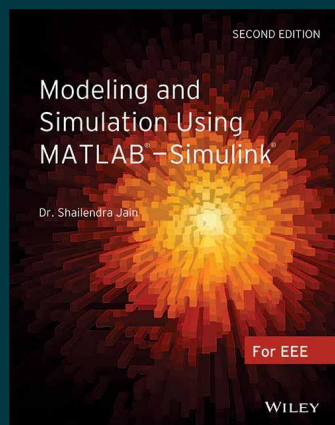




Modeling and Simulation using MATLAB - Simulink, 2ed

By [Dr. Shailendra Jain](#)

Paperback

9788126551972

₹1,999.00

Pages: 720

Description

The engineering profession has long been a pioneer in regard to integration of computers in the curriculum as well as teaching. Computing resources can be effectively incorporated into the subjects of electrical and electronics engineering. A brief review of current text-books from major publishers reveals that, to a large extent, the computer is now considered a support tool for the study of subjects. Development on the integration of the computing resources is now reflected in courses implemented at several universities and institutions.

About the Author

Dr. Shailendra Jain

Dr. Shailendra Kumar Jain is an Associate Professor in Department of Electrical Engineering

Table of Contents

Preface

Preface to the First Edition

1 Simulation Mechanism and Simulation Tools

1.1 Virtual Experimentation

1.2 Simulation Mechanics

1.3 Exploring Simulation Tools

1.4 Advantages and Disadvantages of MATLAB

1.5 Scope of the Book

2 Introduction to MATLAB

2.1 Introduction

2.2 Starting and Ending MATLAB

2.3 MATLAB Desktop

2.4 Help Browser

2.5 Types of Files

2.6 MATLAB Search Path

2.7 Command Input Assistance

2.8 Exploring Function Browser

3 MATLAB Basics

3.1 Basic Arithmetic Operations

3.2 Variables and Arrays

3.3 Handling Arrays (Vectors and Matrix)

3.4 Some useful Built-in Functions

3.5 Operators and Special Characters

3.6 Control Structures

3.7 Input/Output Commands

3.8 File Handling

4 Introduction to Plotting

4.1 Introduction

4.2 The plot Command

4.3 Formatting a Plot

4.4 Multiple Plots

4.5 Adding Legend to a Plot

4.6 Sub-Plots

4.7 Plotting Complex Data

4.8 Additional 2-D Plots

4.9 Plotting a Function

4.10 Three-Dimensional Plots

4.11 Formatting a Plot using the Plot Editor

4.12 Interactive Plotting Using Plotting Tools

5 Programming in MATLAB

5.1 Introduction

5.2 MATLAB Editor

5.3 MATLAB Programming

5.4 Debugging MATLAB Programs

5.5 MATLAB Debugger

5.6 Functions and Function Files

5.7 Differential Equation Solver

5.8 Calculus Functions using Symbolic Mathematics

5.9 Programming Examples

6 Basic Electrical and Networks Applications

6.1 Analysis of Electrical Networks

6.2 Network Theorems

6.3 Solution of Network Problems (Solution of Linear Differential Equations)

7 Introduction to Simulink

7.1 Introduction

7.2 Getting Simulink

- 7.3 Creating and Simulating a Simulink Model
- 7.4 Simulink Solution of Differential Equation
- 7.5 Solvers
- 7.6 Keystrokes or Mouse Action for Handling Blocks and Lines
- 7.7 Assigning Variables
- 7.8 Observing Variables during Simulation
- 7.9 Storing/Saving Data
- 7.10 Linking Script File/M-file with Model File
- 7.11 Data Import/Export
- 7.12 Creating and Masking Subsystems
- 7.13 Solution Using Laplace Transform Approach
- 7.14 Simulation of Non-Linear System
- 7.15 Equivalent Circuit
- 8 Control System Applications
 - 8.1 Introduction
 - 8.2 Important MATLAB Functions
 - 8.3 Use of Laplace Transform
 - 8.4 Writing Transfer Function (TF)
 - 8.5 Pole-Zero Mapping
 - 8.6 Block Diagram Reduction
 - 8.7 Time Response Analysis
 - 8.8 Step Response using MATLAB
 - 8.9 Ramp Response
 - 8.10 Impulse Response
 - 8.11 Parabolic Response
 - 8.12 State Space Approach
 - 8.13 Response of Arbitrary Input
 - 8.14 Root Locus
 - 8.15 Bode Plots
 - 8.16 Nyquist Plot
- 9 Power Electronics Applications
 - 9.1 Introduction
 - 9.2 SimPowerSystems™ Toolbox
 - 9.3 Building and Simulating a Simple Circuit
 - 9.4 Interfacing the Electrical Circuit with Simulink
 - 9.5 Diode Circuits and Rectifiers 441
 - 9.6 Simulation of Battery Charger
 - 9.7 Simulation of Single-Phase Full-Wave Rectifier

9.8 Effect of Source Inductances

9.9 Simulation of Controlled Converters

9.10 Simulation Model for the Measurement of Power Factor Angle

9.11 Simulation of DC-AC Inverters

9.12 AC Voltage Controllers

9.13 Virtual Experimentation

10 Script File Approach to Model and Simulate Circuits

10.1 Introduction

10.2 Generating a Periodic Signal and Finding its Average and RMS Value

10.3 Modeling and Simulation of General Electrical Circuits

10.4 Script File Approach to Simulate Power Converters

10.5 Simulation of Three-Phase Rectifier (Classical Approach)

10.6 Use of MATLAB Function

11 Fuzzy Logic and Applications

11.1 Introduction

11.2 Classical Control Approach

11.3 Advantages and Applications of Fuzzy Logic

11.4 Fuzzy Logic System

11.5 Implication and Aggregation Methods

11.6 Defuzzification Methods

11.7 MATLAB® Fuzzy Logic Toolbox™

11.8 Building Fuzzy Inference Systems (FIS) Using Graphical User Interface (GUI)

11.9 Fuzzy Logic Control Applications

11.10 Exploring FIS from the Command Prompt

11.11 Building FIS using Custom Functions

11.12 Working with FLC in Simulink Environment

11.13 Design of Fuzzy Control Rule

11.14 Design Methodology and Control Implementation

Chapter Summary

List of Important Commands

Important Fuzzy Terminology

Exercises

Appendix A: Graphical User Interface

A.1 Introduction

A.2 Accessing GUI Template

List of Important Commands

Bibliography

Index

To purchase this product, please visit:

<https://www.wileyindia.com/modeling-and-simulation-using-matlab-simulink-2ed.html>



Scan to buy