X. AUXILIARY PROGRAMS

A number of "auxiliary" programs, not an integral part of SAMMY itself, are designed to be used in conjunction with SAMMY. These programs manipulate SAMMY PARameter and/or COVariance files, aid in interpreting or illustrating SAMMY input or output, or offer a means of comparing SAMMY results with other calculations. The codes are listed in alphabetical order in Table X.1, which also provides a brief description of the purpose of the code, and the section number in which details can be found.

Table X.1. SAMMY auxiliary codes

Code name	Description	Section
ANGODF	Convert PLOT file from energy/angle to angle/energy	X.A
CONVRT	Convert from REFIT input to SAMMY or vice versa	X.B
SAMAMR	Add, mix, or recover variables in COVariance file	X.C
SAMAMX	Alter the value of one non-varied parameter in the COVariance file after completion of an analysis	X.D
SAMCPR	Compare SAMMY calculations to those from other sources	X.E
SAMDIS	Calculate statistical distributions for resonance parameters	X.F
SAMFTZ	Modify the experimental energies with t_0 and L_0	X.G
SAMGY2	Smooth the Y_2 function for multiple-scattering calculations	X.R
SAMORT	Plot the ORR resolution function	X.H
SAMPLT	Alternative form for plot files	X.I
SAMQUA	Generate resonance quantum numbers for particle pairs	X.J
SAMRML	Read ENDF File 2; calculate cross sections and derivatives	X.Q
SAMRPT	Plot RPI resolution function	X.K
SAMRST	Plot Gaussian plus exponential resolution function	X.L
SAMSMC	Monte Carlo calculation of multiple scattering corrections	X.M
SAMSTA	Generate staircase plots of resonance widths	X.N
SAMTHN	Thin experimental data	X.O
SUGGEL	Estimate quantum numbers for resonances	X.P

When angular distribution data are analyzed, results are reported in an ODF file [JC78] from which plots of energy vs. cross section at a fixed angle can be made. To plot angle vs. cross section at fixed energy, it is necessary to reorganize the ODF file; this reorganization is accomplished with program ANGODF, discussed in Section X.A.

The task of converting from REFIT to SAMMY input can be eased by use of program CONVRT, discussed in Section X.B.

In Section X.C the program SAMAMR is described; this program is used to rearrange PARameter and COVariance files to facilitate analyses of disparate data sets with the same resonance parameter set. (Note that SAMAMR replaces the two codes SAMADD and SAMMIX described in early versions of this report.)

Program SAMAMX is used to alter the value of one non-varied parameter in the covariance file after completion of an analysis. See Section X.D.

For assistance in comparing results of calculations performed by different computer codes, use program SAMCPR; see Section X.E for details.

Program SAMDIS (elsewhere named SAMDIST) is used for calculating statistical distributions for R-matrix resonance parameters; see ref. [LL95]. Level spacing distributions are calculated according to the Wigner distribution law, distributions for widths are calculated via χ^2 distributions, and long-range correlations of the energies are tested via the Δ_3 statistic of Mehta-Dyson. A summary of features of this code is given in Section X.F, along with recent modifications of the input to the code.

Program SAMFTZ is used to modify the experimental energies in a DATa file, in order to align them more accurately with other experimental data. See Section X.G for details.

Program SAMORT, described in Section X.H, is used for plotting the components of the Oak Ridge resolution function. Similar plots can be made for the RPI resolution function using program SAMRPT (Section X.K) and of the original Gaussian plus exponential resolution function (Section X.L).

Program SAMPLT, which provides an alternative methodology for generating plots, is discussed in Section X.I. (Note: This program has been renamed from SAMBIN.)

Quantum numbers can be generated using program SAMQUA, described in Section X.J. This program has recently been updated by Olivier Bouland et al. [OB03] to include more complicated cases.

Program SAMSMC may be used for Monte Carlo calculations of the self-shielding and multiple-scattering corrections to capture and fission yields. See Section X.M.

The program SAMSTA, described in Section X.N, is used to create a file from which "staircase plots" of the resonance from a SAMMY PARameter file can be generated.

Section X.O describes program SAMTHN, a simple program for averaging data files used as input to SAMMY runs.

Soo Youl Oh and Luiz Leal's SUGGEL code, used to provide initial estimates for the quantum numbers of resonances, is described in Section X.P.

Section X.Q describes SAMRML, a program designed as an aid for people wishing to implement the ENDF File 2 LRU=1 LRF=7 format. This code calculates cross sections and derivatives as SAMMY does but without the considerable overhead relating to comparisons to experimental data.

Program SAMY2C reads double-plus scattering corrections as generated by SAMSMC and smooths them for use in place of the SAMMY-generated values in future SAMMY calculations. Details are given in Section III.D and in Section X.R.