
UNIVERSITY OF ILLINOIS
Department of Electrical and Computer Engineering
ECE 417 MULTIMEDIA SIGNAL PROCESSING

Lecture 5 Sample Problem Solutions

Problem 5.1

$$S_0(e^{j\omega}) = N \sum_{m=0}^{P-1} S_m \text{dsinc} \left(\omega - \frac{2\pi m}{P}, N \right) e^{-j(\frac{N-1}{2})(\omega - m\omega_0)}$$

Problem 5.2

$$S_f(e^{j\omega}) = \sum_{m=0}^{P-1} S_m e^{j\theta_{fm}} W(e^{j(\omega - m\omega_0)})$$

Problem 5.3

$$S_f(e^{j\omega}) = \frac{1}{P} \sum_{m=0}^{P-1} H(e^{jm\omega_0}) e^{j\theta_{fm}} W(e^{j(\omega - m\omega_0)})$$