

7.5 In exercise 7.4, we obtained the following 2 results:

$$\frac{1}{\rho^2} = \sum_{n=1}^N a_n$$

and

$$\|\mathbf{w}\|^2 = \frac{1}{\rho^2} = \sum_{n=1}^N \sum_{m=1}^N a_n a_m t_n t_m \phi(\mathbf{x}_n)^T \phi(\mathbf{x}_m)$$

Substituting these results into equation 7.10, we get:

$$\begin{aligned} \tilde{L}(\mathbf{a}) &= \frac{1}{\rho^2} - \frac{1}{2} \cdot \frac{1}{\rho^2} \\ &= \frac{1}{2\rho^2} \\ \implies \frac{1}{\rho^2} &= 2\tilde{L}(\mathbf{a}) \end{aligned}$$

which is the same as the result in 7.124.

We already proved 7.125 in exercise 7.4.