

ECE-320, Practice Quiz #7

1) For the 2x2 matrix $P = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse of this matrix, P^{-1} , is which of the following:

a) $P^{-1} = \frac{1}{ad-bc} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ b) $P^{-1} = \frac{1}{ad-bc} \begin{bmatrix} d & b \\ c & a \end{bmatrix}$ c) $P^{-1} = \frac{1}{ad-bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

d) $P^{-1} = \frac{1}{ad+bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ e) $P^{-1} = \frac{1}{ad+bc} \begin{bmatrix} d & b \\ c & a \end{bmatrix}$ f) none of these

2) For the following state variable model

$$\dot{q}(t) = \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} q(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$
$$y(t) = [1 \quad 2]q(t)$$

The poles of the system are at

a) -1 and -3 b) -2 and -2 c) 1 and 3 d) 0 and 1 e) 1 and 2

3) For the following state variable model

$$\dot{q}(t) = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} q(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$
$$y(t) = [1 \quad 2]q(t)$$

The poles of the system are at

- a) -1 and -2 b) -1 and -1 c) 1 and 3 d) 0 and 1 e) 1 and 2

4) For the following state variable model

$$\dot{q}(t) = \begin{bmatrix} -1 & -1 \\ 1 & -3 \end{bmatrix} q(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$
$$y(t) = [1 \quad 2]q(t)$$

The poles of the system are at

- a) -1 and -3 b) -2 and -2 c) 1 and 3 d) 0 and 1 e) -1 and -2

Answers: 1-c, 2-e, 3-b, 4-b