

VI.C.3. Implicit Data Covariance (IDC) Matrices

The data-reduction process, which is generally performed by the experimentalist who measured the data, includes background subtraction and normalization, as well as other corrections (for deadtime, self-shielding, etc.). This process introduces systematic errors, which lead to an off-diagonal data covariance matrix (DCM). This off-diagonal portion of the DCM should be included along with the diagonal portion (statistical errors) in the analysis process.

As described in Section IV (*The Fitting Procedure*) and, in particular, Section IV.D.3 (*Implicit Data Covariance Matrix*), it is possible for SAMMY to treat data covariances without actually ever generating, storing, or inverting the complete off-diagonal DCM. There are several possibilities for inputting the necessary information into SAMMY.

The Propagated Uncertainty Parameter (PUP) option is described in detail in Sections IV.D.1 and IV.D.2. Input for PUPs is discussed in Section VI.C.3.a.

A second option for input of data covariance information is for the user to externally generate the pieces g (derivatives with respect to data-reduction parameters) and m (covariance matrix for the data-reduction parameters) of the DCM. See Section VI.C.3.b for details.

Finally, in Section VI.C.3.c, SAMMY's original version of IDC methodology is discussed. Though this option is still available, in practice it provides the exact same results as the PUP method and is somewhat more awkward to use.