COURSE	Name	: Control System Analysisand Design
	Code	: EE184521
	Credits	: 3
	Semester	: V

Description of Course

This course is a continuation of the Basic Control System course. After students understand about the response characteristics in the time domain, the important thing to learn is the analysis of responses in the frequency domain as well as the modern control techniques that use the mathematical model of the system in state space. Therefore, the scope studied in this course is the technique of analyzing and designing a regulatory system in frequency domain (using root locus and bode diagram) as well as in state space.

Learning Outcomes

KNOWLEDGE

(P02) Mastering the concepts and principles of engineering, and implementing them in the form of procedures for analysis and design in power systems, control systems, multimedia telecommunications, or electronics.

SPECIFIC SKILL

(KK01) Able to formulate engineering problems in power systems, control systems, multimedia telecommunications, or electronics.

GENERAL SKILL

(KU12) Able to implement information and communication technology (ICT) in the context of implementation of his/her work.

ATTITUDE

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

Course Learning Outcomes

KNOWLEDGE

Mastering the techniques of analysis and design of control systems in the time domain and frequency as well as in the representation of state equations.

SPECIFIC SKILL

Able to analyze and designing control system by using root locus, bode diagram, nyiquist diagram and in state space.

GENERAL SKILL

Able to simulate the design result of the system using simulation software.

ATTITUDE

Have a passion to improve knowledge in the field of control system to improve the quality of Indonesian society in the mastery of technology.

Main Subjects

1. System stability analysis using Root Locus method
2. Stability analysis of frequency domain using Bode diagram method and Nyquist diagram
3. Design of Root Locus based compensator
4. Design of Bode Diagram based compensator
5. Representation of the system in the form of state equations
6. The canonical form of state equations and their transformations
7. The intrinsic properties of state equations (controllability &observability)
8. Analysis of system stability in the form of state equations
9. Design of state feedback controller
10. Decoupling process of MIMO system using algebra block diagram and state feedback
11. Cascade system design
12. Design of error-based model controller: Sliding Mode, Inverse error model

Reference(s)

[1] Ogata, Katsuhiko. “Modern Control Engineering”, 5th Edition, Pearson, 2009.
[2] Kuo, C. Benjamin. “Automatic Control System”, Wiley, 2002.
[3] Franklin, F. Gene, Powell, J. David, Naeini, Abbas Emami. “Feedback Control of Dynamic System 6th edition”
[4] Nise, Norman S., “Control System Engineering”. Wiley. 2015

Prerequisite(s)

EE184404 Introduction to Control Systems