We can now use Equation (2) to derive the variance of the predicted energies. The predicted energy $\hat{E}_i$ of structure $i$ is a linear function of the ECI

$$\hat{E}_i = \sum_{\alpha} X_{i\alpha} J^*_\alpha \equiv X_i \cdot J^*$$

where $J^*$ denotes the vector of the ECI times their respective multiplicities (i.e. $J^*_\alpha = m_\alpha J_{\alpha}$). The variance of a linear function of a random vector $J^*$ with known covariance matrix $V$ is given by:

$$\text{etc.}$$