

Design of Electric Motors, Generators, and Drive Systems June 1-5, 2020

Instructors:

James L. Kirtley (JLK)

Steven B. Leeb (SBL)

Monday

09:30 Introduction, Introductions (JLK)
09:45 Elements of Energy Flows in Electromechanics (JLK)
11:00 Introduction to MATLAB (SBL)
12:00 Lunch Break
1:00 Models of PM DC and Brushless Machines (JLK)
2:00 Introduction to Afternoon Lab (SBL)
2:30 - 5:00 Lab: Getting Started, Simulating DC Machines

Tuesday

08:30 MATLAB Programming and functions (SBL)
09:30 Park's Transformation, D-Q Modeling of Synchronous Machines (SBL)
10:30 Internals of PM Brushless Machines (JLK)
11:30 Drives Using Interior Magnet PM Machines (JLK)
12:00 Lunch Break
1:00 Continued: Design Strategy and models (JLK)
2:30 Introduction to Afternoon Lab (SBL)
3:00 - 5:00 Lab: Simulating Brushless (PM) Drive Systems

Wednesday

8:30 Inverters and Drive Systems: DC-DC (SBL)
11:00 AC Inverters: The teaching lab inverter (SBL)
12:00 Lunch Break
1:00 Inverters Continued
2:00 Introduction to Afternoon Lab (JLK)
2:30 - 5:00 Lab: Build an induction motor and/or brushless motor drive

Thursday

08:30 Induction Machine Modeling (JLK)
09:45 Induction Machine Design Techniques (JLK)
11:00 Induction Motor Drives: 6-pulse and PWM (JLK)
12:00 Lunch Break
1:00 Machine Optimization Techniques (JLK)
1:30 - 5:00 Lab: Designing Scripts for Designing Brushless Machines

Friday

08:30 Induction Motor Control Models (SBL)
09:45 Field Oriented Control (SBL)
11:00 The Rest of the Control Loop (SBL)
12:00 Lunch Break
1:00 Introduction to Afternoon Lab (SBL)
1:30 - 5:00 Lab: Simulation and Analysis of Induction Motor Drives