

ECE-486 Homework 3, Spring 2009

1. Find the z-transforms of the following:

(a) $x(n) = \{\dots, 0, 0, 1, \underset{\uparrow}{1}, 1, 0, 0, \dots\}$

(b) $y(n) = \{\dots, -1, 1, -1, \underset{\uparrow}{1}, 0, 0, 0, \dots\}$

(c) $u(-n)$

(d) $(1/2)^{|n|}$

2. Find the inverse z-transform of the following:

$$\frac{z}{z-1} + \frac{z(z+4)}{z-2} - \frac{5}{z-3} + \frac{z^4}{z^2-16} \quad 2 < |z| < 3$$

3. A discrete-time causal system is described by

$$y(n] - 5y(n-1) + 2y(n-2) = 2.4x(n).$$

- Find the transfer function of the system (specify the ROC of your result).
- Draw the pole-zero diagram for this system.
- Is this a BIBO stable system?
- Find the impulse response of the system.