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Test-2 (Ph.D. ECE)

Course Code:10M1WEC132

Course Title: Advanced Control Systems

Maxm. Marks:25

Duration: 1.5 Hrs

Note: Use of mobile phone in the examination hall shall be treated as a case of unfair means.

Q-1: (a) Explain the basic concept behind the pole placement approach of system design.
Explain the necessary and sufficient condition of arbitrary pole placement. [2+2]

(b) For any given dynamical system, give all the steps of determining state-feedback gain matrix using state feedback control. [4]

Q-2: (a) Explain in brief the quadratic optimal control problem. [3]

(b) Differentiate the linear quadratic optimal control method of system design with the pole placement technique. [4]

Q-3: (a) Explain the concept of intelligent space with reference to the networked control systems. [3]

(b) Describe the networked predictive control with the help of schematic of diagram. [3]

Q-4: Determine the optimal control signal u for the system defined by [4]

$$\dot{x} = Ax + Bu$$

$$\text{Where, } A=[0 \ 1; 0 \ -1], \ B=[0;1]$$

Such that following performance index is minimized:

$$J = \int_0^{\infty} (X^T X + u^2) dt$$