

R09

Code No: D7502

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech II - Semester Examinations, March 2011

ADAPTIVE CONTROL THEORY

(CONTROL SYSTEMS)

Time: 3hours

Max. Marks: 60

Answer any five questions

All questions carry equal marks

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1. What are the different types of adaptive schemes? Explain in detail. [12]
2. Consider a system described by a model.

$$dy/dt = -ay + bu,$$
 Where u is the control variable and y is the measured output. Assume that we want to obtain a closed loop system described by $dy_m/dt = -a_m y_m + b_m u_c$ $u(t) = \theta_1 u_c(t) - \theta_2 y(t)$. Design a Model reference adaptive system (MRAS) using MIT rule. [12]
3. How to design a MRAS using
 - a) Hyper stability approach?
 - b) Narendra's error model approach? [6+6]
4. Explain the design procedure of Self tuning regulator using pole placement method. [12]
5. Explain the hybrid predictor design and hybrid self tuning algorithm. [12]
6. Explain stochastic adaptive control and dual control. [12]
7. Explain the adaptive control systems application in the following areas:
 - a) Power systems.
 - b) Electric drives. [6+6]
8. Write short notes on:
 - a) Recursive parameter estimation.
 - b) Direct and indirect MRAS. [6+6]
