

Electromechanical Systems

2 units (selection)

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Target) The purpose of Electromechanical System is to understand the conceptual philosophy of new ac machine drive systems, which are found in a vast number of industries.

Outline) We discuss the mathematical modeling techniques of ac machines in the various reference frames, the vector control method using these modeling techniques and the sensorless control methods. Furthermore we introduce the configurations of power converter and the architectures of the control systems embedded the micro-controller LSI and DSP chips. By simulation analysis using "Mathematica" and "MATLAB" in the first half, and through the practical designs in the second half, the more theoretical and practical understandings are expected.

Style) Lecture and exercise

Keyword) *dq transformation, synchronous motor, induction motor, vector control, sensorless control*

Relational Lecture) "Advanced Power Electronics"(0.3)

Requirement) Prerequisites (preferable) : "Electrical machines (I),(II)" , "Power electronics" and "Electrical machine dynamics and controls" in undergraduate.

Goal) To understand the conceptual philosophy of new ac machine drive control systems

Schedule)

1. Modeling of synchronous motors.
2. Modeling of induction motors.
3. Vector control of synchronous motors.
4. Vector control of induction motors (1).
5. Vector control of induction motors (2).
6. Sensorless vector control of synchronous motors.
7. Sensorless vector control of induction motors (1).
8. Sensorless vector control of induction motors (2).
9. Inverter circuits for ac motor drives.
10. LSI for ac motor drive controls.
11. DSP for ac motor drive controls.
12. Configuration of ac motor drive controls system (1).
13. Configuration of ac motor drive controls system (2).

14. Sum-up and conclusions.

15. Final examination.

16. Review of final examination.

Contents) <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216777>

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

Contact)

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