Now $\mathbf{S_B w_i} = \lambda_i \mathbf{S_W w_i}$, since the columns of an optimal $\mathbf{W}$ are the generalized eigenvectors corresponding to the largest eigenvalues. Now we can find the eigenvalues as the roots of the characteristic polynomial

$$|\mathbf{S_B} - \lambda_i \mathbf{S_w}| = 0 \tag{61}$$

and solve

$$(\mathbf{S_B} - \lambda_i \mathbf{S_W})\vec{w_i} = 0 \tag{62}$$

for the eigenvectors $\vec{w_i}$.