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Roll No.

811

B. Tech. EXAMINATION, May 2019

(Eighth Semester)

(Old Scheme) (Re-appear Only)

(EE)

EE406

ADVANCED CONTROL SYSTEM

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. All questions carry equal marks.

(3-39/19)M-811

P.T.O.

1. Describe the state diagrams for discrete-time state models. **20**

2. For a circuit given below. Show that the current through the inductor is an acceptable state variable. Write the state and output equation and what do you think about the suitability of the Inductor flux linkage. **20**

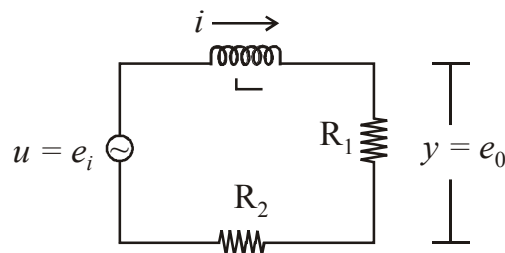


Fig. 1

3. Explain the unit step-Response of the second order system of servo motors system. **20**
4. Consider the linear autonomous system :

$$X(k+1) = \begin{bmatrix} 0.5 & 1 \\ -1 & -1 \end{bmatrix} X(K)$$

using direct method of Lyapunov, determine stability of the equilibrium state. **20**

5. Consider the non-linear system described by the equations :

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = -(1 - |x_1|)x_2 - x_1$$

Find the region in the state plane for which the equilibrium state of the system is Asymptotically stable. **20**

6. Investigate the controllability and observability of the system given below : **20**

$$X(K+1) = \begin{bmatrix} 1 & K \\ 0 & -1 \end{bmatrix} X(K) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(K)$$

$$y(K) = [1 \quad 1] X(K)$$

7. Give some z-transform applications in sampling process. **20**
8. Explain state variable formulation of discrete-time system. **20**