Reg. No. | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FIRST SEMESTER M.TECH. (CONTROL SYSTEMS)

END SEMESTER DEGREE EXAMINATIONS, FEBRUARY - 2021

SUBJECT: ADAPTIVE CONTROL [ICE-5151]

TIME: 3 HOURS 22-02-2021 MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A. Differentiate between classical control and adaptive control.

1B. Derive Bezout identity. Specify its significance.

1C. Derive the generalized minimum variance control law.

(2+3+5)

2A. Draw the block diagram for indirect adaptive control scheme.

2B. In what way is output error model different from auto regressive exogenous input model?

2C. Explain the digital computer control loop.

(2+3+5)

3A. Which are the two methods used for adjusting the parameters in a model reference adaptive system? Which method can be implemented from the results of the other and how?

3B. Write the computational steps for implementing a Generalised Predictive Control (GPC).

3C. Derive the expression for recursive plant model identification in closed loop.

(2+3+5)

4A. Write the expression for zero order and first order hold. Distinguish them.

4B. What are the effects of variation in the DC gain and time constant of a first order system? Explain with an example.

4C. Derive the overall closed loop equation of a system, in terms of x(t) and e(t), for continuous time observer based state feedback.

(2+3+5)

5A. What is system identification? Differentiate between system identification and system simulation.

5B. Draw the block diagram of a system with Luenberger observer. Explain its use in brief.

5C. Elaborate the design procedure of a continuous time dynamic output feedback controller.

(2+3+5)

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