

Design of Dynamic Systems

2 units (selection)

Katsunobu Konishi · PROFESSOR / INTELLIGENT MACHINES, MECHANICAL ENGINEERING, INTELLIGENT STRUCTURES AND MECHANICS SYSTEMS ENGINEERING

Target This class introduces automatic control and image recognition techniques that can be used for autonomous control of mechanical systems.

Outline Modeling and control for mechanical systems such as actuators, robotic manipulators and aerial vehicles are introduced in the first half of this class. In the second half, image processing and image recognition techniques are introduced in order to obtain environmental information necessary for autonomous control behaviour.

Fundamental Lecture “**Actuator Control Theory**”(1.0), “**System Design**”(1.0), “**Image Processing**”(1.0)

Relational Lecture “**Visual pattern processing**”(0.5)

Requirement Students are required to have a good understanding of undergraduate-level automatic control theory and image processing.

Goal

1. To understand the procedures and tools of control system design.
2. To understand the feature space analysis and object detection techniques.

Schedule

1. Actuator
2. Sensor
3. Equation of motion (robot arm)
4. Equation of motion (aerial vehicle)
5. Modal analysis
6. Reduced order model
7. Vibration control
8. Trajectory control
9. Intermediate examination
10. Image processing (color space)
11. Image processing (filtering)
12. Image processing (bird view observation)
13. Brightness pattern analysis
14. Feature space analysis
15. Object detection
16. Final examination

Evaluation Criteria Evaluate base on two examinations and reports.

Textbook To be introduced in the class.

Reference To be introduced in the class.

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216795>

Student Able to be taken by only specified class(es)

Contact

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