

# Robot Control

Syllabus Number

3E333

Special Subjects

Elective 2 credit

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## 1. Course Description

We learn behavior of dynamical systems with inputs, how their behavior is modified by feed back and mathematical tools such as Laplace transform, etc.

This course is related to DP4

## 2. Course Objectives

- (1) We will learn how to draw block diagram of dynamic system
- (2) We will learn how to model continuous system
- (3) We will learn how to analyze dynamic system using frequency response
- (4) We will learn how to analyze stability of dynamic system

## 3. Grading Policy

Evaluation rate are Report 20 %, midterm exam 40%, final exam(40%).

All the reports should be submitted.

## 4. Textbook and Reference

Textbook

We also use LMS and handouts.

## 5. Requirements(Assignments)

Preparation for the class: 1.5 hours

Review of the class : 1.5 hours

## 6. Note

Course contents might be modified.

## 7. Schedule

- [1] Introduction of Control System
- [2] Feedback control of the robot, Laplace transform
- [3] Modeling and Block diagram, PID control
- [4] Transient characteristics and state characteristics of the control system
- [5] Frequency response and stability evaluation of the control system
- [6] Motor angle control 1: parameter identification of the control target
- [7] Motor angle control 2: determination the control gain by the pole placement method
- [8] Midterm exam and review
- [9] Control design exercise 1-1: Position control of the wagon (Modeling)
- [10] Control design exercise 1-2: Position control of the wagon (Design, System evaluation)
- [11] Control design exercise 2-1: Control of the wagon type inverted pendulum (Modeling 1)
- [12] Control design exercise 2-2: Control of the wagon type inverted pendulum (Modeling 2)
- [13] Control design exercise 2-3: Control of the wagon type inverted pendulum (Control design)
- [14] Control design exercise 2-4: Control of the wagon type inverted pendulum (System evaluation)
- [15] Final exam and review