MATLAB SIMULINK

Mentor: Malaiyappan

Short -Description:

A MATLAB Simulink course provides an introduction to using Simulink, a powerful graphical simulation and modelling environment within MATLAB, for designing, simulating, and analysing dynamic systems. The course may include hands-on exercises and projects to reinforce the learned concepts and develop practical skills in designing and simulating complex systems using Simulink.

Total Duration: 11.30 Hrs | Modules: 5 | Assignments: | Projects –

Related Tags: Matlab, Simulink, Simscape,power electronics

Modules and description:

Module 1: Introduction to matlab

Duration: 1:00 hrs

1. Matlab Simulink introduction
2. Simscape introduction

Key description:

Matlab Simulink, users can create models by dragging and dropping predefined blocks from a library and connecting them to represent the system's components and their relationships. These blocks can represent mathematical operations, inputs and outputs, sensors and actuators, and various system elements. Users can configure block parameters, specify initial conditions, and define input signals to accurately simulate the system's behaviour over time.

Module 2: Rectifier design:

Duration: 2 hrs

1.Design the Single/Three Phase Rectifier using MATLAB

2.Single/Three Phase AC Voltage Controller using MATLAB

Key Description:

Rectifiers are electronic circuits used to convert alternating current (AC) to direct current (DC). They play a crucial role in various applications, including power supplies, motor drives, and renewable energy systems. The design of rectifiers can be categorized into two main types: single-phase rectifiers and three-phase rectifiers.

Module 3: Converter and inverter design

Duration: 2:00 hrs

1. DC-DC Converter using MATLAB
2. Buck converter design
3. Inverter Design using MATLAB
4. Grid Tie Inverter Design using MATLAB
5. Matrix Converter using MATLAB
6. Multi-Level Inverter Design using MATLAB SIMULINK
7. Active Power Filter Design using MATLAB SIMULINK

Key Description:

The topics covered involve designing various power electronic systems using MATLAB and MATLAB Simulink. This includes designing buck converters for stepping down DC voltage, designing inverters for converting DC to AC power, designing grid tie inverters for connecting renewable energy sources to the utility grid, designing matrix converters for direct AC power conversion, designing multi-level inverters for synthesizing AC waveforms, and designing active power filters for mitigating harmonics and compensating reactive power.

Module 4: Battery charger design

Duration: 1.30 hrs

1.Battery Charger design using MATLAB SIMULINK

Key Description:

Battery charger design involves the process of designing a circuit or system that efficiently charges batteries. The charger ensures that the battery receives the correct charging voltage and current to recharge it effectively and safely. The design considerations typically include factors such as battery chemistry, charging algorithm, charging voltage/current limits, and safety features. battery charger design focuses on creating a reliable and efficient charging system that ensures the battery is charged correctly, maximizes its capacity and lifespan, and provides necessary safety features to protect against overcharging, overheating, and other potential risks.

Module 5: Speed control of motors:

Duration: 5 hrs

1.Speed Control of DC Motor Using Chopper
2.Speed Control of Induction Motor Using VSI Fed Inverter
3.Speed Control of BLDC Motor Using Chopper using Simulink
4.Speed Control of PMSM Motor Using Chopper using Simulink
5.Three Phase Induction Motor Fault Diagnosis using Simulink

Key Description:

These topics focus on the speed control and fault diagnosis of different types of motors using Simulink. They include the speed control of an induction motor using a VSI fed inverter, the speed control of a BLDC motor using a chopper circuit, the speed control of a PMSM motor using a chopper circuit, and the fault diagnosis of a three-phase induction motor. Simulink is used to model and simulate these motor control systems, enabling the design and analysis of control strategies for precise speed regulation and the identification of motor faults. Overall, these topics aim to enhance motor performance, efficiency, and reliability through effective control and diagnostic techniques.