MANIPAL INSTITUTE OF TECHNOLOGY

Reg. No.

## FIRST SEMESTER M.TECH. (CONTROL SYSTEMS)

## **END SEMESTER DEGREE EXAMINATIONS, FEBRUARY - 2021**

# SUBJECT: ADAPTIVE CONTROL [ICE-5151]

#### 22-02-2021

## 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.

TIME: 3 HOURS

- 1C. Derive the generalized minimum variance control law.
- 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.
- 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).
- Derive the expression for recursive plant model identification in closed loop. 3C.
- Write the expression for zero order and first order hold. Distinguish them. 4A.
- 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.
- 5A. What is system identification? Differentiate between system identification and system simulation.

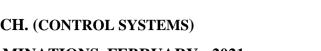
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- 5B. Draw the block diagram of a system with Luenberger observer. Explain its use in brief.
- 5C. Elaborate the design procedure of a continuous time dynamic output feedback controller.

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Page 1 of 1



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MAX. MARKS: 50