COURSE TABLE OF CONTENTS

Power Electronics Control Design with Simulink and Simscape

OEM: MathWorks • Duration: 2 Days (16 hrs) • Code: MW-POWER-ELECTRONICS-CONTROL-DESIGN-WITH

COURSE MODULES & TOPICS

Day 1 of 2

Modeling DC/DC Power Electronic Converters

- Modeling an open-loop boost converter
- Measuring physical quantities
- Selecting a solver
- Visualizing simulation results

Parameterizing Power Semiconductor Devices

- Modeling power semiconductor devices
- Parameterizations workflows
- Accessing losses and efficiency
- Modeling thermal effects in semiconductors

Converter Model Fidelity

- Selecting appropriate converter model fidelity
- Controlling model fidelity using prebuilt converters
- Controlling model fidelity using discrete components

Digital Control Design

- Implementing closed-loop voltage discrete PID control
- Linearizing power electronic converters with frequency response estimation
- Tuning the controller
- Closed-loop testing and verification

Day 2 of 2

Modeling DC/AC Three-Phase Inverters

- Modeling an open-loop three-phase inverter
- Measuring three-phase physical quantities
- Characterizing harmonics and distortion
- Controlling inverter model fidelity

Inverter Control Design

- Introducing the Clarke and Park transforms
- Implementing a current control in the rotating orthogonal dq reference frame
- Performing frequency response estimation of the inverter
- Tuning the current controller
- Closed-loop testing and verification

Motor Control

- Modeling a permanent magnet synchronous motor
- Principles of field-oriented control
- Implementing a motor torque control
- Verifying the motor design

System-Level Integration and Validation

- Architecting the system-level model
- Partitioning the system models
- Integrating components into a system-level model
- Verifying the system-level model