

**Code No: D7502**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD  
M.TECH II SEMESTER EXAMINATIONS, APRIL/MAY 2012  
ADAPTIVE CONTROL THEORY  
(CONTROL SYSTEMS)**

**Time: 3hours****Max.Marks:60**

**Answer any five questions  
All questions carry equal marks**

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- 1.a) Linear feedback by itself cope up with parameter changes, then why are we going for Adaptive controllers?  
b) What are the different types of adaptive controllers?
2. The desired response of a system is  $dy_m/dt = -a_my_m + b_mu_c$ , the process is described by  $dy/dt = -ay + bu$ , and the controller is  $u = \theta_1u_c - \theta_2y$ , design the MRAS controller and realize using Lyapunov stability theory.
3. Consider the process  $G(s) = 1/s(s+a)$ , where 'a' is unknown parameter. Assume that desired closed loop system is  $G_m(s) = \omega^2 / (s^2 + 2\xi\omega s + \omega^2)$ . Construct continuous time self tuning regulator algorithm.
4. Explain the principle and working of Fuzzy Logic Adaptive control system.
5. Explain the applications of Adaptive control to electrical generator control and power systems.
6. Explain the design procedure of MRAC using Narendra's error model approach with example.
7. Explain the parameter estimation using least squares method.
8. Write short notes on
  - a) Hybrid adaptive control
  - b) Adaptive predictive control.

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