$$\tilde{\mathbf{m}}_i = \frac{1}{n_i} \sum_{\mathbf{y} \in \mathcal{Y}_i} \mathbf{y}$$

$$\tilde{\mathbf{m}} = \frac{1}{n} \sum_{i=1}^{c} n_i \tilde{\mathbf{m}}_i$$

$$\tilde{\mathbf{S}}_W = \sum_{i=1}^{c} \sum_{\mathbf{y} \in \mathcal{Y}_i} (\mathbf{y} - \tilde{\mathbf{m}}_i)(\mathbf{y} - \tilde{\mathbf{m}}_i)^t$$

and

$$\tilde{\mathbf{S}}_B = \sum_{i=1}^{c} n_i (\tilde{\mathbf{m}}_i - \tilde{\mathbf{m}})(\tilde{\mathbf{m}}_i - \tilde{\mathbf{m}})^t,$$