Cleveland State University
Department of Electrical and Computer Engineering
Spring 2003

EEC 673/773 Power Electronics and Electric Machines

Catalog data: EEC 673/773. (4-0-4). Power electronics converters in the combination with electric machines. Field-oriented induction machine control, stability of an induction machine under the sine-wave supply, voltage source inverter drives, current source inverter drives, d, q modeling of induction and synchronous machines.

Prerequisite: EEC 572 or equivalent

Textbook

D. W Novotny and T. A. Lipo, "Vector Control and Dynamics of AC drives", Oxford University Press, Inc, 1998.
Class Notes

Reference:

Stephan Chapman, " **Electric Machinery Fundamentals**", McGraw – Hill, 1999.
Ned Mohan, "**Electric Dives – an integrative approach",** University of Minnesota printing services, 2000.

N. Mohan, T. M. Undeland and W. P. Robbins, **Power Electronics: Converters, Applications and Design,** Second Edition, McGraw-Hill, 1995.

Coordinator:

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Goals: To deepen the understanding of power electronics converters in combination with electric machines.

Prerequisite by Topic: Power electronics converters, steady state operation of electric machines.

Week	Topics:	Reading
1 (Jan 13-17)	Basic Induction Machine Concepts	Chapman 7.1-7.5
2 (Jan 20-24)	**Martin Luther King Holiday-January 20th** Measurement of induction Machine Parameters Using an Inverter Supply.	Class Notes
3 (Jan 27-31)	**Lab 1**- Measurement of Induction Machine Parameters Using an Inverter Supply.	
4 (Feb.3-7)	**Lab 1**- Measurement of Induction Machine Parameters Using an Inverter Supply.	
5 (Feb 10-14)	A Novel Method for measuring Induction Machine Magnetizing inductance Review Session and Discussion .	Class Notes
(Feb 17-21)	**President's Day Holiday-Feb 17th** **Midterm Exam**	

Week	Topics:	Reading
7 (Feb 24-28)	Voltage Source Inverter Drive LAB 2-VSI Drive	Class Notes
8 (Mar 3-7)	LAB 2- VSI Drive	
9 (Mar 10-14)	**Spring Recess**	
10 (Mar 17-21)	d, q Modeling of Induction Machines	Novotny, Lipo 2.1-2.3
11 (Mar 24-28)	Determination of Induction Machine Inductances Complex Vector Representation	Novotny, Lipo 2.4 - 2.5
12 (Mar 31-Apr 4)	Complex Variable Model of Three Phase Induction Motor	Novotny, Lipo 2.6-2.7
13 (Apr 7-11)	Transformation to a Rotating Reference Frame	Novotny, Lipo 2.8-2.11
14 (Apr 14-18)	Starting Performance-d,q,0 Variables	Novotny, Lipo 2.13

Projects:	Laboratory experiments and simulation.
Grading	Midterm - 40% Final Exam - 45% Lab Reports – 15%
Homework:	Has to be turned in on time**.**
Computer Usage:	PSpice Software: MATLAB, SIMULINK
Prepared by:	Dr. A. V. Stankovic **Date: 01 15 2003**