HONOR SUBJECT

PME7D013 AUTOMATIC CONTROL SYSTEM 4-0-0

MODULE I (10 HOURS)

Introduction: Basic concept of control system, Open loop and Close loop control systems. Control System and components.

Laplace Transform: Laplace transformation, Laplace transforms theorems, inverse Laplace transform.Mathematical model of physical systems: modeling of fluid systems and thermal systems Liquid level systems, pneumatic systems, hydraulic systems, thermal systems. Feedback Characteristics of control systems, Types of feedback, effects of different feedbacks on control systems.

MODULE II (16 HOURS)

Time response analysis:

Standard input signals, Step, ramp, parabolic and impulse inputs. Time response of fist and second order systems to input signals. Time response specifications, Steady state error and error constants of different types of control systems.

Concept of stability , Necessary condition for stability, Routh's stability criterion, application of Routh's criterion for linear feed back system, relative stability.

Root-locus analysis : Root locus concepts, rules for construction of root loci, root contours, systems with transportation lead and lag.

MODULE III (16 HOURS)

Frequency response analysis : Bode diagrams, polar plots, Nyquist stability criterion, Stability analysis, relative stability in frequency domain.

Controllers: Proportional, derivative and integral control actions, PD, PI and PID controllers and their applications to feed back control systems.

Mathematical modeling of Dynamic systems in state space, state-space representation of mechanical and electrical systems. State equation and transfer functions, Characterisic equation , Eigenvalue and eigenvector of state matrix. Design of control systems in state space.

BOOKS

1. Modern Control Engineering, K, Ogata
2. Automatic Control system, B. C. Kuo
3. Control Systems Engineering, L. J. Nagrath, M. Gopal