

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN  
Department of Electrical and Computer Engineering

ECE 498MH SIGNAL AND IMAGE ANALYSIS

**Homework 6**  
Fall 2013

Assigned: Friday, October 18, 2013

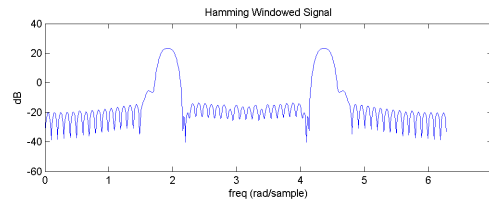
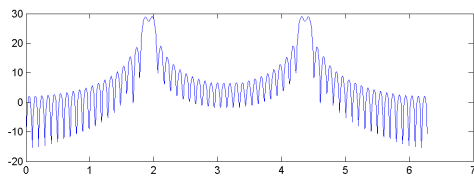
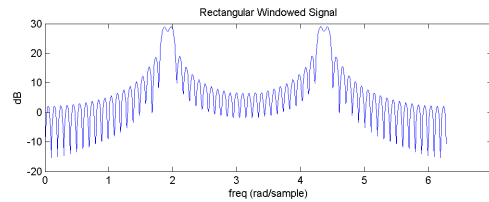
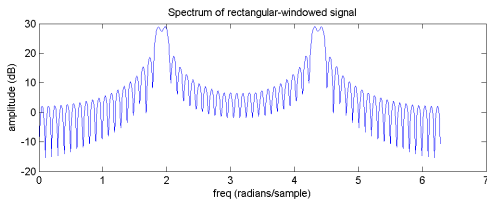
Due: Friday, November 1, 2013

Reading: SPF Chapters 7 and 8

**Problem 6.1**

(a)  $U(\omega) = \frac{1}{1-e^{-j\omega}}$ , (b)  $R(\omega) = \frac{\sin(\omega(2M+1)/2)}{\sin(\omega/2)}$ , (c)  $\omega_z = \frac{2\pi}{2M+1}$ ,  
 (d)  $R\left(\frac{3\pi}{2M+1}\right) = -\frac{1}{\sin\left(\frac{3\pi}{2M+1}\right)} \approx -\frac{2M+1}{3\pi} = -\frac{1}{3\pi}R(0)$

**Problem 6.2**



,

