

Instruction: Work on this quiz individually. Do not share your answers with others. Submit your solution on the day of the final exam: Tuesday, December 16, 1997 at 3:30 pm.

1. (5 pts Total) Let

$$x(t) = e^{-12t}u(t) + e^{-t}u(-t).$$

- (a) (4 pts) Find the Laplace Transform and ROC of $x(t)$.
 (b) (1 pts) Does a $x(t)$ have a Fourier Transform? Explain.

2. (9 pts Total) Let

$$X(s) = \frac{74}{(s-4)(s+2-j)(s+2+j)}.$$

- (a) (3 pts) Determine all the possible ROCs for $X(s)$.
 (b) (6 pts) For each ROC, find the inverse Laplace Transform.

3. (6 pts Total) For each of the following LTI systems, determine whether is is (i) causal and (ii) stable.

(a) (2 pts)

$$H(s) = \frac{1}{(s-4)(s+2-j)(s+2+j)} \quad \text{ROC} : \text{Re}\{s\} > 4.$$

(b) (2 pts)

$$H(s) = \frac{(s-4j)(s+4j)(s-1-5j)(s-1+5j)}{(s+3-2j)(s+3+2j)(s+2-j)(s+2+j)(s+1)} \quad \text{ROC} : \text{Re}\{s\} > -1.$$

(c) (2 pts)

$$H(s) = \frac{(s-2)}{(s+3-2j)(s+3+2j)(s+2-j)(s+2+j)} \quad \text{ROC} : -3 < \text{Re}\{s\} < -2.$$