VI.F.1. The AVeraGe File

In Section V.C, descriptions are given of the way SAMMY can be used to produce energy-averaged, time-averaged, Bondarenko-averaged, or unweighted energy-averaged cross sections and the associated covariance matrix. To invoke these options, alphanumeric command lines must be included in the INPut file. For energy- or time-averaging (Section V.C.1), the command is

```
AVERAGE OVER ENERGY ranges.
```

For Bondarenko averaging, the command is

```
GROUP AVERAGE OVER Energy ranges, or
BONDARENKO AVERAGE Over energy ranges.
```

For unweighted energy-averaging, the command is

```
UNWEIGHTED ENERGY Average, or
ENERGY-AVERAGE USINg constant flux
```

One or more additional files are required, which are denoted the AVG (AVeraGe) files or BON (BONdarenko) files; their names are given to SAMMY as interactive input (see Table VI E .1), directly following the name of the first data file, or, if a COVariance file is used, directly after the name of the COVariance file . Formats for AVG files are given in Table VI F1.1, and for the BON files in Table VI F1.2. The two types of files follow very much the same format, except the BON files require additional input parameter values. For unweighted energy-averaging, either file may be used (the "TYPE" line is ignored).

For all types of multigroup averaging, it is possible to print the partial derivatives (sensitivities) of the multigroup cross sections with respect to the resonance parameters and to print the associated multigroup covariance matrix. The command

```
PRINT AVERAGED SENSItivities for endf parameters
```

will cause the creation of several files, all in ASCII format:

SAMAVG.COV contains the multigroup covariance matrix.

SAMSEN.DAT contains partial derivatives of all multigroup cross sections with respect to resonance parameters of the five lowest-lying resonances. These derivatives are with respect to the *p*-parameters (see Section IV.C) rather than *u*-parameters, that is, with respect to the "endf parameters" as suggested in the command line.

SAMMY.LLL contains the same information as the multigroup-average portion of the SAMMY.LPT file, but in reverse energy order to facilitate comparison with results from some processor codes.

SAMMY.MGS contains the multigroup cross section (and nothing else), again in reverse energy order, to facilitate porting to spreadsheets for comparisons with output from other codes.

Table VI F1.1. Format of the AVG file

Line Number	Col-umn	Variable Name	Format	Meaning (units)	Possible Values	Notes
1	1-80	TITLE	A80			
2	1-10	TYPE	A10	Type of averaging to be used	"`ENERGY-AVErage`" or "`TIME-AVERAge`"	energy- or time- average
3	1-10	EMIN	F10	Minimum energy for this range (eV)		
	11-20	EMAX	F10	Maximum energy for this range (eV)		If EMAX = 0, use EMAX equal to the value given for EMIN on the next line
4, 5, ...	(repeat line 3 as many times as needed)					
last	(blank)					

Table VI F1.2. Format of the BONdarenko file

Line Number	Col-umn	Variable Name	For-mat	Meaning (units)	Possible Values	Notes
1	1-80	TITLE	A80			
2	1-10	TYPE	A10	Type of averaging to be used	"BONDA RENKO"	Currently this is the only option; others may be added later
3	1-10	EMIN	F10	Minimum energy for this range (eV)		
	11-20	EMAX	F10	Maximum energy for this range (eV)		If EMAX = 0, use EMAX equal to the value given for EMIN on the next line
4,5,...	(repeat Line 3 as many times as needed)					
6	(blank)					
7	1-10	TYPE	A10	Type of parameters to be used	"BONDA RENKO"	Again this is the only option; others may be added later
8	1-10	EBONDA(1)	F10	Energy (eV)		
	11-20	BONDAR(1)	F10	Value of $C(E)$ at E = EBONDA(1)		Eq. (VC2.2)
	21-30	SIG000	F10	σ_0		Eq. (VC2.2)
9	1-10	EBONDA(2)	F10	Energy (eV)		
	11-20	BONDAR(2)	F10	Value of $C(E)$ at E = EBONDA(2)		
10, 11,...	(Repeat line 9 as many times as needed. Value of $C(E)$ is interpolated linearly between the points specified.)					
last	(blank)					