. BY READING AN EXISTING MF=1, MT=451 Spectra

IT IS POSSIBLE FOR THIS PROGRAM TO DETERMINE WHICH VERSION OF Spectra

THE ENDF/B FORMAT THE DATA IS IN. WITHOUT HAVING A SECTION OF Spectra

MF=1, MT=451 PRESENT IT IS IMPOSSIBLE FOR THIS PROGRAM TO Spectra

DETERMINE WHICH VERSION OF THE ENDF/B FORMAT THE DATA IS IN, AND Spectra

AS SUCH IT IS IMPOSSIBLE FOR THE PROGRAM TO DETERMINE WHAT FORMAT Spectra

SHOULD BE USED TO CREATE A HOLLERITH SECTION. Spectra

Spectra

REACTION INDEX Spectra

-------------- Spectra

THIS PROGRAM DOES NOT USE THE REACTION INDEX WHICH IS GIVEN IN Spectra

SECTION MF=1, MT=451 OF EACH EVALUATION. Spectra

Spectra

THIS PROGRAM DOES NOT UPDATE THE REACTION INDEX IN MF=1, MT=451. Spectra

THIS CONVENTION HAS BEEN ADOPTED BECAUSE MOST USERS DO NOT Spectra

REQUIRE A CORRECT REACTION INDEX FOR THEIR APPLICATIONS AND IT WAS Spectra

NOT CONSIDERED WORTHWHILE TO INCLUDE THE OVERHEAD OF CONSTRUCTING Spectra

A CORRECT REACTION INDEX IN THIS PROGRAM. HOWEVER, IF YOU REQUIRE Spectra

A REACTION INDEX FOR YOUR APPLICATIONS, AFTER RUNNING THIS PROGRAM Spectra

YOU MAY USE PROGRAM DICTIN TO CREATE A CORRECT REACTION INDEX. Spectra

Spectra

SECTION SIZE Spectra

------------ Spectra

SINCE THIS PROGRAM USES A LOGICAL PAGING SYSTEM THERE IS NO LIMIT Spectra

TO THE NUMBER OF POINTS IN ANY SECTION, E.G., THE TOTAL CROSS Spectra

SECTION MAY BE REPRESENTED BY 200,000 DATA POINTS. Spectra

Spectra

FOR ANY LINEARIZED SECTION THAT CONTAINS 60000 OR FEWER POINTS Spectra

THE ENTIRE OPERATION WILL BE PERFORMED IN CORE AND THE LINEARIZED Spectra

DATA WILL BE OUTPUT DIRECTLY TO THE ENDF/B FORMAT. FOR ANY SECTION Spectra

THAT CONTAINS MORE POINTS THE DATA WILL BE LINEARIZED A PAGE AT A Spectra

TIME (1 PAGE = 60000 POINTS) AND OUTPUT TO SCRATCH. AFTER THE Spectra

ENTIRE SECTION HAS BEEN LINEARIZED THE DATA WILL BE READ BACK FROM Spectra

SCRATCH AND OUTPUT TO THE ENDF/B FORMAT. Spectra

Spectra

SELECTION OF DATA Spectra

----------------- Spectra

THE PROGRAM SELECTS DATA TO BE LINEARIZED BASED EITHER ON EITHER Spectra

MAT (ENDF/B MAT NO.) OR ZA AS WELL AS MF AND MT NUMBERS. THIS Spectra

PROGRAM ALLOWS UP TO 100 MAT/MF/MT OR ZA/MF/MT RANGES TO BE Spectra

SPECIFIED BY INPUT PARAMETERS. THE PROGRAM WILL ASSUME THAT THE Spectra

ENDF/B TAPE IS IN MAT ORDER, REGARDLESS OF THE CRITERIA USED Spectra

TO RETRIEVE MATERIALS. IF RETRIEVAL IS BY MAT RANGE THE PROGRAM Spectra

WILL TERMINATE WHEN A MAT IS FOUND THAT IS ABOVE ALL REQUESTED Spectra

MAT RANGES. IF RETRIEVAL IS BY ZA RANGE THE PROGRAM WILL SEARCH Spectra

THE ENTIRE ENDF/B TAPE. Spectra

Spectra

PROGRAM OPERATION Spectra

----------------- Spectra

EACH SECTION OF DATA IS CONSIDERED SEPARATELY. EACH SECTION OF Spectra

ENDF/B DATA TO LINEARIZE IS REPRESENTED BY A TABLE OF ENERGY Spectra

VS. CROSS SECTION AND ANY ONE OF FIVE ALLOWABLE INTERPOLATION LAWS Spectra

BETWEEN ANY TWO TABULATED POINTS. THIS PROGRAM WILL REPLACE EACH Spectra

SECTION OF DATA CROSS SECTIONS BY A NEW TABLE OF ENERGY VS. Spectra

CROSS SECTION IN WHICH THE INTERPOLATION LAW IS ALWAYS LINEAR IN Spectra

ENERGY AND CROSS SECTION BETWEEN ANY TWO TABULATED POINTS. Spectra

Spectra

DATA IS READ AND LINEARIZED A PAGE AT A TIME (ONE PAGE CONTAINS Spectra

60000 DATA POINTS). IF THE FINAL LINEARIZED SECTION CONTAINS TWO Spectra

PAGES OR LESS, DATA POINTS IT WILL BE ENTIRELY CORE RESIDENT Spectra

AFTER IT HAS BEEN LINEARIZED AND WILL BE WRITTEN DIRECTLY FROM Spectra

CORE TO THE OUTPUT TAPE. IF THE LINEARIZED SECTION IS LARGER THAN Spectra

TWO PAGES, AFTER EACH PAGE IS LINEARIZED IT WILL BE WRITTEN TO Spectra

SCRATCH. AFTER THE ENTIRE SECTION HAS BEEN LINEARIZED IT WILL Spectra

BE READ BACK FROM SCRATCH, TWO PAGES AT A TIME, AND WRITTEN TO Spectra

THE OUTPUT TAPE. Spectra

Spectra

KEEP EVALUATED DATA POINTS Spectra

-------------------------- Spectra

SOMETIMES IT IS CONVENIENT TO KEEP ALL ENERGY POINTS WHICH WERE Spectra

PRESENT IN THE ORIGINAL EVALUATION AND TO MERELY SUPPLEMENT THESE Spectra

POINTS WITH ADDITIONAL ENERGY POINTS IN ORDER TO LINEARIZE THE Spectra

CROSS SECTIONS. FOR EXAMPLE, IT IS OFTEN CONVENIENT TO KEEP THE Spectra

THERMAL VALUE (AT 0.0253 EV) OR THE VALUE AT 14.1 MEV. Spectra

Spectra

THE CURRENT VERSION OF THIS PROGRAM WILL ALLOW THE USER TO KEEP Spectra

ALL ORIGINAL EVALUATED DATA POINTS BY SPECIFYING 1 IN COLUMNS Spectra

34-44 OF THE FIRST INPUT LINE. THIS WILL TURN OFF THE BACKWARD Spectra

THINNING (SEE UCRL-50400, VOL. 17, PART A FOR EXPLANATION) AND Spectra

RESULT IN ALL ORIGINAL ENERGY POINTS BEING KEPT. CAUTION SHOULD Spectra

BE EXERCISED IN USING THIS OPTION SINCE IT CAN RESULT IN A Spectra

CONSIDERABLE INCREASE IN THE NUMBER OF DATA POINTS OUTPUT BY Spectra

THIS CODE. Spectra

Spectra

FOR ALL USERS WHO ARE NOT INTERESTED IN THIS OPTIONS NO CHANGES Spectra

ARE REQUIRED IN THE INPUT TO THIS PROGRAM, I. E. IF COLUMNS Spectra

34-44 ARE BLANK (AS FOR ALL PREVIOUS VERSIONS OF THIS CODE) THE Spectra

PROGRAM WILL OPERATE EXACTLY AS IT DID BEFORE. Spectra

Spectra

ALLOWABLE ERROR Spectra

--------------- Spectra

ALLOWABLE ERROR MUST ALWAYS BE SPECIFIED IN THE INPUT TO THIS Spectra

PROGRAM AS A FRACTION, NOT A PER-CENT. FOR EXAMPLE, INPUT THE Spectra

ALLOWABLE FRACTIONAL ERROR 0.001 IN ORDER TO OBTAIN DATA THAT IS Spectra

ACCURATE TO WITHIN 0.1 PER-CENT. Spectra

Spectra

THE CONVERSION OF THE DATA FROM THE GENERAL INTERPOLATION FORM TO Spectra

LINARLY INTERPOLABLE FORM CANNOT BE PERFORMED EXACTLY. HOWEVER, IT Spectra

CAN BE PERFORMED TO VIRTUALLY ANY REQUIRED ACCURACY AND MOST Spectra

IMPORTANTLY CAN BE PERFORMED TO A TOLERANCE THAT IS SMALL COMPARED Spectra

TO THE UNCERTAINTY IN THE CROSS SECTIONS THEMSELVES. AS SUCH THE Spectra

CONVERSION OF CROSS SECTIONS TO LINEARLY INTERPOLABLE FORM CAN BE Spectra

PERFORMED WITH ESSENTIALLY NO LOSE OF INFORMATION. Spectra

Spectra

THE ALLOWABLE ERROR MAY BE ENERGY INDEPENDENT (CONSTANT) OR ENERGY Spectra

DEPENDENT. THE ALLOWABLE ERROR IS DESCRIBED BY A TABULATED Spectra

FUNCTION OF UP TO 20 (ENERGY,ERROR) PAIRS AND LINEAR INTERPOLATION Spectra

BETWEEN TABULATED POINTS. IF ONLY ONE TABULATED POINT IS GIVEN THE Spectra

ERROR WILL BE CONSIDERED CONSTANT OVER THE ENTIRE ENERGY RANGE. Spectra

WITH THIS ENERGY DEPENDENT ERROR ONE MAY OPTIMIZE THE OUTPUT FOR Spectra

ANY GIVEN APPLICATION BY USING A SMALL ERROR IN THE ENERGY RANGE Spectra

OF INTEREST AND A LESS STRINGENT ERROR IN OTHER ENERGY RANGES. Spectra

Spectra

DEFAULT ALLOWABLE ERROR Spectra

----------------------- Spectra

IN ORDER TO INSURE CONVERGENCE OF THE LINEARIZING ALGORITHM THE Spectra

ALLOWABLE ERROR MUST BE POSITIVE. IF THE USER INPUTS AN ERROR Spectra

THAT IS NOT POSITIVE IT WILL AUTOMATICALLY BE SET TO THE DEFAULT Spectra

VALUE (CURRENTLY 0.001, CORRESPONDING TO 0.1 PER-CENT) AND Spectra

INDICATED AS SUCH IN THE OUTPUT LISTING. Spectra

Spectra

COULOMB PENETRABILITY (INTERPOLATION LAW = 6) Spectra

-------------------------------------------- Spectra

INTRODUCED FOR ENDF/B-VI. THIS IS DEFINED AS, Spectra

Spectra

SIG(E) = C1\*EXP(-C2/SQRT(E - T)) Spectra

Spectra

THIS PROGRAM ONLY CONSIDERS EXOTHERMIC REACTIONS - T = 0 Spectra

Spectra

SIG(E) = C1\*EXP(-C2/SQRT(E)) Spectra

Spectra

WARNING...THIS INTERPOLATION LAW SHOULD ONLY BE USED FOR REACTIONS Spectra

WHICH HAVE A POSITIVE Q-VALUE (EXOTHERMIC REACTIONS), Spectra

SINCE HERE WE ONLY CONSIDER T = 0.0 IN THE FORMALISM. Spectra

IN ALL OTHER CASES A WARNING MESSAGE WILL BE PRINTED. Spectra

Spectra

INPUT FILES Spectra

----------- Spectra

UNIT DESCRIPTION Spectra

---- ----------- Spectra

2 INPUT LINES (BCD - 80 CHARACTERS/RECORD) Spectra

10 ORIGINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD) Spectra

Spectra

OUTPUT FILES Spectra

------------ Spectra

UNIT DESCRIPTION Spectra

---- ----------- Spectra

3 OUTPUT REPORT (BCD - 120 CHARACTERS/RECORD) Spectra

11 FINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD) Spectra

Spectra

SCRATCH FILES Spectra

------------- Spectra

UNIT DESCRIPTION Spectra

---- ----------- Spectra

12 SCRATCH FILE (BINARY - 180000 WORDS/RECORD Spectra

Spectra

OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILEIO) Spectra

---------------------------------------------------- Spectra

UNIT FILE NAME Spectra

---- ---------- Spectra

2 SPECTRA.INP Spectra

3 SPECTRA.LST Spectra

10 ENDFB.IN Spectra

11 ENDFB.OUT Spectra

12 (SCRATCH) Spectra

Spectra

Spectra

INPUT PARAMETERS Spectra

---------------- Spectra

FOR VERSIONS EARLIER THAN 90-1 THIS PROGRAM ONLY ALLOWED THE USER Spectra

TO SPECIFY BY INPUT PARAMETERS WHICH MATERIALS (MAT) TO PROCESS. Spectra

FOR EACH REQUESTED MATERIAL NEUTRON INTERACTION CROSS SECTIONS Spectra

(MF=3) WOULD BE LINEARIZED AND THE REMAINDER OF THE MATERIAL Spectra

WOULD BE COPIED. Spectra

Spectra

FOR VERSIONS 90-1 AND LATER THIS PROGRAM WILL ALLOW THE USER TO Spectra

TO SPECIFY BY INPUT PARAMETERS EXACTLY WHAT SECTIONS OF DATA Spectra

TO PROCESS. FOR EACH SECTION OF DATA, SPECIFIED BY MAT, MF, MT Spectra

RANGES, SECTIONS OF MF=3, 23 AND 27 WILL BE LINEARIZED AND ALL Spectra

OTHER REQUESTED SECTIONS WILL BE COPIED. ALL SECTIONS WHICH ARE Spectra

NOT EXPLICITLY REQUESTED WILL BE SKIPPED AND WILL NOT APPEAR ON Spectra

ENDF/B FILE OUTPUT BY THIS PROGRAM. Spectra

Spectra

WITH THIS NEW PROCEDURE YOU CAN MINIMIZE THE SIZE OF THE ENDF/B Spectra

FILE OUTPUT BY THIS PROGRAM, E.G., IF YOU ONLY WANT NEUTRON Spectra

CROSS SECTIONS FOR SUBSEQUENT PROCESSING YOU NEED ONLY REQUEST Spectra

ONLY MF=3 DATA. Spectra

Spectra

HOWEVER, YOU MUST UNDERSTAND THAT ONLY THOSE SECTIONS WHICH YOU Spectra

EXPLICITLY REQUEST WILL APPEAR ON THE ENDF/B FILE OUTPUT BY Spectra

THIS PROGRAM. FOR EXAMPLE, IF YOU WISH TO DOCUMENT EXACTLY Spectra

HOW YOU LINEARIZED THE DATA BY INCLUDING COMMENTS IN MF=1, MT=451 Spectra

THEN YOU MUST EXPLICITLY REQUEST THAT MF=1, MT=451 BE PROCESSED Spectra

FOR EACH MATERIAL THAT YOU REQUEST. SIMILAR IF YOU WANT THE Spectra

ENTIRE EVALUATION YOU MUST REQUEST ALL MF AND MT TO BE OUTPUT. Spectra

Spectra

LINE COLS. DESCRIPTION Spectra

---- ----- ----------- Spectra

1 1-11 SELECTION CRITERIA (0=MAT, 1=ZA) Spectra

12-22 MONITOR MODE SELECTOR Spectra

= 0 - NORMAL OPERATION Spectra

= 1 - MONITOR PROGRESS OF LINEARIZING OF THE DATA. Spectra

EACH TIME A PAGE OF DATA POINTS IS WRITTEN TO Spectra

THE SCRATCH FILE PRINT OUT THE TOTAL NUMBER OF Spectra

POINTS ON SCRATCH AND THE LOWER AND UPPER Spectra

ENERGY LIMITS OF THE PAGE (THIS OPTION MAY BE Spectra

USED IN ORDER TO MONITOR THE EXECUTION SPEED Spectra

OF LONG RUNNING JOBS). Spectra

23-33 MINIMUM CROSS SECTION OF INTEREST (BARNS). Spectra

(IF 0.0 OR LESS IS INPUT THE PROGRAM WILL Spectra

USE 1.0E-10). ENERGY INTERVALS WILL NOT BE Spectra

SUB-DIVIDED IF THE ABSOLUTE VALUE OF THE CROSS Spectra

SECTION WITHIN THE INTERVAL IS LESS THAN THIS VALUE. Spectra

AN EXCEPTION TO THIS RULE IS NEAR THRESHOLDS ENERGY Spectra

INTERVALS WILL BE SUB-DIVIDED UNTIL CONVERGENCE Spectra

REGARDLESS OF THE MAGNITUDE OF THE CROSS SECTION. Spectra

34-44 KEEP ORIGINAL EVALUATED DATA POINTS. Spectra

= 0 - NO. Spectra

= 1 - YES - ADDITIONAL POINTS MAY BE ADDED IN ORDER Spectra

TO LINEARIZE DATA, BUT ALL ORIGINAL Spectra

DATA POINTS WILL BE INCLUDED IN THE Spectra

RESULTS. Spectra

2 1-72 ENDF/B INPUT DATA FILENAME Spectra

(STANDARD OPTION = ENDFB.IN) Spectra

3 1-72 ENDF/B OUTPUT DATA FILENAME Spectra

(STANDARD OPTION = ENDFB.OUT) Spectra

4-N 1- 6 LOWER MAT OR ZA LIMIT Spectra

7- 8 LOWER MF LIMIT Spectra

9-11 LOWER MT LIMIT Spectra

12-17 UPPER MAT OR ZA LIMIT Spectra

18-19 UPPER MF LIMIT Spectra

20-22 UPPER MT LIMIT Spectra

UP TO 100 RANGES MAY BE SPECIFIED, ONLY ONE RANGE Spectra

PER LINE. THE LIST OF RANGES IS TERMINATED BY A Spectra

BLANK LINE. IF THE UPPER MAT LIMIT OF ANY REQUEST Spectra

IS LESS THAN THE LOW LIMIT IT WILL BE SET EQUAL TO Spectra

THE LOWER LIMIT. IF THE UPPER LIMIT IS STILL ZERO Spectra

IT WILL BE SET EQUAL TO 999999. IF THE UPPER MF OR Spectra

MT LIMIT IS ZERO IT WILL BE SET TO 99 OR 999 Spectra

RESPECTIVELY. Spectra

VARY 1-11 ENERGY FOR ERROR LAW Spectra

12-22 ALLOWABLE FRACTIONAL ERROR FOR ERROR LAW. Spectra

THE ACCEPTABLE LINEARIZING ERROR MAY BE SPECIFIED TO Spectra

BE EITHER ENERGY INDEPENDENT (DEFINED BY A SINGLE Spectra

ERROR), OR ENERGY DEPENDENT (DEFINED BY UP TO 20 Spectra

ENERGY, ERROR PAIRS). FOR THE ENERGY DEPENDENT CASE Spectra

LINEAR INTERPOLATION WILL BE USED TO DEFINE THE ERROR Spectra

AT ENERGIES BETWEEN THOSE AT WHICH IT IS TABULATED. Spectra

IN ALL CASES THE ERROR LAW IS TERMINATED BY A BLANK Spectra

LINE. IF ONLY ONE ENERGY, ERROR PAIR IS GIVEN THE Spectra

THE LAW WILL BE CONSIDERED TO BE ENERGY INDEPENDENT. Spectra

IF MORE THAN ONE PAIR IS GIVEN IT WILL BE CONSIDERED Spectra

TO BE ENERGY DEPENDENT (NOTE, ENERGY INDEPENDENT Spectra

FORM WILL RUN FASTER THAN THE EQUIVALENT ENERGY Spectra

DEPENDENT FORM). FOR AN ENERGY DEPENDENT ERROR LAW Spectra

ALL ENERGIES MUST BE ASCENDING ENERGY ORDER. FOR Spectra

CONVERGENCE OF THE LINEARIZING ALGORITHM ALL ERRORS Spectra

MUST BE POSITIVE. IF AN ALLOWABLE ERROR IS NOT Spectra

POSITIVE IT WILL BE SET EQUAL TO THE STANDARD OPTION Spectra

(CURRENTLY 0.001, CORRESPONDING TO 0.1 PER-CENT). Spectra

IF THE FIRST ERROR LINE IS BLANK IT WILL TERMINATE Spectra

THE ERROR LAW AND THE ERROR WILL BE TREATED AS Spectra

ENERGY INDEPENDENT, EQUAL TO THE STANDARD OPTION Spectra

(CURRENTLY 0.1 PER-CENT). (SEE EXAMPLE INPUT 4). Spectra

Spectra

EXAMPLE INPUT NO. 1 Spectra

------------------- Spectra

RETRIEVE DATA BY ZA IN ORDER TO FIND ALL URANIUM ISOTOPES AND Spectra

THORIUM 232. RETRIEVE ALL NEUTRON INTERACTION CROSS SECTIONS Spectra

(MF=3). ALL ENERGY INTERVALS IN WHICH THE CROSS SECTION IS Spectra

AT LEAST 1 MICRO-BARN (1.0E-06 BARNS) WILL BE SUBDIVIDED. Spectra

BACKWARD THINNING WILL BE PERFORMED. FROM 0 TO 100 EV LINEARIZE Spectra

TO WITHIN 0.1 PER-CENT ACCURACY. FROM 100 EV TO 1 KEV VARY Spectra

ACCURACY BETWEEN 0.1 AND 1.0 PER-CENT. ABOVE 1 KEV USE 1 Spectra

PER-CENT ACCURACY. Spectra

Spectra

EXPLICITLY SPECIFY THE STANDARD FILENAMES. Spectra

Spectra

IN THIS CASE THE FOLLOWING 11 INPUT LINES ARE REQUIRED Spectra

Spectra

1 0 1.00000- 6 0 Spectra

ENDFB.IN Spectra

ENDFB.OUT Spectra

92000 3 0 92999 3999 Spectra

90232 3 0 0 3 0 (UPPER LIMIT AUTOMATICALLY SET TO 90232 3999) Spectra

(END OF REQUEST LIST) Spectra

0.00000+ 0 1.00000-03 Spectra

1.00000+ 2 1.00000-03 Spectra

1.00000+ 3 1.00000-02 Spectra

1.00000+ 9 1.00000-02 Spectra

(END OF ERROR LAW) Spectra

Spectra

EXAMPLE INPUT NO. 2 Spectra

------------------- Spectra

SAME AS THE ABOVE CASE, EXCEPT LINEARIZE ALL DATA TO WITHIN THE Spectra

STANDARD ACCURACY (CURRENTLY 0.1 PER-CENT). IN ORDER TO USE THE Spectra

STANDARD ACCURACY YOU NEED NOT SPECIFY ANY ERROR LAW AT ALL. IN Spectra

THIS CASE INCLUDE THE HOLLERITH SECTION, MF=1, MT=451, FOR EACH Spectra

MATERIAL. Spectra

Spectra

LEAVE THE DEFINITION OF THE FILENAMES BLANK - THE PROGRAM WILL Spectra

THEN USE STANDARD FILENAMES. Spectra

Spectra

IN THIS CASE THE FOLLOWING 9 INPUT LINES ARE REQUIRED Spectra

Spectra

1 0 1.00000- 6 0 Spectra

(USE DEFAULT FILENAME = ENDFB.IN) Spectra

(USE DEFAULT FILENAME = ENDFB.OUT) Spectra

92000 1451 92999 1451 Spectra

92000 3 0 92999 3999 Spectra

90232 1451 0 1451 Spectra

90232 3 0 0 3 0 (UPPER LIMIT AUTOMATICALLY SET TO 90232 3999) Spectra

(END OF REQUEST LIST) Spectra

(0.1 PER-CENT ERROR, END OF ERROR LAW) Spectra

Spectra

EXAMPLE INPUT NO. 3 Spectra

------------------- Spectra

LINEARIZE ALL MATERIALS ON AN ENDF/B TAPE TO WITHIN AN ACCURACY Spectra

OF 0.5 PER-CENT (0.005 AS A FRACTION). IN THIS CASE YOU NEED NOT Spectra

SPECIFY THE MAT, MF, MT RANGES. Spectra

Spectra

READ THE ENDF/B DATA FROM \ENDFB6\ZA092238 AND WRITE THE ENDF/B Spectra

DATA TO \ENDFB6\LINEAR\ZA092238. Spectra

Spectra

IN THIS CASE THE FOLLOWING 6 INPUT LINES ARE REQUIRED Spectra

Spectra

(MAT, 1.0E-10 BARNS, THIN) Spectra

\ENDFB6\ZA092238 Spectra

\ENDFB6\LINEAR\ZA092238 Spectra

(RETRIEVE ALL DATA, END REQUEST LIST) Spectra

5.00000-03 Spectra

(END OF ERROR LAW) Spectra

Spectra

NOTE THAT IN THIS CASE IF THE INPUT HAD SPECIFIED AN EQUIVALENT Spectra

ENERGY DEPENDENT ERROR LAW BY GIVING A NUMBER OF ENERGY POINTS Spectra

AT EACH OF WHICH THE ERROR IS 0.5 PER-CENT THE PROGRAM WOULD TAKE Spectra

LONGER TO RUN (I.E., ONLY USE AN ENERGY DEPENDENT ERROR LAW WHEN Spectra

IT IS NECESSARY). Spectra

Spectra

EXAMPLE INPUT NO. 4 Spectra

------------------- Spectra

IN ORDER TO LINEARIZE ALL MATERIALS ON AN ENDF/B TAPE TO THE Spectra

STANDARD OPTION OF 0.1 PER-CENT IT IS ADEQUATE TO INPUT A SET Spectra

OF COMPLETELY BLANK LINES WHICH WILL AUTOMATICALLY INVOKE ALL Spectra

OF THE STANDARD OPTIONS. Spectra

Spectra

LEAVE THE DEFINITION OF THE FILENAMES BLANK - THE PROGRAM WILL Spectra

THEN USE STANDARD FILENAMES. Spectra

Spectra

IN THIS CASE THE FOLLOWING THREE INPUT LINES ARE REQUIRED Spectra

Spectra

(MAT, 1.0E-10 BARNS, THIN) Spectra

(USE DEFAULT FILENAME = ENDFB.IN) Spectra

(USE DEFAULT FILENAME = ENDFB.OUT) Spectra

(RETRIEVE ALL DATA, END REQUEST LIST) Spectra

(0.1 PER-CENT ERROR, END OF ERROR LAW) Spectra

Spectra

======================================================================= Spectra