

APPENDIX A. VERSIONS OF THIS MANUAL

(This page is taken from the Introduction to the original document ORNL/TM-9179, published in 1984, with ~~strikeouts~~ and {inserts} to clarify topics that might otherwise cause confusion.)

In 1980 the multilevel multichannel R-matrix code SAMMY [NL80] was released for use in analysis of neutron data at the Oak Ridge Electron Linear Accelerator (ORELA). At its inception, SAMMY was a severely altered version of George Auchampaugh's multilevel R-matrix code MULTI [GA74], the fundamental difference being that SAMMY uses Bayes' method while MULTI uses a least-squares method to update parameter values. Since that time, significant modifications and improvements have been incorporated into SAMMY: (1) User-friendly options have been introduced to streamline common operations and to protect a run from common user errors. (2) The Reich-Moore formalism has been extended to include an optional logarithmic parameterization of the external R-matrix, for which any or all parameters may be varied. (3) The ability to vary sample thickness, effective temperature, matching radius, and/or resolution-broadening parameters has been incorporated. (4) To avoid loss of information (i.e., computer round-off errors) between runs, the "covariance file" now includes precise values for all variables. (5) Unused but correlated variables may be included in the analysis.

Because of these and earlier changes, the 1980 SAMMY manual is now hopelessly obsolete. This report is intended to be complete documentation for the current version of SAMMY. Its publication in ~~loose leaf form~~ {pdf format} will permit updates to the manual to be made concurrently with updates to the code itself, thus eliminating most of the time lag between update and documentation.

Because Bayes' method is a new concept to many users, its derivation and implementation are described in some detail in Section ~~H~~ {IV} of this report. Though a similar discussion is included in both the earlier SAMMY report [NL80] and the BAYES report [NL82], it is repeated here for completeness sake.

The evaluation of theoretical cross sections is described in Section ~~III~~ {II}. Doppler- and resolution-broadening are discussed in Section ~~IV~~ {III}. ~~Special data types (such as transmission or combinations) are discussed in Section V.~~

Section VI describes the input to SAMMY, with tables detailing each file the user must create. A discussion of the output is given in Section VII.

In Section ~~VIII~~ {X.C} the auxiliary codes ~~SAMADD and SAMMIX~~ are {SAMAMR is} described: ~~these codes are~~ {this code is} to be used in conjunction with SAMMY when multiple experiments are analyzed sequentially.

~~Two examples of SAMMY runs are presented in Section IX; these runs are typical of runs required for analysis of transmission and fission data.~~

“Helpful hints for running SAMMY” are given in Section ~~X~~ {XI}. ~~It is hoped that this section can be considerably expanded in the future: ideas from users would be appreciated here.~~
{ This section was completely rewritten for Revision 7. }

Section ~~XI~~ {XIII} gives a general description of the computer code, more for the benefit of someone wishing to convert SAMMY to another computer than for a physicist wishing to use SAMMY to perform data analyses.

~~A FORTRAN listing of the code is provided in the appendix in microfiche form. Input and output for several test cases are also given there.~~