ECEn 487 - Introduction to Digital Signal Processing

Winter 2013

Quiz 3

1. (2 pts) Suppose you have a signal $x_c(t) = \cos(2\pi \cdot 100t)$. Suppose you sample the signal at a period of $T = 10^{-3}$ seconds and get $x[n]$. What is the Discrete-Time Fourier Transform of $x[n]$?

2. (2 pts) Now, suppose you play back $x[n]$ at a rate of $T = 3 \times 10^{-3}$ with perfect reconstruction to get $r_c(t)$. What is $r_c(t)$?

3. (2 pts) Suppose you take $x[n]$ and you downsample it by a factor of 3 to get $y[n]$. What is the resulting Discrete-Time Fourier Transform of $y[n]$?

4. (2 pts) Suppose you take $x[n]$ and you upsample it by a factor of 4 to get $z[n]$. What is the resulting Discrete-Time Fourier Transform of $z[n]$?

5. (2 pts) Suppose that you sample $x_c(t)$ from Problem 1 at a rate of $T = 3 \times 10^{-1}$ to get $g[n]$. What is the resulting Discrete-Time Fourier Transform of $g[n]$?