

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Department of Electrical and Computer Engineering
ECE 498MH SIGNAL AND IMAGE ANALYSIS

Homework 10
Fall 2013

Assigned: Friday, November 22, 2013

Due: Friday, December 6, 2013

Reading:

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 $P_{ss}(0) = \frac{1}{1 - 2a + a^2}$, $P_{ss}(\frac{\pi}{2}) = \frac{1}{1 + a^2}$, and $P_{ss}(\pi) = \frac{1}{1 + 2a + a^2}$. For real-valued a between $0 \leq a < 1$, 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



