TKE213102

Design of Modern Control Systems

Perancangan Sistem Kendali Modern

BASIC INFORMATION

Course Credit	3 / 150 minutes per Week
Course Type	Required
Course Classification	Engineering Topics
Prerequisites	Signals and Systems; Control Systems

STUDENT AND LEARNING OUTCOMES

Covered Student Outcomes

Development of Engineering Solution (KP.2)

Modern Tools Utilization (SK.1)

Engineering Design (KP.3)

Learning Outcomes

LO1 Students are able to understand equivalence of linear systems.

LO2 Students are able to study BIBO stability and internal stability.

LO3 Students are able to design state feedback controllers and estimators.

LO4 Students are able to solve controller equation and perform robust tracking.

LO5 Students are able to use advanced algebra on control systems applications.

LO6 Students are able to design digital controller for given LTI plants.

COURSE DESCRIPTION

This course talks more about control engineering in view of modern therminology, i.e., using time domain approach. Students will learn a lot about the use of mathematics especially linear algebra to analyze, design and implement a control sytems.

TOPICS

1. Course Overview, Introduction
2. Time and Frequency Domain Models
3. Brief Review of Linear Algebra Concepts
4. Transformations and Realizations
5. Canonical Forms and Equivalent Systems
6. Minimal Realizations
7. Vector Space Concepts for Time-Varying Systems
8. Fundamental Matrix Solutions
9. Controllability, Observability and Duality
10. Jordan Forms, Spectral Theory and Functions of Matrices
11. Pole Assignment and Stability

12. Decoupling and Compensator Design
13. State Estimators and Luenberger Observers
14. Separation of Estimation and Control
15. Linear Quadratic and Optimum Control
16. Implementation using Digital Control Systems

REFERENCES

[1] Chi-Tsong Chen , Linear System Theory and Design, 4th Edition, Oxford University Press.
[2] Franklin, Powell and Emami-Naeini, Feedback Control of Dynamics Systems, 6th Edition.
[3] Doyle, Francis and Tannenbaum, Feedback Control Theory, McMillan.