Solutions to exercise lecture 8

7.8 (*a*) From (7.113), the optimum weights are given by

$$\boldsymbol{\omega}_0 = \boldsymbol{R}_{yy}^{-1}\boldsymbol{R}_{ys}$$

Computing, we have $\boldsymbol{R}_{yy}^{-1} = \begin{bmatrix} 1.1456 & -0.5208 \\ -0.5208 & 1.1456 \end{bmatrix}$ and

$$\boldsymbol{\omega}_0 = \begin{bmatrix} \omega_{01} \\ \omega_{02} \end{bmatrix} = \begin{bmatrix} 1.1450 & -0.5208 \\ -0.5208 & 1.1456 \end{bmatrix}\begin{bmatrix} 0.5272 \\ -0.4458 \end{bmatrix} = \begin{bmatrix} 0.8360 \\ -0.7853 \end{bmatrix}$$

That is, $\omega_{01} = 0.8360$ and $\omega_{02} = -0.7853$

(*b*) From (7.105), the minimum mean-square error is

$$e_m = \sigma_s^2 - \boldsymbol{R}_{ys}^T\omega_0 - \omega_0^T\boldsymbol{R}_{ys} + \omega_0^T\boldsymbol{R}\omega_0$$

Substituting the values and computing, we obtain $e_m = 0.1579$.

Matlab exercise

http://person.hst.aau.dk/sschmidt/ST/BP_solution.m