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]

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