CONTROL SYSTEMS & SIMULATION LAB

Course Code: 22EE1106

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Prerequisites: Control Systems

Course Outcomes: At the end of lab course, students will able to

CO1: Obtain the characteristics of synchros and magnetic amplifiers

CO2: Determine the effects of feedback on second order system and illustrate the effects of controllers

CO3: Draw the root locus, bode plot and Determine state model for the given transfer function of linear time invariant systems by using Simulation tools

CO4: Determine the characteristics of servo motors

CO5: Design compensation networks for linear time invariant systems

The following are the experiments required to be conducted as compulsory experiments:

1. Characteristics of Synchros.
2. Characteristics of magnetic amplifiers.
3. Time response of second order system (Linear System Simulator)
4. Characteristics of AC servo motor
5. Plot Root locus of LTI system-Verification using Simulation tools.
6. State space analysis of LTI system- verification using Simulation tools.
7. Characteristics of lead compensator and Design using Bode plot– Verification using Simulation tools.
8. Characteristics of lag compensator and Design using Bode plot – Verification using Simulation tools. 9. Draw Nyquist plot of LTI system-Verification using Simulation tools
10. Effect of P, PD, PI and PID Controller on a second order system.

In addition to the above Ten experiments, at least any two of the Experiments from the list are required to be conducted:

11. Temperature controller using P, PI controllers.
12. PSPICE-simulation of Op-Amp based integrator and differentiator circuits.
13. Effect of feedback on DC servo motor.
14. Draw Bode plot of LTI system-Verification using Simulation tools.

TEXT BOOK:

1. I. J. Nagrath and M. Gopal, Control Systems Engineering, New Age International, 6th edition 2018

REFERENCES:

1. M. Gopal, Control Systems: Principles and Design, 4th Edition McGraw Hill Education, June 2012.

2. F.Golnaraghi and B.C.Kuo, Automatic Control Systems, 9th Edition, Wiley, 2014.
3. K. Ogata, Modern Control Engineering, 5th Edition, Prentice Hall, 2009.