

**5.11** In case of constant error, equation 5.36 becomes:

$$\frac{1}{2} \sum_i \lambda_i \alpha_i^2 = C \quad \text{where } C = E(\mathbf{w}) - E(\mathbf{w}^*)$$

$$\Rightarrow \sum_i \frac{\alpha_i^2}{(2C/\lambda_i)} = 1$$

which is similar to the equation of the ellipse as per source.

The lengths are given by  $(2C/\lambda_i)^{1/2}$ . It can be easily seen that they are inversely proportional to the square root of the corresponding eigenvalues  $\lambda_i$ .