EE-792   Quiz-2   Summer-16

Last Name: _Godavarthi_   First Name _Sai Marikanta s_
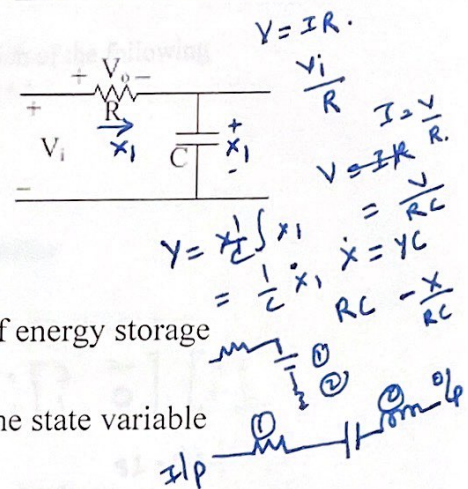
1. Write the state equation for the given circuit

    a. $\dot{X} = \frac{1}{RC}V_i - \frac{1}{RC}X$

    b. $\dot{X} = \frac{1}{R}V_i - \frac{1}{R}X$

    c. $V_0 = V_i - X_1$

    d. $\dot{X} = V_i - X$

$Y = IR.$

$\frac{Vi}{R}$ $I = \frac{V}{R}.$

$V = IR$

$= \frac{V}{RC}$

$Y = \frac{1}{C}\int x_1$ $\dot{X} = YC$

$= \frac{1}{C}\dot{x}_1$ $RC \quad -\frac{X}{RC}$

2. Which of the following statement is **FALSE**

    a. Number of state variables depends upon the number of energy storage elements

    b. Single input and single output system will have only one state variable

    c. State variable is nothing but current and voltage

    d. Input of the circuit can be either voltage or current
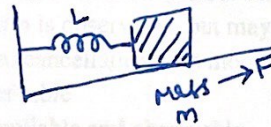
3. which one of the following function represent the spring mass system

    a. $F = m\ddot{y} + c\dot{y} + ky$

    b. $F = m\ddot{y} + k\dot{y} + cy$

    c. $F = m\ddot{y}$

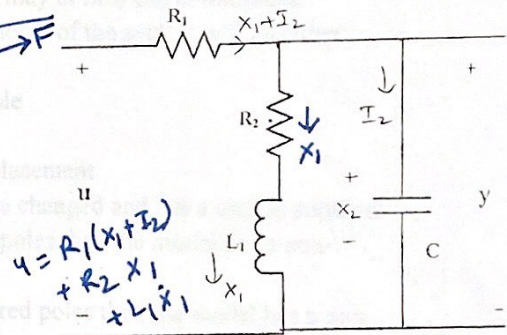   d. $F = m\ddot{y} + k\dot{y}$

Mass → F
m

4. write the first loop equation for given circuit

    a. $U = R_1(X_1 + I_2) + R_2X_1 + L_1\dot{X}_1$

    b. $U = R_1(X_1) + R_2X_1 + L_1\dot{X}_1$

    c. $U = R_1(X_1) + R_2X_1 + \dot{X}_1$

    d. $U = R_1(X_1 + I_2) + X_1$

$U = R_1(X_1 + I_2)$
$+ R_2 X_1$
$+ L_1\dot{X}_1$

$R_1(X_1 + I_2) + R_2(X_1) + n$

5. Write the output equation for the given circuit

    a. $y = X_2$

    b. $y = R_2X_1 + L_1\dot{X}_1$

    c. $y = R_2X_1 + L_1X_1$

    d. $y = R_2X_1 + L_1\dot{X}_1 + X_2$
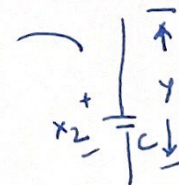
$Y = X_2$

Please show your work for partial credit.
Each question worth 2 points; this quiz worth 1 % of your final grade.

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(1) $H_s = \dfrac{1}{s^2 + 5s + 6}$, is representing a mathematical model of a system; which of the following statement is true $s+2$ $s+3$

    a. Model is stable and controllable
    b. Model is unstable and controllable
    (c.) Modal is stable but need to solve it to find controllability
    d. Modal is unstable but need to solve it to find the controllability

(2) Modal of a given system is represented with the following equations. $\dot{x}_1 = 3x_1 + 2x_2 + u$; $\dot{x}_2 = x_1 + u$, which of the following statement is true

$$x_1 = \begin{bmatrix} 3 & 2 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

    a. Controllable, observable
    b. Controllable, unobservable
    c. Uncontrollable, unobservable $sI - AC$
    d. Uncontrollable, observable   Yes it is controllable

(3) Which of the following statement is False

    a. Controllable canonical form is controllable but may or may not observable
    b. Observable canonical form is observable, but may or may not controllable
    c. If a model has a pole zero cancellation then model of the system will be either uncontrollable or unobservable
    (d.) Jordan form is both controllable and observable

(4) Which of the following statement is FALSE about the pole placement

    a. If the model is controllable all the poles can be changed and has a unique solution
    b. If uncontrollable poles are among the desired poles then the model has a non-unique solution
    (c.) If uncontrollable poles are not among the desired poles then the model has a non-unique solution
    (d.) None of the above is a TRUE statement.

(5) Total response of a model can be calculated by

    (a.) Finding the zero input response and zero initial conditions and add them together
    b. Finding the zero input response with initial conditions are considered
    c. Finding the zero input response without initial conditions
    d. Finding the zero initial conditions with input response included.

Last Name: _Patel_   First Name _Jmee_

1. If the model is controllable then which of the following statement is **TRUE**
   - (a.) All poles can be changed anywhere a unique solution exists
   - b. All poles can be changed anywhere not unique solution exists
   - c. All poles can be changed anywhere a no solution exists
   - d. Poles are not interchangeable a unique solution exists

2. If the model is Observable then which of the following statement is **TRUE**
   - a. The model is undetectable
   - b. If unobservable poles are stable then it is undetectable
   - c. If unobservable poles are unstable then it is detectable
   - (d.) The model is detectable

3. Which of the following statement is **TRUE** about the poles of a model
   - a. The poles are the roots of the characteristic equation
   - b. Eigenvalues of 'A' matrix are the poles of the given model
   - (c.) Both statements are true
   - d. None of the above statements are true

4. Which of the following statement is **TRUE** about stabilizability
   - (a.) A model is stabilizable if controllable pole is stable
   - b. A model is stabilizable if it is uncontrollable
   - (c.) A model is stabilizable if it is controllable
   - d. A model is stabilizable if uncontrollable pole is stable

   we can stabilized if uncontrollable pole are stable

5. The denominator of the transfer function is called
   - a. Characteristic equation
   - (b.) Characteristic polynomial
   - c. Eigenvalues of the vectors
   - (d.) Poles of the given system

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