

Modeling Refrigeration Systems with Simscape

OEM: MathWorks • Code: MW-MODELING-REFRIGERATION-SYSTEMS-WITH-S

COURSE DESCRIPTION

This course focuses on modeling refrigeration thermal management systems in Simulink® using Simscape Fluids™. Modeling thermal fluid systems Designing a refrigeration cycle Modeling refrigeration components Integrating components into a system-level model Implementing a digital controller Increasing model fidelity Estimating parameters based on experimental data

AUDIENCE PROFILE

- IT professionals and technical staff seeking hands-on training in this course's subject area.

PREREQUISITES

- MATLAB Fundamentals, Simulink Fundamentals, and Modeling Physical Systems with Simscape

COURSE OBJECTIVES

By the end of this course, participants will be able to:

- Develop a thermal liquid model to simulate and analyze the performance of a fluid cooling system.
- Design a two-phase fluid refrigeration cycle that meets specific design objectives.
- Use harness models to individually model and test each component of the refrigeration system.
- Combine refrigeration components into a system-level model and implement a digital controller for customizable thermal management.
- Improve the accuracy of a refrigeration component model by considering its geometric properties and estimating relevant parameters.

COURSE OUTLINE

Module 1: Day 1 of 1

Modeling Fluid Cooling Systems

- Modeling a thermal fluid system
- Setting and visualizing fluid properties

- Adding and removing heat from fluids
- Solving fluid networks

Designing a Refrigeration Cycle

- Reviewing common two-phase fluid properties
- Determining two-phase fluid properties
- Visualizing points and cycles using a pressure-enthalpy diagram
- Designing a refrigeration cycle

Modeling Refrigeration Components

- Introducing model fidelity
- Creating harness models
- Modeling the chiller
- Modeling the compressor

Modeling the Refrigeration System

- Building the open-loop model
- Closing the loop
- Designing a digital controller
- Troubleshooting refrigeration models
- Preparing for hardware-in-the-loop testing

Adding Model Fidelity

- Modeling the condenser geometry
- Comparing simulation results
- Estimating physical parameters
- Validating estimated parameters