

$$|\lambda_1 - \nu^{(k)}| \simeq \frac{\|\mathbf{r}^{(k)}\|_2}{|(\mathbf{w}^{(k)})^T \mathbf{q}^{(k)}|}, \quad k \geq 1, \quad (4.1.22)$$

where  $\mathbf{w}^{(k)}$  satisfies  $(\mathbf{w}^{(k)})^T \mathbf{A} = \nu^{(k)} (\mathbf{w}^{(k)})^T$ , and as  $k \rightarrow \infty$ ,  $\mathbf{w}^{(k)} \rightarrow \mathbf{w}$  and  $\mathbf{w}^T \mathbf{A} = \lambda_1 \mathbf{w}^T$  is the left eigenvector associated with  $\lambda_1$ .