

COURSE	Name	: Formation and Collaboration Control Systems
	Code	: EE185523
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

The Formation and Coordination Control System discusses multi-agent analysis and control techniques to form a formation by coordinating to perform certain tasks by meeting specified performance criteria. To coordinate, agents can work together, or compete, exchange certain information according to the predefined network communications topology.

Learning Outcomes**Knowledge**

(P01) Mastering the concepts and principles of science in a comprehensive manner, and to develop procedures and strategies needed for the analysis and design of systems related to the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics as a preparation for further education or professional career.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

(KK02) Being able to compose problem solving in engineering through depth and breadth of knowledge which adapts to changes in science and technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S11) Trying his/her best to achieve perfect results.

Course Learning Outcomes**Knowledge**

The concept of agreement protocol and its application on multi-agent system.

Concepts and principles of formation and coordination arrangements, methods of analysis and design of formation and coordination controllers.

Specific Skill

Able to design formation and coordination systems for multi-agent systems.

Able to perform analysis on system behavior without and with controller.

General Skill

Able to implement formation and coordination controllers using computer programs.

Main Subjects

1. Multi-Agent control system concept and its application
2. Consensus protocol
3. Formation and coordination control
4. Multi-agent coordination for distributed estimation
5. Optimal coordination for multi-agent
6. Noncooperative agents
7. Multi agent Markovian decision processes

Reference(s)

- [1] Wei Ren and Randal W. Beard, Distributed Consensus in Multi-vehicle Cooperative Control: Theory and Application, Springer-Verlag, 2008
- [2] Zhongkui Li and Zhisheng Duan, Cooperative Control of Multi-Agent Systems: A Consensus Region Approach, CRC Press, 2014
- [3] Frank L. Lewis, Hongwei Zhang, Kristian Hengster-Movric, Abhijit Das, Cooperative Control of Multi-Agent Systems: Optimal and Adaptive Design Approaches, Springer-Verlag, 2015

Prerequisite(s)

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