Problem 10.1

(a) \[ P_{ss}(\omega) = \left| \frac{1}{1-ae^{-j\omega}} \right|^2 = \frac{1}{1+a^2 - 2a \cos \omega}. \] The sketch should show \( P_{ss}(0) = \frac{1}{1-2a+a^2}, \) \( P_{ss}(\pi) = \frac{1}{1+a^2}, \) and \( P_{ss}(\pi) = \frac{1}{1+2a+a^2}. \) For real-valued \( a \) between 0 ≤ \( a < 1, \) this is a lowpass spectrum.

(b) \( P_{vv}(\omega) = 1 \)

(c) \[ H(\omega) = \frac{P_{ss}(\omega)}{P_{ss}(\omega) + P_{vv}(\omega)} = \frac{1}{2+a^2 - 2a \cos \omega} \]

Matlab Exercises

Problem 10.2