

### IV.B.3. Solving Bayes' Equations: M+W Inversion Scheme

The non-iterative form of Bayes' equations for the M+W inversion scheme can be written

$$P' - P = M' Y \quad , \quad (\text{IV B3.1})$$

with  $Y$  defined as

$$Y = G' V^{-1} (D - T) \quad , \quad (\text{IV B3.2})$$

and

$$M' = (M^{-1} + W)^{-1} \quad (\text{IV B3.3})$$

where  $W$  is given by

$$W = G' V^{-1} G \quad . \quad (\text{IV B3.4})$$

The inverse of  $M$  is relatively easy to obtain. Initially  $M$  is generally diagonal, so the inverse is trivial. After the initial step,  $M$  is no longer diagonal but the inverse is already known from Eq.(IV B3.3) at the previous step.

The solution of Eqs. (IV B3.1) through (IV B3.4) is found from LINPACK [JD79] routines, in the same manner as the solution is found for the N+V inversion scheme.

For calculations in the unresolved resonance region (URR), M+W is the method used.

In the resolved resonance region (RRR), the M+W inversion scheme is not yet as fully integrated into SAMMY as are the I+Q and N+V methods. In the RRR, the M+W scheme currently may be used in a limited fashion, requiring several distinct SAMMY runs to complete the process. The M+W scheme was first employed as a means of retroactively producing an approximate covariance matrix for an existing set of resonance parameters, but now has other uses as well. See Section IV.E for a discussion of retroactive parameter covariance matrices, and for other topics related to covariance matrices.