

ECE-205 Quiz #7

Problems 1-2 assume we have a system modeled with the transfer function

$$H(s) = \frac{(s+1)(s+2)}{s^2(s+4)}$$

- 1) This system model has how many **zeros**? a) 0 b) 1 c) 2 d) 3
- 2) This system model has how many **poles** (count all poles, not just distinct poles)?
a) 0 b) 1 c) 2 d) 3
- 3) How many terms will there be in the partial fraction expansion of $H(s) = \frac{s+1}{s^2(s+2)}$?
a) 0 b) 1 c) 2 d) 3
- 4) How many terms will there be in the partial fraction expansion of $H(s) = \frac{s}{(s+1)(s+2)}$?
a) 0 b) 1 c) 2 d) 3
- 5) An impulse response $h(t)$ is composed of the terms $1, t, e^{-t}$. A possible corresponding transfer function (for some constant value A) is
- a) $H(s) = \frac{A}{s(s+1)}$ b) $H(s) = \frac{A}{s^2(s+1)}$
c) $H(s) = \frac{As}{(s+1)}$ d) $H(s) = \frac{A}{s(s+1)^2}$
- 6) In using partial fractions to go from the Laplace domain to the time domain for a transfer function with no pole/zero cancellations, the number of terms used in the partial fraction expansion is determined by

- a) the zeros of the transfer function b) the poles of the transfer function

For problems 7-8 assume we have a system modeled by the transfer function $H(s)$.

- 7) To determine the **impulse response** we should compute the inverse Laplace transform of

a) $Y(s) = H(s)$ b) $Y(s) = H(s)\frac{1}{s}$ c) $Y(s) = H(s)\frac{1}{s^2}$ d) $Y(s) = H(s)\frac{1}{s^3}$

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8) To determine the (unit) step response we should compute the inverse Laplace transform of

a) $Y(s) = H(s)$ b) $Y(s) = H(s)\frac{1}{s}$ c) $Y(s) = H(s)\frac{1}{s^2}$ d) $Y(s) = H(s)\frac{1}{s^3}$

9) For the transfer function

$$H(s) = \frac{1}{s(s+2)^2}$$

the corresponding impulse response $h(t)$ is composed of which terms?

a) $t^2 e^{-2t}$ b) t and te^{-2t} c) 1 and te^{-2t}
d) te^{-2t} e) 1 , e^{-2t} , and te^{-2t}

10) The Laplace transform of $x(t) = u(t) - u(t-2)$ is

a) $X(s) = 1 - e^{-2s}$ b) $X(s) = 1 - e^{+2s}$ c) $X(s) = \frac{1}{s} - \frac{e^{-2s}}{s}$ d) none of these

11) The Laplace transform of $x(t) = te^{-3t}u(t)$ is

a) $X(s) = \frac{1}{s} \frac{1}{s+3}$ b) $X(s) = \frac{1}{s+3}$ c) $X(s) = \frac{1}{(s+3)^2}$ d) $X(s) = \frac{2}{(s+3)^2}$

12) The Laplace transform of $x(t) = (t-2)u(t-2)$ is

a) $X(s) = \frac{1}{s-2}$ b) $X(s) = \frac{e^{-2s}}{s}$ c) $X(s) = \frac{e^{-2s}}{s-2}$ d) none of these

13) The Laplace transform equivalent impedance of an inductor (assuming the initial conditions are equal to zero) is

a) $Z(s) = \frac{1}{Ls}$ b) $Z(s) = \frac{L}{s}$ c) $Z(s) = Ls$ d) $Z(s) = \frac{s}{L}$

14) The Laplace transform equivalent impedance of a capacitor (assuming the initial conditions are equal to zero) is

a) $Z(s) = Cs$ b) $Z(s) = \frac{C}{s}$ c) $Z(s) = \frac{s}{C}$ d) $Z(s) = \frac{1}{sC}$