

# Siemens Xcelerator Academy: On-Demand Training

Thursday, March 17, 2022 5:07 PM

Designed for engineers and analysts. You will learn how to use the Simcenter 3D environment for Computer-Aided Engineering (CAE) pre- and post-processing, as well as use the integrated solvers to predict real-world product performance for many physics domains.

- 12 month subscription
- Access to cloud-based environment for hands-on lab exercises
- Access to new training content added during the subscription period
- Knowledge assessments to measure learning progress

*On-Demand Training - Simcenter 3D*

*Fundamentals of using Pre/Post - 2021.2 5 Chapters*

Learn how to analyze a model and work with analysis data in Simcenter 3D.

[1 Learning Experience Overview](#) [2 Topics](#)

1. Welcome: Navigation Overview
2. Fundamentals of using Pre/Post Intro

[2 Analyzing Models in Simcenter 3D Pre/Post - 2021.2 4 Topics](#)

1. What Can You Do with Pre/Post?
2. Finite Element Analysis in Simcenter 3D
3. Finite Element Analysis in Simcenter 3D
4. Assessment: Analyzing Models in Simcenter 3D and Pre/Post

[3 Managing Analysis Data in Simcenter 3D Files - 2021.2 7 Topics](#)

1. Simcenter 3D Files Overview
2. Working with Simcenter 3D Files in Pre/Post
3. Preparing the Model
4. Modifying Model Geometry
5. Solving the Model and Post-processing
6. Lab: Using Simcenter 3D Files in an Analysis
7. Assessment: Managing Analysis Data in Simcenter 3D Files

[4 Using Pre/Post Features to Work with Models - 2021.2 14 Topics](#)

1. Using Pre/Post Features
2. Using the Simulation Navigator to Work with Your Model
3. Lab: Working with a Model Using the Pre/Post User Interface
4. Displaying a Model
5. Lab: Displaying a Model
6. Selecting Objects
7. Using Selection Recipes
8. Lab: Selecting Objects
9. Using Groups
10. Lab: Using Groups
11. Working with Coordinate Systems
12. Lab: Working with Coordinate Systems
13. Assessment: Using Pre/Post Features to Work with Models
14. Thank you for watching Fundamentals of using Pre/Post

[5 Assessment: Fundamentals of Using Pre/Post - 2021.2 1 Topic](#)

1. Assessment: Fundamentals of Using Pre/Post

*Preparing the Model for Analysis - 2021.2 9 Chapters*

Learn how to prepare a model for analysis by working with geometry, meshes, connections, assemblies, loads, and boundary conditions.

## 1 Preparing Geometry for Meshing - 2021.2 13 Topics

1. Loading a Model into Simcenter 3D
2. Preparing Geometry for Meshing
3. Using Synchronous Modeling to Model Parts
4. Lab: Using Synchronous Modeling to Modify Parts
5. Simplifying Geometry with Idealization
6. Lab: Creating Midsurfaces before Meshing
7. Simplifying Geometry with Abstraction
8. Lab: Simplifying Geometry with Abstraction
9. Working with Associative Copies of Geometry
10. Lab: Working with Associative Copies of Geometry
11. Lab: Simplifying Geometry for Meshing
12. Lab Solution: Simplifying Geometry for Meshing
13. Assessment: Preparing Geometry

## 2 Meshing a Model - 2021.2 29 Topics

1. Selecting a Mesh and Element Type
2. Creating a Mesh
3. Lab: Creating a 3D Tetrahedral Mesh
4. Using Mesh Collectors to Organize the Model
5. Lab: Using Mesh Collectors to Organize the Model
6. Defining Material Properties for a Mesh
7. Lab: Defining Material Properties for a Mesh
8. Lab: Defining Physical Properties for a Mesh
9. Creating a 3D Hexahedral Mesh
10. Splitting Complex Bodies for Hexahedral Meshing
11. Lab: Creating a 3D Hexahedral Mesh
12. Creating a 2D Mesh
13. Lab: Creating a 2D Mesh
14. Creating a 2D Mapped Mesh
15. Lab: Creating a 2D Mapped Mesh
16. Creating a 1D Mesh
17. Lab: Creating a 1D Mesh
18. Controlling the Mesh Display
19. Creating Mesh Mating Conditions to Connect Meshes
20. Lab: Creating Mesh Mating Conditions
21. Editing Meshes with Manual Mesh Techniques
22. Lab: Editing Meshes with Manual Mesh Techniques
23. Controlling Mesh Density
24. Lab: Controlling Mesh Density
25. Setting Element Size and Surface Curvature
26. Lab: Modifying Element Size
27. Lab: Creating a Structured Mesh
28. Lab Solution: Creating a Structured Mesh
29. Assessment: Meshing

## 3 Modeling Connections - 2021.2 19 Topics

1. Modeling Connections
2. Modeling Pinned Connections
3. Lab: Modeling Pinned Connections
4. Modeling Connections with Spider Elements
5. Lab: Modeling Connections with Spider Elements
6. Modeling Glue Connections
7. Lab: Modeling Edge-Surface Glue Connections
8. Lab: Modeling Surface-Surface Glue Connections
9. Modeling Bolted Connections
10. Modeling Bolted Connections Using Nuts
11. Lab: Modeling a Bolted Connection with a Nut
12. Modeling a Tapped Bolted Connection
13. Lab: Modeling a Tapped Bolted Connection
14. Lab: Applying Bolt Pre-loads
15. Creating Universal Connections

16. Lab: Creating Universal Connections
17. Lab: Connecting Bodies
18. Lab Answer: Connecting Bodies
19. Assessment: Modeling Connections

#### 4 Modeling Assemblies - 2021.2 6 Topics

1. Modeling Assemblies
2. Modeling an Assembly FEM from a CAD Assembly
3. Modeling an Assembly FEM without a CAD Assembly
4. Lab: Modeling an Associative Assembly FEM
5. Lab: Modeling a Non-associative Assembly FEM
6. Assessment: Modeling Assemblies

#### 5 Applying Boundary Conditions - 2021.2 11 Topics

1. Applying Boundary Conditions
2. Nastran Structural Loads
3. Nastran Structural Constraints
4. Applying Loads
5. Applying Constraints
6. Lab: Applying Loads and Constraints
7. Applying Contact
8. Lab: Applying Contact
9. Lab: Applying Boundary Conditions
10. Lab Answer: Applying Boundary Conditions
11. Assessment: Applying Boundary Conditions

#### 6 Defining Variable Conditions and Properties - 2021.2 15 Topics

1. Using Fields
2. Types of Fields
3. Using Fields to Define Boundary Conditions
4. Lab: Using Fields to Define a Boundary Condition
5. Using a Spatial Map Field to Define a Boundary Condition
6. Lab: Using a Spatial Map Field to Define a Boundary Condition
7. Using a Field to Define Material Properties
8. Lab: Using a Field to Define Nonlinear Material Properties
9. Displaying Fields
10. Lab: Displaying Fields
11. Using Expressions
12. Lab: Using Expressions to Define Boundary Conditions
13. Lab: Defining a Variable Boundary Condition
14. Lab Solution: Defining a Variable Boundary Condition
15. Assessment: Defining Variable Conditions and Properties

#### 7 Modeling Symmetry - 2021.2 5 Topics

1. Symmetry Modeling Overview
2. Lab: Modeling a Cyclic Symmetric Structure
3. Lab: Modeling an Axisymmetric Structure
4. Lab: Using Plane Stress Elements in a Axisymmetric Analysis
5. Knowledge Check: Modeling Symmetry

#### 8 Checking the Model and Resolving Problems - 2021.2 7 Topics

1. Checking Mesh Quality
2. Techniques for Resolving Mesh Quality Issues
3. Lab: Resolving Mesh Quality Problems
4. Checking the Model Before Solving
5. Techniques for Resolving Model Quality Issues
6. Lab: Resolving Model Quality Issues
7. Assessment: Checking the Model and Resolving Problems

#### 9 Assessment: Preparing the model for analysis - 2021.2 1 Topic

1. Assessment: Preparing the model for analysis

#### *Solving the Model - 2021.2 4 Chapters*

Learn how to solve a model with the Simcenter Nastran solver using structural analysis types.

#### [1 Setting Up and Running a Structural Analysis - 2021.2 9 Topics](#)

1. Using Solutions and Subcases
2. Creating Solutions and Subcases
3. Lab: Creating Solutions and Subcases
4. Defining Solution Attributes
5. Setting Solver Parameters
6. Solving the Model
7. Dealing with Common Solver Errors
8. Validating Results
9. Assessment: Setting Up and Running a Structural Analysis

#### [2 Introduction to Structural Analysis Workflows - 2021.2 10 Topics](#)

1. Structural Analysis Overview
2. Linear Statics Analysis Workflow
3. Lab: Linear Statics Analysis Workflow
4. Normal Modes Analysis Workflow
5. Lab: Normal Modes Analysis Workflow
6. Using Subcase Versus Global Constraints
7. Linear Buckling Analysis Overview
8. Linear Buckling Analysis Workflow
9. Lab: Linear Buckling Analysis Workflow
10. Assessment: Introduction to Structural Analysis Workflows

#### [3 Introduction to Nonlinear Analysis Workflows - 2021.2 8 Topics](#)

1. Nonlinear Analysis Overview
2. Setting Up a Nonlinear Solution
3. Lab: Geometric Nonlinear Analysis
4. Using Time Steps in a Nonlinear Solution
5. Lab: Using Timesteps in a Nonlinear Solution
6. Evaluating Nonlinear Models
7. Lab: Evaluating Nonlinear Models
8. Assessment: Introduction to Nonlinear Analysis Workflows

#### [4 Assessment: Solving the Model - 2021.2 1 Topic](#)

1. Assessment: Solving the Model

#### [Reviewing Analysis Results - 2021.1 5 Chapters](#)

Learn how to display analysis results using post views, graphs, and reports.

#### [1 Displaying Results in Post Views - 2021.1 23 Topics](#)

1. Displaying Results Overview
2. Displaying Results in Post Processing
3. Displaying Results in a Post View
4. Lab: Displaying Results in a Post View
5. Controlling Visibility in Post Views
6. Lab: Controlling Visibility in Post Views
7. Displaying Results in Multiple Viewports
8. Lab: Displaying Results in Multiple Viewports
9. Animating Results
10. Lab: Animating Results
11. Annotating Results
12. Lab: Annotating Results
13. Displaying More Results in Post Processing
14. Displaying Stress/Strain Results on 2D Elements
15. Lab: Displaying Stress/Strain Results on 2D Elements
16. Calculating and Displaying Beam Stresses
17. Lab: Displaying Beam Stresses
18. Displaying Symmetry Results in a Post View
19. Lab: Displaying Axisymmetric Results in a Post View

20. Displaying Results in the Results Viewer
21. Lab: Displaying Results in Post Views
22. Lab Solution: Displaying Results in Post Views
23. Assessment: Displaying Results in Post Views

#### 2 Manipulating Results Data - 2021.1 10 Topics

1. Manipulating Results Data Overview
2. Identifying and Outputting Results
3. Lab: Identifying and Outputting Results
4. Creating Custom Results
5. Lab: Creating Custom Results
6. Combining and Enveloping Results
7. Lab: Enveloping and Combining Results
8. Creating Nodal Force Reports
9. Lab: Creating Nodal Force Reports
10. Assessment: Manipulating Results Data

#### 3 Graphing Results - 2021.1 14 Topics

1. Graphing Overview
2. Graphing Results Across FE Entities
3. Lab: Graphing Results Across FE Entities
4. Graphing Results Using a Query Curve
5. Lab: Graphing Results Using a Query Curve
6. Graphing Results Across Iterations
7. Lab: Graphing Results Across Multiple Iterations
8. Plotting Two Functions
9. Lab: Plotting Two Functions
10. Modifying Graph Display Properties
11. Lab: Modifying Graph Display Properties
12. Lab: Graphing Results
13. Lab Answer: Graphing Results
14. Assessment: Graphing Results

#### 4 Saving and Restoring Views - 2021.1 6 Topics

1. Saving and Restoring Views
2. Saving and Restoring Layout States to Set Up Views
3. Lab: Saving and Restoring Layout States to Set Up Views
4. Saving and Restoring Post View Settings
5. Lab: Saving and Restoring Post View Settings
6. Assessment: Saving and Restoring Views

#### 5 Generating Reports - 2021.1 4 Topics

1. Introduction to Creating Reports
2. Generating a Report
3. Customizing a Report Template
4. Assessment: Generating Reports

#### *Working with Acoustics Models - 2020.1 9 Chapters*

This learning path teaches users how to prepare an acoustics model and review analysis results.

#### 1 Analysis with Simcenter Nastran FEM Acoustics - 2020.1 4 Topics

1. Introduction to Simcenter Nastran FEM Acoustics
2. Analyzing an Acoustics Model in Nastran FEM Acoustics
3. Lab: Analyzing an Acoustics Model in Nastran FEM Acoustics
4. Knowledge Check: Introduction to Simcenter Nastran FEM Acoustics

#### 2 Meshing a Simcenter Nastran FEM Acoustics Model - 2020.1 17 Topics

1. Meshes for Acoustic Models
2. Acoustic Mesh Types
3. Meshing Structural Models
4. Lab: Meshing Structural Models

5. Meshing for Interior Acoustic Analysis (FEM)
6. Lab: Generating Meshes for Interior Acoustic Analysis (FEM)
7. Meshing for External Acoustic Analysis
8. Lab: Generating Meshes for Exterior Acoustic Analysis (FEM)
9. Creating a Microphone Mesh
10. Lab: Creating a Microphone Mesh
11. Acoustic Materials
12. Lab: Meshing a Nastran FEM Acoustics Model
13. Lab Solution: Meshing a Nastran FEM Acoustics Model
14. Lab: Meshing a Nastran FEM Vibro-acoustics Model
15. Lab Solution Part 1: Meshing a Nastran FEM Vibro-acoustics Model
16. Lab Solution: Part 2: Meshing a Nastran FEM Vibro-acoustics Model
17. Knowledge Check: Meshing a Simcenter Nastran FEM Acoustics Model

### [3 Setting Up and Solving a Simcenter Nastran FEM Acoustics Solution - 2020.1 20 Topics](#)

1. Setting Up and Solving an Acoustics Model
2. Nastran FEM Acoustics Solution Types
3. Nastran FEM Acoustics Solution Parameters
4. Lab: Setting Up and Solving an Acoustics Model
5. Nastran FEM Acoustics Boundary Conditions
6. Creating Nastran FEM Acoustics Boundary Conditions
7. Lab: Creating Nastran FEM Acoustics Boundary Conditions
8. Creating Loads for Nastran FEM Acoustics Analysis
9. Lab: Creating Loads for Nastran FEM Acoustics Analysis
10. Creating Constraints for Nastran FEM Acoustics Analysis
11. Lab: Creating Constraints for Nastran FEM Acoustics Analysis
12. Nastran FEM Acoustics Simulation Objects
13. Creating Simulation Objects for Nastran FEM Acoustics Analysis
14. Lab: Creating Simulation Objects for Nastran FEM Acoustics Analysis
15. Solving the Nastran FEM Acoustics Model and Reviewing Results
16. Post Processing Scenarios
17. Lab: Setting Up and Solving a Nastran FEM Vibro-Acoustics Analysis
18. Lab Solution: Part 1: Setting Up and Solving a Nastran FEM Vibro-Acoustics Analysis
19. Lab Solution: Part 2: Setting Up and Solving a Nastran FEM Vibro-Acoustics Analysis
20. Knowledge Check: Setting Up and Solving a Simcenter Nastran FEM Acoustics Solution

### [4 Analysis with Simcenter 3D Acoustics BEM - 2020.1 4 Topics](#)

1. Introduction to Simcenter 3D Acoustics BEM
2. Analyzing an Acoustics Model in Acoustics BEM
3. Lab: Analyzing an Acoustics Model in Acoustics BEM
4. Knowledge Check: Analysis with Simcenter 3D Acoustics BEM

### [5 Meshing a Simcenter 3D Acoustics BEM Model - 2020.1 9 Topics](#)

1. Meshes for Acoustics Models
2. Meshing for Direct BEM Acoustics Analysis
3. Lab: Generating Meshes for Direct BEM Analysis
4. Meshing for Indirect BEM Acoustic Analysis
5. Lab: Generating Meshes for Indirect BEM Acoustic Analysis
6. Acoustic Materials
7. Lab: Meshing an Acoustics BEM Model
8. Lab Solution: Meshing an Acoustics BEM Model
9. Knowledge Check: Meshing a Simcenter 3D Acoustics BEM Model

### [6 Setting Up and Solving a Simcenter 3D Acoustics BEM Solution - 2020.1 13 Topics](#)

1. Acoustics BEM Solution Types
2. Acoustics BEM Solution Parameters
3. Acoustics BEM Loads
4. Creating Loads for Acoustics BEM Analysis
5. Lab: Creating Loads for Acoustics BEM Analysis
6. Acoustics BEM Simulation Objects

7. Creating Simulation Objects for Acoustics BEM Analysis
8. Lab: Creating Simulation Objects for Acoustics BEM Analysis
9. Post Processing Scenarios
10. Lab: Setting Up and Solving an Acoustics BEM Solution
11. Lab Solution: Setting Up an Acoustics BEM Solution
12. Lab Solution: Solving an Acoustics BEM Solution
13. Knowledge Check: Setting Up and Solving a Simcenter 3D Acoustics BEM Solution

#### 7 Model and Load Pre-Processing - 2020.1 4 Topics

1. Model and Load Pre-Processing
2. Transforming External Result Data for Acoustics Loads
3. Lab: Using CFD Data to Create Fan Noise Loads
4. Knowledge Check: Model and Load Pre-Processing

#### 8 Using Alternate Component Representations in Acoustics Models - 2020.1 21 Topics

1. Using Alternate Component Representations in Acoustics Models
2. Creating a Mode Set
3. Lab: Creating a Mode Set
4. Using a Mode Set in an Acoustics Analysis
5. Lab: Using a Mode Set in an Acoustics Analysis
6. Creating an FRF Set
7. Lab: Creating an FRF Set
8. Using ATVs as Alternate Component Representations
9. Creating an ATV Set
10. Lab: Creating an ATV Set
11. Using an ATV Set to Evaluate ATV Response
12. Lab: Evaluating ATV Response Using SOL 108
13. Evaluating ATV Response Using Noise and Vibration
14. Lab: Evaluating ATV Response Using Noise and Vibration
15. Using an ATV Set to Evaluate MATV Response
16. Lab: Evaluating MATV Response
17. Creating an ATV Set for BEM Acoustics
18. Lab: Creating an ATV Set for BEM Acoustics
19. Evaluate ATV Response in BEM Acoustics
20. Lab: Evaluating ATV Response in BEM Acoustics
21. Knowledge Check: Using Alternate Component Representations in Acoustics Models

#### 9 Assessment: Working with Acoustics Models - 2020.1 1 Topic

1. Assessment: Working with Acoustics Models

#### *Acoustics Analysis Applications - 2020.1 11 Chapters*

This learning path teaches users how to apply acoustics analysis to solve problems in industry.

#### 1 Gearbox Noise Radiation - 2020.1 7 Topics

1. Analyzing Gearbox Noise Radiation
2. Lab: Analyzing Motion to Acoustics Gearbox Noise
3. Lab Solution: Setting up the Gearbox Model
4. Lab Solution: Setting Up the Acoustic Model
5. Lab Solution: Analyzing and Mapping Data
6. Lab Solution: Setting Up and Solving the Vibro-acoustics Model
7. Knowledge Check: Gearbox Noise Radiation

#### 2 Transmission Loss Using Duct Modes - 2020.1 6 Topics

1. Analyzing Transmission Loss Using Duct Modes
2. Lab: Analyzing Transmission Loss of a Muffler Using Duct Modes
3. Lab Solution: Setting Up the Finite Element Model
4. Lab Solution: Setting Up and Solving the Solution
5. Lab Solution: Reviewing Results
6. Knowledge Check: Transmission Loss Using Duct Modes



### 3 Panel Transmission Loss - 2020.1 9 Topics

1. Analyzing Panel Transmission Loss
2. Lab: Analyzing Aircraft Panel Transmission Loss
3. Lab Solution: Setting up the Acoustic Model
4. Lab Solution: Setting Up the Solution
5. Lab Solution: Reviewing Results
6. Lab Solution: Applying Static Pressure and Temperature
7. Lab Solution: Reviewing Static Pressure and Temperature Results
8. Lab Solution: Analyzing Narrow Band Results
9. Knowledge Check: Panel Transmission Loss

### 4 Compressor Noise Radiation - 2020.1 9 Topics

1. Using Binary Loads and Binary Nodes in Acoustics Analysis
2. Lab: Analyzing Compressor Noise Radiation Using Binary Displacement Loads
3. Lab Solution: Importing the Model
4. Lab Solution: Meshing the Model
5. Lab Solution: Solving and Reviewing Results
6. Lab: Analyzing Compressor Noise Radiation Using Binary Modes
7. Lab Solution: Setting Up the Finite Element Model
8. Lab Solution: Solving and Reviewing Results
9. Knowledge Check: Compressor Noise Radiation

### 5 Electric Motor Noise - 2020.1 6 Topics

1. Analyzing Electric Motor Noise
2. Lab: Analyzing Electric Motor Noise
3. Lab Solution: Defining the Structural Model
4. Lab Solution: Importing and Mapping Force Loads
5. Lab Solution: Solving and Reviewing Results
6. Knowledge Check: Electric Motor Noise

### 6 Pass-By Noise - 2020.1 6 Topics

1. Analyzing Pass By Noise
2. Lab: Analyzing Car Engine Bay Noise
3. Lab Solution: Setting Up the Acoustic Model
4. Lab Solution: Setting Up the Acoustic Objects
5. Lab Solution: Reviewing Acoustic Results
6. Knowledge Check: Pass By Noise

### 7 Wind Noise - 2020.1 7 Topics

1. Analyzing Wind Noise
2. Lab: Analyzing Wind Noise
3. Lab Solution: Reviewing the Finite Element Model
4. Lab Solution: Mapping CFD Loads
5. Lab Solution: Setting up and Solving the Vibro-acoustic Solution
6. Lab Solution: Reviewing Results
7. Knowledge Check: Wind Noise

### 8 Aircraft Cabin Noise Using TBL Loads - 2020.1 7 Topics

1. Analyzing Turbulent Boundary Layer Models
2. Lab: Analyzing Aircraft Panel Noise
3. Lab Solution: Setting up the Finite Element Model
4. Lab Solution: Setting up and Solving for VATVs
5. Lab Solution: Generating TBL Loading
6. Lab Solution: Setting up, Solving, and Reviewing Results
7. Knowledge Check: Aircraft Cabin Noise Using TBL Loads

### 9 Fan Noise - 2020.1 7 Topics

1. Analyzing Fan Noise
2. Lab: Analyzing Electronics Fan Noise
3. Lab Solution: Reviewing the Finite Element Model
4. Lab Solution: Mapping CFD Loads



5. Lab Solution: Setting Up and Solving the Vibro-acoustic Solution
6. Lab Solution: Reviewing Results
7. Knowledge Check: Fan Noise

#### 10 Satellite Vibration - 2020.1 9 Topics

1. Analyzing Satellite Vibration
2. Lab: Analyzing Response to Random Excitation of a Satellite
3. Lab Solution: Setting Up the Satellite Model
4. Lab Solution: Solving and Reviewing Results
5. Lab Solution: Creating the Random Vibro-Acoustic Solution
6. Lab Solution: Defining the AML and Plane Waves
7. Lab Solution: Setting Up the PSD Solution
8. Lab Solution: Reviewing Results
9. Knowledge Check: Satellite Vibration

#### 11 Assessment: Acoustics Analysis Applications - 2020.1 1 Topic

1. Assessment: Acoustics Analysis Applications

#### *Controls and Mechatronics Co-simulation 3 Chapters*

Learn how to control the motion mechanism using data from an external control system.

#### 1 Control Elements 4 Topics

1. Control Elements
2. Creating Control Elements
3. Lab: Using Control Elements
4. Knowledge Check: Control Elements

#### 2 Mechatronics Co-simulation 8 Topics

1. Co-simulation with Third-Party Software
2. Co-simulation using Amesim
3. Running a Co-simulation using Amesim
4. Lab: Running a Co-simulation using Simcenter Amesim
5. Running a Co-simulation using Matlab/Simulink
6. Running a Co-simulation using FMI
7. Lab: Running a Co-simulation using FMI
8. Knowledge Check: Mechatronics Co-simulation

#### 3 Assessment: Controls and Mechatronics Co-simulation 1 Topic

1. Assessment: Controls and Mechatronics Co-simulation

#### *FE Model Correlation 7 Chapters*

Prepare the physical tests using the pre-test planning tools and how to correlate modal finite element results with experimental data in Simcenter 3D.

#### 1 FE model correlation 3 Topics

1. Introduction to FE model correlation and updating
2. Getting started in Simcenter 3D FE Model Correlation
3. Knowledge Check: FE model correlation

#### 2 Pre-test solution process 10 Topics

1. Pre-test solution process
2. Pre-test DOFs
3. Lab: Creating pre-test solution and defining DOFs
4. Sensor selection
5. Create pre-test solution and solve sensor configuration
6. Lab: Defining sensor configurations
7. Exciter selection
8. Lab: Defining an exciter configuration using the DPR method
9. Lab Answer: Using a Pre-test solution to define exciter locations
10. Knowledge Check: Pre-test solution process

### 3 Create a test analysis reference solution 4 Topics

1. Test analysis reference solution
2. Sharing sensor and exciter locations with test engineers
3. Lab: Creating a test analysis reference solution
4. Knowledge Check: Create a test analysis reference solution

### 4 Prepare for correlation analysis 7 Topics

1. Correlation solution process
2. Creating test and analysis reference solutions
3. Lab: Managing test and analysis reference data
4. Geometrical correlation of work and reference model
5. Lab: Prepare a model for correlation solution process
6. Lab Answer: Prepare a model for correlation solution process
7. Knowledge Check: Prepare for correlation analysis

### 5 Modal correlation 12 Topics

1. Modal correlation
2. Manage mode sensors and work with mode pairs
3. Lab: Managing mode sensors
4. Quantitative modal correlation
5. Generate and display matrix results
6. Lab: Visualizing modal correlation results
7. Correlate modes of symmetric structure
8. Lab: Modal correlation of a symmetric structure
9. Lab: Comparing correlation mode shapes
10. Lab: Modal correlation of an aircraft engine nacelle
11. Lab Answer: Modal correlation of an aircraft engine nacelle
12. Knowledge Check: Modal correlation

### 6 FRF correlation 8 Topics

1. Analysis solution process
2. Create analysis solution and output request
3. Lab: Create an analysis solution with FRF output
4. FRF correlation
5. Create FRF correlation and display overlay FRFs
6. Lab: Creating FRF correlation
7. Lab Answer: Creating an FRF correlation
8. Knowledge Check: FRF correlation

### 7 Assessment: FE model correlation 1 Topic

1. Assessment: FE model correlation

## *Motion Fundamentals 12 Chapters*

Learn to use the basic capabilities of Simcenter 3D Motion to analyze mechanisms.

### 1 Introduction to Simcenter 3D Motion 7 Topics

1. Introduction to Simcenter 3D Motion
2. What is a Mechanism?
3. Motion Workflow
4. Working in Motion
5. Using Motion Files
6. Lab: Animating a Mechanism
7. Knowledge Check: Working in Motion

### 2 Analyzing Mechanisms in Motion 10 Topics

1. Motion Solvers and General Solution Options
2. Motion Analysis-Specific Solution Options
3. Running a Kinematic Analysis
4. Running a Dynamic Analysis
5. Running a Static Analysis
6. Lab: Running a Kinematic Analysis with Motion

7. Lab: Articulating a Simple Mechanism
8. Lab: Running a Dynamic Analysis with Motion
9. Lab: Running a Static Analysis with Motion
10. Knowledge Check: Analyzing Mechanisms in Motion

### 3 Preparing Models in Motion 8 Topics

1. Preparing Models in Motion
2. Using Assemblies in Motion
3. Lab: Using Assemblies in Motion
4. Importing CAD Data into Motion
5. Lab: Importing CAD Data into Motion
6. Creating a Mechanism in Motion with Primitive Geometry
7. Lab: Creating a Mechanism with Primitive Geometry
8. Knowledge Check: Preparing Models for Motion

### 4 Creating Bodies, Joints, and Drivers 20 Topics

1. Motion Bodies
2. Lab: Creating Motion Bodies
3. Joints
4. Creating Joints
5. Lab: Creating Cylindrical and Universal Joints
6. Understanding the Gruebler Count
7. Lab: Checking the Gruebler Count
8. Assembling CAD Data
9. Joint Friction
10. Adding Friction on a Joint
11. Lab: Defining Friction on a Joint
12. Specialized Constraints and Couplers
13. Creating Specialized Constraints and Couplers
14. Lab: Creating a Gear Coupler
15. Lab: Defining a Point on Curve Constraint
16. Lab Solution: Defining a Point on Curve Constraint
17. Motion Drivers
18. Creating Motion Drivers
19. Lab: Creating a Harmonic Motion Driver
20. Knowledge Check: Creating Bodies, Joints, and Drivers

### 5 Defining Springs, Dampers, and Bushings 8 Topics

1. Springs and Dampers
2. Creating Springs and Dampers
3. Lab: Creating a Spring
4. Lab: Creating a Torsion Spring and Damper
5. Bushings
6. Creating Bushings
7. Lab: Creating Bushings
8. Knowledge Check: Defining Springs, Dampers, and Bushings

### 6 Working with Data 16 Topics

1. Profiles
2. Using Profiles
3. Lab: Using Profiles
4. Expressions
5. Using Expressions
6. Lab: Using Expressions
7. Parameter Tables
8. Using Parameter Tables
9. Lab: Using Parameter Tables
10. Math Functions and AFUs
11. Using Math Functions and AFUs
12. Lab: Using Math Functions and AFUs
13. Markers, Smart Points, and Sensors
14. Creating Markers, Smart Points, and Sensors
15. Lab: Creating Markers and Sensors

## 16. Knowledge Check: Working with Data

### 7 Adding Loads 7 Topics

1. Adding Loads to the Motion Model
2. Creating Forces and Torques
3. Lab: Creating Scalar and Vector Forces
4. Lab: Creating a Scalar Torque
5. Lab: Creating Forces and Torques on a Scissors Jack
6. Lab Solution: Creating Forces and Torques on a Scissors Jack
7. Knowledge Check: Adding Loads

### 8 Defining Contact 14 Topics

1. 3D Contact
2. Defining 3D Contact
3. Lab: Creating 3D Contact
4. Lab: Adding Friction to 3D Contact
5. Lab: Creating a Valve Spring and 3D Contact
6. Lab Solution: Creating a Valve Spring and 3D Contact
7. Analytical Contact
8. Analytical Contact Parameters
9. Defining Analytical Contact
10. Lab: Creating Analytical Contact
11. Lab: Creating Analytical Contact Geometry
12. Lab: Creating Analytical Contact on a Newton's Cradle
13. Lab Solution: Creating Analytical Contact on a Newton's Cradle
14. Knowledge Check: Defining Contact

### 9 Solving a Motion Analysis 7 Topics

1. Setting Up a Motion Analysis
2. Setting Up and Solving a Static Analysis
3. Setting Up and Solving a Dynamics Analysis
4. Improving Solver Performance and Debugging Solver Errors
5. Lab: Debugging Solver Errors
6. Exporting a Solution and Solving Outside Simcenter 3D
7. Knowledge Check: Solving a Motion Analysis

### 10 Working with Motion Results 10 Topics

1. Motion Results
2. Animating Motion Results
3. Graphing Motion Results
4. Lab: Animating and Graphing Forces
5. Lab: Running a Clearance Analysis
6. Lab: Identifying Interference
7. Lab: Tracing Movement
8. Lab: Running a Simulation with Spreadsheet Data
9. Lab: Displaying Results in Results Viewer
10. Knowledge Check: Working with Motion Results

### 11 Working with Submechanisms 8 Topics

1. Submechanisms
2. Working with Submechanisms
3. Lab: Adding a Submechanism
4. Adding Override Properties to Submechanisms
5. Lab: Adding Override Properties to Submechanisms
6. Mapping Submechanism Geometry
7. Lab: Mapping Submechanism Geometry
8. Knowledge Check: Working with Submechanisms

### 12 Assessment: Motion Fundamentals 1 Topic

1. Assessment: Motion Fundamentals

### *Discrete Drivetrain 1 Chapter*

Learn how to create chain, track, and cable models for Motion analysis.

## 1 Discrete Drivetrain 13 Topics

1. Introduction to Discrete Drivetrain
2. Defining Discrete Drivetrain Layout Elements
3. Defining Discrete Drivetrain Pattern Elements
4. Defining Discrete Drivetrain Advanced Reporting
5. Defining Discrete Drivetrain Pre-tension and Sag
6. Creating a Chain Model
7. Lab: Creating a Chain Model
8. Creating a Track Model
9. Solving a Track Model
10. Lab: Creating a Track Model
11. Creating a Cable Model
12. Lab: Creating a Cable Model
13. Knowledge Check: Discrete Drivetrain

## *Fundamentals of thermal analysis in Simcenter 3D 6 Chapters*

Learn how to use the basic capabilities of Simcenter 3D Thermal Multiphysics to perform sophisticated thermal analysis.

### 1 Introducing Simcenter 3D Multiphysics 5 Topics

1. Introducing Simcenter 3D Multiphysics
2. Introducing Simcenter 3D Multiphysics workflow
3. Lab: Simulation process in Simcenter 3D Pre/Post
4. Heat transfer concepts
5. Assessment: Introducing thermal analysis in Simcenter 3D Multiphysics

### 2 Meshing for thermal analysis 9 Topics

1. Selecting a mesh and element types
2. Defining a mesh for thermal analysis
3. Creating mesh and defining material and physical properties for a thermal models
4. Lab: Create multiple mesh types
5. Lab: Create physical properties for a heat exchanger model
6. Working with mesh
7. Lab: Create mesh mating conditions and mesh controls
8. Lab: Resolve mesh quality issues
9. Assessment: Meshing for thermal analysis

### 3 Defining thermal boundary conditions 5 Topics

1. Defining thermal loads
2. Defining thermal constraints
3. Applying thermal boundary conditions
4. Lab: Define thermal boundary conditions
5. Assessment: Defining thermal boundary conditions

### 4 Defining thermal contacts 7 Topics

1. Thermal coupling
2. Selecting primary and secondary regions
3. Lab: Perform a heat transfer analysis between a chip, PCB and casting
4. Thermal coupling types
5. Defining thermal contacts
6. Lab: Create thermal coupling boundary conditions
7. Assessment: Defining thermal contacts

### 5 Steady state and transient thermal analysis 11 Topics

1. Solution setups for steady state and transient analysis
2. Steady state analysis
3. Setting up and solving a steady state solution
4. Lab: Define a thermostat in a steady state solution
5. Controlling transient solution
6. Defining time steps in transient solutions
7. Principle Lab: Thermal transient analysis of a power supply

8. Lab Answer: Thermal transient analysis of a power supply
9. Setting up a transient solution from a condition sequence
10. Lab: Post process transient results
11. Assessment: Steady state and transient thermal analysis

#### 6 Assessment: Fundamentals of thermal analysis in Simcenter 3D 1 Topic

1. Assessment: Fundamentals of thermal analysis in Simcenter 3D

#### *Thermal-structural analysis in Simcenter 3D Multiphysics 3 Chapters*

Analyze a general thermal-structural model, use advanced modeling features to perform a thermal-structural analysis of turbomachinery in hybrid 2D/3D models.

#### 1 Coupled thermal-structural analysis 9 Topics

1. Structural analysis in Simcenter 3D Multiphysics
2. Lab: Set up and run a structural solution
3. Coupled thermal-structural analysis
4. Setting up a thermal-structural solution
5. Post-processing thermal-structural results
6. Lab: Set up and run a coupled thermal-structural solution
7. Lab: Thermal-structural analysis of the fog lamp
8. Lab answer: Thermal-structural analysis of the for lamp
9. Assessment: Coupled thermal-structural analysis

#### 2 Multiphysics analysis of turbomachines 13 Topics

1. Multiphysics analysis of turbomachines
2. Defining thermal streams, voids and convecting zones
3. Create thermal boundary conditions for an aeroengine compressor
4. Using condition sequences in turbomachinery modeling
5. Create a solution from a condition sequence
6. Using axisymmetric and non-axisymmetric elements
7. Creating the axisymmetric models with non-axisymmetric parts
8. Lab: Create physical properties and elements for an axisymmetric model
9. Lab: Create an axisymmetric model
10. Creating hybrid 2D and 3D models
11. Setting up a hybrid 2D and 3D model
12. Lab: Set up a hybrid 2D and 3D thermal model
13. Multiphysics analysis of turbomachines

#### 3 Assessment: Thermal-structural analysis in Simcenter 3D Multiphysics 1 Topic

1. Assessment: Thermal-structural analysis in Simcenter 3D Multiphysics

#### *Flexible Body Analysis 4 Chapters*

Learn how to analyze and post-process flexible motion bodies.

#### 1 Flexible Body Analysis with Automatic Flex 7 Topics

1. Introduction to Flexible Bodies
2. Flexible Body Analysis Using Automatic Flex
3. Using Automatic Flex to Create a Flexible Body
4. Lab: Using Automatic Flex to Create a Flexible Body
5. Lab: Adding Flexibility to a Model using Automatic Flex with Mesh
6. Lab Solution: Adding Flexibility to a Model using Automatic Flex with Mesh
7. Knowledge Check: Flexible Body Analysis with Automatic Flex

#### 2 Flexible Body Analysis with Flexible Body 4 Topics

1. Flexible Body Analysis Using Flexible Body
2. Using Flexible Body to Create a Flexible Body
3. Lab: Using Flexible Body to Create a Flexible Body
4. Knowledge Check: Flexible Body Analysis with Flexible Body

#### 3 Flexible Body Post-processing 4 Topics

1. Flexible Body Post-processing
2. Post Processing Flexible Bodies
3. Lab: Post Processing Flexible Bodies
4. Knowledge Check: Flexible Body Post-processing

#### 4 Assessment: Flexible Body Analysis 1 Topic

1. Assessment: Flexible Body Analysis

#### *Advanced thermal modeling applications 6 Chapters*

Learn how to model advanced radiation, 1D hydraulic network, articulation, Joule heating, Peltier cooling and how to extend the solver functionality.

#### 1 Radiation modeling 6 Topics

1. Understanding thermal radiation
2. Radiation exchange
3. Radiation modeling
4. Defining enclosure and radiative heating
5. Lab: Explore advanced thermo-optical properties for radiation modeling
6. Assessment: Radiation modeling

#### 2 1D hydraulic network modeling 7 Topics

1. 1D hydraulic duct networks
2. How the thermal solver computes ducts
3. Creating a 1D mesh duct network and modeling the cooling of a 2D shell heat exchanger
4. Lab: Create 1D duct network in a mold
5. Analyzing forced convection in a heat exchanger using immersed ducts
6. Lab: Create duct boundary conditions on a model
7. Assessment: 1D hydraulic network modeling

#### 3 Articulation and motion modeling 5 Topics

1. Articulation and motion modeling in heat transfer analysis
2. How the thermal solver computes articulation
3. Modeling the thermal effects of moving parts
4. Lab: Model the robot arm motion using articulation
5. Assessment: Articulation and motion modeling

#### 4 Joule heating and Peltier cooler 5 Topics

1. Joule heating and Peltier cooler modeling
2. Modeling Joule heating
3. Lab: Model Joule heating
4. Lab: Model a Peltier cooler
5. Assessment: Joule heating and Peltier cooler

#### 5 Customize the thermal solver 6 Topics

1. Extending the solver functionality with a user-written subroutine
2. Lab: Using a user written subroutine define a thermostat
3. Customizing the thermal solver using plugin functions
4. Including and running the plugin function in a solve
5. Lab: Using a plugin function to specify a heat transfer coefficient
6. Knowledge check: Customize the thermal solver

#### 6 Assessment: Advanced thermal modeling applications 1 Topic

1. Assessment: Advanced thermal modeling applications

#### *Fundamentals of using Pre/Post - 2021.1 4 Chapters*

Learn how to analyze a model and work with analysis data in Simcenter 3D.

#### 1 Learning Experience Overview 2 Topics

1. Welcome: Navigation Overview
2. Fundamentals of using Pre/Post Intro



## 2 Analyzing Models in Simcenter 3D Pre/Post - 2021.1 4 Topics

1. What Can You Do with Pre/Post?
2. Finite Element Analysis in Simcenter 3D
3. Finite Element Analysis in Simcenter 3D
4. Assessment: Analyzing Models in Simcenter 3D and Pre/Post

## 3 Managing Analysis Data in Simcenter 3D Files - 2021.1 8 Topics

1. Simcenter 3D Files Overview
2. Defining the Pre/Post Model
3. Idealizing the Model's Geometry
4. Meshing the Model
5. Applying Boundary Conditions
6. Solving the Model and Post-processing
7. Lab: Using Simcenter 3D Files in an Analysis
8. Assessment: Managing Analysis Data in Simcenter 3D Files

## 4 Using Pre/Post Features to Work with Models - 2021.1 14 Topics

1. Working with a Model using the Pre/Post User Interface
2. Using the Simulation Navigator to Work with Your Model
3. Lab: Working with a Model Using the Pre/Post User Interface
4. Displaying a Model
5. Lab: Displaying a Model
6. Selecting Objects
7. Using Selection Recipes
8. Lab: Selecting Objects
9. Using Groups
10. Lab: Using Groups
11. Working with Coordinate Systems
12. Lab: Working with Coordinate Systems
13. Assessment: Using Pre/Post Features to Work with Models
14. Thank you for watching Fundamentals of using Pre/Post

## *Preparing the Model for Analysis - 2021.1 8 Chapters*

Learn how to prepare a model for analysis by working with geometry, meshes, connections, assemblies, loads, and boundary conditions.

### 1 Preparing Geometry for Meshing - 2021.1 13 Topics

1. Loading a Model into Simcenter 3D
2. Preparing Geometry for Meshing
3. Using Synchronous Modeling to Model Parts
4. Lab: Using Synchronous Modeling to Modify Parts
5. Simplifying Geometry with Idealization
6. Lab: Creating Midsurfaces before Meshing
7. Simplifying Geometry with Abstraction
8. Lab: Simplifying Geometry with Abstraction
9. Working with Associative Copies of Geometry
10. Lab: Working with Associative Copies of Geometry
11. Lab: Simplifying Geometry for Meshing
12. Lab Solution: Simplifying Geometry for Meshing
13. Assessment: Preparing Geometry

### 2 Meshing a Model - 2021.1 29 Topics

1. Selecting a Mesh and Element Type
2. Creating a Mesh
3. Lab: Creating a 3D Tetrahedral Mesh
4. Using Mesh Collectors to Organize the Model
5. Lab: Using Mesh Collectors to Organize the Model
6. Defining Material Properties for a Mesh
7. Lab: Defining Material Properties for a Mesh
8. Lab: Defining Physical Properties for a Mesh
9. Creating a 3D Hexahedral Mesh
10. Lab: Creating a 3D Hexahedral Mesh

11. Splitting Complex Bodies for Hexahedral Meshing
12. Creating a 2D Mesh
13. Lab: Creating a 2D Mesh
14. Creating a 2D Mapped Mesh
15. Lab: Creating a 2D Mapped Mesh
16. Creating a 1D Mesh
17. Lab: Creating a 1D Mesh
18. Controlling the Mesh Display
19. Creating Mesh Mating Conditions to Connect Meshes
20. Lab: Creating Mesh Mating Conditions
21. Editing Meshes with Manual Mesh Techniques
22. Lab: Editing Meshes with Manual Mesh Techniques
23. Controlling Mesh Density
24. Lab: Controlling Mesh Density
25. Setting Element Size and Surface Curvature
26. Lab: Modifying Element Size
27. Lab: Creating a Structured Mesh
28. Lab Solution: Creating a Structured Mesh
29. Assessment: Meshing

### [3 Modeling Connections - 2021.1 19 Topics](#)

1. Modeling Connections
2. Modeling Pinned Connections
3. Lab: Modeling Pinned Connections
4. Modeling Connections with Spider Elements
5. Lab: Modeling Connections with Spider Elements
6. Modeling Glue Connections
7. Lab: Modeling Edge-Surface Glue Connections
8. Lab: Modeling Surface-Surface Glue Connections
9. Modeling Bolted Connections
10. Modeling Bolted Connections Using Nuts
11. Lab: Modeling a Bolted Connection with a Nut
12. Modeling a Tapped Bolted Connection
13. Lab: Modeling a Tapped Bolted Connection
14. Lab: Applying Bolt Pre-loads
15. Creating Universal Connections
16. Lab: Creating Universal Connections
17. Lab: Connecting Bodies
18. Lab Answer: Connecting Bodies
19. Assessment: Modeling Connections

### [4 Modeling Assemblies - 2021.1 6 Topics](#)

1. Modeling Assemblies
2. Modeling an Assembly FEM from a CAD Assembly
3. Modeling an Assembly FEM without a CAD Assembly
4. Lab: Modeling an Associative Assembly FEM
5. Lab: Modeling a Non-associative Assembly FEM
6. Assessment: Modeling Assemblies

### [5 Applying Boundary Conditions - 2021.1 11 Topics](#)

1. Applying Boundary Conditions
2. Nastran Structural Loads
3. Nastran Structural Constraints
4. Applying Loads
5. Applying Constraints
6. Lab: Applying Loads and Constraints
7. Applying Contact
8. Lab: Applying Contact
9. Lab: Applying Boundary Conditions
10. Lab Answer: Applying Boundary Conditions
11. Assessment: Applying Boundary Conditions

### [6 Defining Variable Conditions and Properties - 2021.1 15 Topics](#)

1. Using Fields
2. Types of Fields
3. Using Fields to Define Boundary Conditions
4. Lab: Using Fields to Define a Boundary Condition
5. Using a Spatial Map Field to Define a Boundary Condition
6. Lab: Using a Spatial Map Field to Define a Boundary Condition
7. Using a Field to Define Material Properties
8. Lab: Using a Field to Define Nonlinear Material Properties
9. Displaying Fields
10. Lab: Displaying Fields
11. Using Expressions
12. Lab: Using Expressions to Define Boundary Conditions
13. Lab: Defining a Variable Boundary Condition
14. Lab Solution: Defining a Variable Boundary Condition
15. Assessment: Defining Variable Conditions and Properties

#### [7 Modeling Symmetry - 2021.1 5 Topics](#)

1. Symmetry Modeling Overview
2. Lab: Modeling a Cyclic Symmetric Structure
3. Lab: Modeling an Axisymmetric Structure
4. Lab: Using Plane Stress Elements in a Axisymmetric Analysis
5. Knowledge Check: Modeling Symmetry

#### [8 Checking the Model and Resolving Problems - 2021.1 7 Topics](#)

1. Checking Mesh Quality
2. Techniques for Resolving Mesh Quality Issues
3. Lab: Resolving Mesh Quality Problems
4. Checking the Model Before Solving
5. Techniques for Resolving Model Quality Issues
6. Lab: Resolving Model Quality Issues
7. Assessment: Checking the Model and Resolving Problems

#### [Solving the Model - 2021.1 3 Chapters](#)

Learn how to solve a model with the Simcenter Nastran solver using structural analysis types.

#### [1 Setting Up and Running a Structural Analysis - 2021.1 9 Topics](#)

1. Using Solutions and Subcases
2. Creating Solutions and Subcases
3. Lab: Creating Solutions and Subcases
4. Defining Solution Attributes
5. Setting Solver Parameters
6. Solving the Model
7. Dealing with Common Solver Errors
8. Validating Results
9. Assessment: Setting Up and Running a Structural Analysis

#### [2 Introduction to Structural Analysis Workflows - 2021.1 7 Topics](#)

1. Structural Analysis Overview
2. Linear Statics Analysis Workflow
3. Lab: Linear Statics Analysis Workflow
4. Normal Modes Analysis Workflow
5. Lab: Normal Modes Analysis Workflow
6. Using Subcase Versus Global Constraints
7. Assessment: Introduction to Structural Analysis Workflows

#### [3 Introduction to Nonlinear Analysis Workflows - 2021.1 8 Topics](#)

1. Nonlinear Analysis Overview
2. Setting Up a Nonlinear Solution
3. Lab: Geometric Nonlinear Analysis
4. Using Time Steps in a Nonlinear Solution
5. Lab: Using Timesteps in a Nonlinear Solution

6. Evaluating Nonlinear Models
7. Lab: Evaluating Nonlinear Models
8. Assessment: Introduction to Nonlinear Analysis Workflows

#### *Reviewing Analysis Results - 2021.2 6 Chapters*

Learn how to display analysis results using post views, graphs, and reports.

#### [1 Displaying Results in Post Views - 2021.2 23 Topics](#)

1. Displaying Results Overview
2. Displaying Results in Post Processing
3. Displaying Results in a Post View
4. Lab: Displaying Results in a Post View
5. Controlling Visibility in Post Views
6. Lab: Controlling Visibility in Post Views
7. Displaying Results in Multiple Viewports
8. Lab: Displaying Results in Multiple Viewports
9. Animating Results
10. Lab: Animating Results
11. Annotating Results
12. Lab: Annotating Results
13. Displaying More Results in Post Processing
14. Displaying Stress/Strain Results on 2D Elements
15. Lab: Displaying Stress/Strain Results on 2D Elements
16. Calculating and Displaying Beam Stresses
17. Lab: Displaying Beam Stresses
18. Displaying Symmetry Results in a Post View
19. Lab: Displaying Axisymmetric Results in a Post View
20. Displaying Results in the Results Viewer
21. Lab: Displaying Results in Post Views
22. Lab Solution: Displaying Results in Post Views
23. Assessment: Displaying Results in Post Views

#### [2 Manipulating Results Data - 2021.2 10 Topics](#)

1. Manipulating Results Data Overview
2. Identifying and Outputting Results
3. Lab: Identifying and Outputting Results
4. Creating Custom Results
5. Lab: Creating Custom Results
6. Combining and Enveloping Results
7. Lab: Enveloping and Combining Results
8. Creating Nodal Force Reports
9. Lab: Creating Nodal Force Reports
10. Assessment: Manipulating Results Data

#### [3 Graphing Results - 2021.2 14 Topics](#)

1. Graphing Overview
2. Graphing Results Across FE Entities
3. Lab: Graphing Results Across FE Entities
4. Graphing Results Using a Query Curve
5. Lab: Graphing Results Using a Query Curve
6. Graphing Results Across Iterations
7. Lab: Graphing Results Across Multiple Iterations
8. Plotting Two Functions
9. Lab: Plotting Two Functions
10. Modifying Graph Display Properties
11. Lab: Modifying Graph Display Properties
12. Lab: Graphing Results
13. Lab Answer: Graphing Results
14. Assessment: Graphing Results

#### [4 Saving and Restoring Views - 2021.2 6 Topics](#)

1. Saving and Restoring Views

2. Saving and Restoring Layout States to Set Up Views
3. Lab: Saving and Restoring Layout States to Set Up Views
4. Saving and Restoring Post View Settings
5. Lab: Saving and Restoring Post View Settings
6. Assessment: Saving and Restoring Views

#### 5 Generating Reports - 2021.2 4 Topics

1. Introduction to Creating Reports
2. Generating a Report
3. Customizing a Report Template
4. Assessment: Generating Reports

#### 6 Assessment: Reviewing Analysis Results - 2021.2 1 Topic

1. Assessment: Reviewing Analysis Results

#### *Processes and Solutions - 2021.2 7 Chapters*

Learn how to analyze models using specialized Simcenter 3D tools.

#### 1 Adaptive Meshing - 2021.2 4 Topics

1. Adaptive Meshing Overview
2. Refining a Mesh with Adaptive Meshing
3. Lab: Refining a Mesh with Adaptive Meshing
4. Assessment: Adaptive Meshing

#### 2 Superelements - 2021.2 7 Topics

1. Superelement Analysis Overview
2. Reducing a Subassembly to a Superelement
3. Lab: Reducing a Subassembly to a Superelement
4. System Modeling with External Superelements Overview
5. Modeling with External Superelements
6. Lab: Modeling with External Superelements
7. Assessment: Superelements

#### 3 Introduction to Thermal Analysis - 2021.2 4 Topics

1. Thermal Analysis Overview
2. Setting Up and Solving a Thermal Analysis
3. Lab: Setting Up and Solving a Thermal Analysis
4. Assessment: Introduction to Thermal Analysis

#### 4 Geometry Optimization - 2021.2 4 Topics

1. Geometry Optimization Overview
2. Geometry Optimization Workflow
3. Lab: Geometry Optimization
4. Assessment: Geometry Optimization

#### 5 Simcenter Nastran Design Optimization - 2021.2 5 Topics

1. Simcenter Nastran Design Optimization Overview
2. Setting up the Model for Nastran Design Optimization
3. Creating Constraints and Solving for Simcenter Nastran Design Optimization
4. Lab: Simcenter Nastran Design Optimization
5. Assessment: Design Optimization

#### 6 Simcenter Nastran Topology Optimization - 2021.2 4 Topics

1. Simcenter Nastran Topology Optimization Overview
2. Simcenter Nastran Topology Optimization Workflow
3. Lab: Simcenter Nastran Topology Optimization
4. Assessment: Simcenter Nastran Topology Optimization

#### 7 Assessment: Processes and Solutions - 2021.2 1 Topic

1. Assessment: Processes and Solutions

#### *Introduction to Response Dynamics - 2021.2 1 Chapter*

Learn how to use response dynamics to analyze a model's response to an excitation.

#### 1 Response Dynamics - 2021.2 11 Topics

1. Response Dynamics Overview
2. Setting Up and Solving a Response Dynamics Analysis
3. Lab: Part 1: Setting Up and Solving a Response Dynamics Analysis
4. Solving a Transient Analysis
5. Lab: Part 2: Solving a Response Dynamics Transient Analysis
6. Analyzing a Random Event
7. Lab: Analyzing a Random Event
8. Part 1: Analyzing Response to Harmonic and PSD Excitations
9. Part 2: Analyzing Response to Harmonic and PSD Excitations
10. Lab: Analyzing Response to Harmonic and PSD Excitations
11. Assessment: Introduction to Response Dynamics Analysis

#### *Working with Simcenter 3D / Simcenter Nastran FEM Acoustics 6 Chapters*

This learning path teaches users how to prepare a Simcenter 3D / Simcenter Nastran FEM Acoustics model and review analysis results.

#### 1 Analysis with Simcenter 3D/Simcenter Nastran FEM Acoustics 5 Topics

1. Introduction to Simcenter 3D / Simcenter Nastran FEM Acoustics
2. Analyzing an Acoustics Model in Simcenter 3D / Simcenter Nastran FEM Acoustics
3. Lab: Analyzing an Acoustics Model in Simcenter 3D/Simcenter Nastran FEM Acoustics
4. Analysis with the Simcenter 3D Noise and Vibration Solver
5. Knowledge Check: Introduction to Simcenter 3D/Simcenter Nastran FEM Acoustics

#### 2 Meshing Acoustics Models 17 Topics

1. Meshes for Acoustic Models
2. Acoustic Mesh Types
3. Meshing Structural Models
4. Lab: Meshing Structural Models
5. Meshing for Interior Acoustic Analysis
6. Lab: Generating Meshes for Interior Acoustic Analysis
7. Meshing for External Acoustic Analysis
8. Lab: Generating Meshes for Exterior Acoustic Analysis
9. Creating a Microphone Mesh
10. Lab: Creating a Microphone Mesh
11. Acoustic Materials
12. Lab: Meshing an Acoustics Model
13. Lab Solution: Meshing an Acoustics Model
14. Lab: Meshing Vibro-acoustics Model
15. Lab Solution Part 1: Meshing a Vibro-acoustics Model
16. Lab Solution Part 2: Meshing a Vibro-acoustics Model
17. Knowledge Check: Meshing an Acoustics Model

#### 3 Setting Up and Solving Acoustics Solutions 20 Topics

1. Setting Up and Solving an Acoustics Model
2. Solution Types for Simcenter 3D / Simcenter Nastran FEM Acoustics
3. Solution Parameters for Simcenter 3D / Simcenter Nastran FEM Acoustics
4. Lab: Setting Up and Solving an Acoustics Model
5. Boundary Conditions for Simcenter 3D / Simcenter Nastran Acoustics FEM
6. Creating Boundary Conditions for Acoustics Analysis
7. Lab: Creating a Boundary Condition for Acoustics Analysis
8. Creating Loads for Acoustics Analysis
9. Lab: Creating Loads for Acoustics Analysis
10. Creating Constraints for Acoustics Analysis

11. Lab: Creating Constraints for Acoustics Analysis
12. Simulation Objects for Simcenter 3D / Simcenter Nastran FEM Acoustics
13. Creating Simulation Objects for Acoustics Analysis
14. Lab: Creating Simulation Objects for Acoustics Analysis
15. Solving the Acoustics Model and Reviewing Acoustics Analysis Results
16. Post Processing Scenarios
17. Lab: Setting Up and Solving a Vibro-Acoustic Analysis
18. Lab Solution: Part 1: Setting Up and Solving a Vibro-Acoustics Analysis
19. Lab Solution: Part 2: Setting Up and Solving a Vibro-Acoustics Analysis
20. Knowledge Check: Setting Up and Solving an Acoustics Solution

#### [4 Model and Load Pre-Processing 4 Topics](#)

1. Model and Load Pre-Processing
2. Transforming External Result Data for Acoustics Loads
3. Lab: Using CFD Data to Create Fan Noise Loads
4. Knowledge Check: Model and Load Pre-Processing

#### [5 Using Alternate Component Representations 10 Topics](#)

1. Using Alternate Component Representations in Acoustics Models
2. Creating a Mode Set to Represent a Structural Model
3. Lab: Creating a Mode Set to Represent a Structural Model
4. Creating an ATV Set to Represent an Acoustics Model
5. Lab: Creating an ATV Set to Represent an Acoustics Model
6. Evaluating MATV Response Using Noise and Vibration
7. Lab: Evaluating MATV Response Using Noise and Vibration
8. Creating and Using an FRF Set in a Vibro-Acoustic Analysis
9. Lab: Creating and Using an FRF Set in a Vibro-Acoustic Analysis
10. KC: Using Alternate Component Representations

#### [6 Assessment: Working-with-Simcenter-3D/Simcenter-Nastran-FEM-Acoustics 1 Topic](#)

1. Assessment: Working-with-Simcenter-3D/Simcenter-Nastran-FEM-Acoustics

#### *Applications of Simcenter 3D / Simcenter Nastran FEM Acoustics 7 Chapters*

This learning path teaches users how to apply Simcenter 3D/Simcenter Nastran FEM Acoustics analysis to solve problems in industry.

#### [1 Gearbox Noise Radiation 7 Topics](#)

1. Analyzing Gearbox Noise Radiation
2. Lab: Analyzing Motion to Acoustics Gearbox Noise
3. Lab Solution: Setting up the Gearbox Model
4. Lab Solution: Setting Up the Acoustic Model
5. Lab Solution: Analyzing and Mapping Data
6. Lab Solution: Setting Up and Solving the Vibro-acoustics Model
7. Knowledge Check: Gearbox Noise Radiation

#### [2 Transmission Loss Using Duct Modes 6 Topics](#)

1. Analyzing Transmission Loss with Duct Modes
2. Lab: Analyzing Transmission Loss of a Muffler Using Duct Modes
3. Lab Solution: Setting Up the Finite Element Model
4. Lab Solution: Setting Up and Solving the Solution
5. Lab Solution: Reviewing Results
6. Knowledge Check: Transmission Loss Using Duct Modes

#### [3 Panel Transmission Loss 9 Topics](#)

1. Analyzing Panel Transmission Loss
2. Lab: Analyzing Aircraft Panel Transmission Loss
3. Lab Solution: Setting up the Acoustic Model
4. Lab Solution: Setting Up the Solution
5. Lab Solution: Reviewing Results
6. Lab Solution: Applying Static Pressure and Temperature
7. Lab Solution: Reviewing Static Pressure and Temperature Results



8. Lab Solution: Analyzing Narrow Band Results
9. Knowledge Check: Panel Transmission Loss

#### 4 Electric Motor Noise 4 Topics

1. Analyzing Electric Motor Noise
2. Lab: Analyzing Electric Motor Noise
3. Lab Solution: Analyzing Electric Motor Noise
4. Knowledge Check: Electric Motor Noise

#### 5 Pass-By Noise 6 Topics

1. Analyzing Pass By Noise
2. Lab: Analyzing Car Engine Bay Noise
3. Lab Solution: Setting Up the Acoustic Solution
4. Lab Solution: Setting Up the Acoustic Objects
5. Lab Solution: Reviewing Acoustic Results
6. Knowledge Check: Pass By Noise

#### 6 Satellite Vibration 9 Topics

1. Analyzing Satellite Vibration
2. Lab: Analyzing Response to Random Excitation of a Satellite
3. Lab Solution: Setting Up the Satellite Model
4. Lab Solution: Solving and Reviewing Results
5. Lab Solution: Creating the Random Vibro-Acoustic Solution
6. Lab Solution: Defining the AML and Plane Waves
7. Lab Solution: Setting Up the PSD Solution
8. Lab Solution: Solving and Reviewing Results
9. Knowledge Check: Satellite Vibration

#### 7 Assessment: Applications of Simcenter 3D / Simcenter Nastran FEM Acoustics 1 Topic

1. Assessment: Applications of Simcenter 3D / Simcenter Nastran FEM Acoustics

#### *Ray Acoustics 4 Chapters*

This learning path teaches users how to prepare a Ray Acoustics model, solve it, and review analysis results.

#### 1 Ray Acoustics 8 Topics

1. Introduction to Simcenter 3D Ray Acoustics
2. Ray Acoustics Analysis Theory
3. Meshing a Ray Acoustics Model
4. Setting Up a Ray Acoustics Model
5. Reviewing Ray Acoustics Results
6. Analyzing a Ray Acoustics Model
7. Lab: Analyzing a Ray Acoustics Model
8. Knowledge Check: Ray Acoustics

#### 2 Parking Sensor Simulation 6 Topics

1. Introduction to Parking Sensor Simulation
2. Lab: Parking Sensor Simulation
3. Lab Solution: Exploring the FE Model and Directionality Field
4. Lab Solution: Setting Up and Solving the Ray Acoustics Simulation
5. Lab Solution: Exploring Results
6. Knowledge Check: Parking Sensor Simulation

#### 3 Interior Acoustics and Particle Tracing 4 Topics

1. Introduction to Interior Acoustics and Particle Tracing
2. Lab: Car Audio Simulation
3. Lab Solution: Analyzing a Car Audio Problem
4. Knowledge Check: Interior Acoustics and Particle Tracing

#### 4 Assessment: Ray Acoustics 1 Topic

1. Assessment: Ray Acoustics

Learn how to analyze a model and work with analysis data in Simcenter 3D.

[1 Learning Experience Overview 2 Topics](#)

1. Welcome: Navigation Overview
2. Fundamentals of using Pre/Post Intro

[2 Analyzing Models in Simcenter 3D Pre/Post 4 Topics](#)

1. What Can You Do with Simcenter 3D Pre/Post?
2. Finite Element Analysis in Simcenter 3D
3. Finite Element Analysis in Simcenter 3D
4. Knowledge Check: Analyzing Models in Simcenter 3D and Pre/Post

[3 Managing Analysis Data in Simcenter 3D Files 7 Topics](#)

1. Simcenter 3D Files Overview
2. Working with Simcenter 3D Files in Pre/Post
3. Preparing the Model
4. Modifying Model Geometry
5. Solving the Model and Post-processing
6. Lab: Using Simcenter 3D Files in an Analysis
7. Knowledge Check: Managing Analysis Data in Simcenter 3D Files

[4 Using Pre/Post Features to Work with Models 15 Topics](#)

1. Using Pre/Post Features
2. Using Simcenter 3D Search
3. Using the Simulation Navigator to Work with Your Model
4. Lab: Working with a Model Using the Pre/Post User Interface
5. Displaying a Model
6. Lab: Displaying a Model
7. Selecting Objects
8. Using Selection Recipes
9. Lab: Selecting Objects
10. Using Groups
11. Lab: Using Groups
12. Working with Coordinate Systems
13. Lab: Working with Coordinate Systems
14. Knowledge Check: Using Pre/Post Features to Work with Models
15. Thank you for watching Fundamentals of using Pre/Post

[5 Assessment: Fundamentals of Using Pre/Post 1 Topic](#)

1. Assessment: Fundamentals of Using Pre/Post

*Preparing the Model for Analysis 9 Chapters*

Learn how to prepare a model for analysis by working with geometry, meshes, connections, assemblies, loads, and boundary conditions.

[1 Preparing Geometry for Meshing 13 Topics](#)

1. Loading a Model into Simcenter 3D
2. Preparing Geometry for Meshing
3. Using Synchronous Modeling to Model Parts
4. Lab: Using Synchronous Modeling to Modify Parts
5. Simplifying Geometry with Idealization
6. Lab: Creating Midsurfaces before Meshing
7. Simplifying Geometry with Abstraction
8. Lab: Simplifying Geometry with Abstraction
9. Working with Associative Copies of Geometry
10. Lab: Working with Associative Copies of Geometry
11. Lab: Simplifying Geometry for Meshing
12. Lab Solution: Simplifying Geometry for Meshing
13. Knowledge Check: Preparing Geometry

[2 Meshing a Model 29 Topics](#)

1. Selecting a Mesh and Element Type
2. Creating a Mesh
3. Lab: Creating a 3D Tetrahedral Mesh
4. Using Mesh Collectors to Organize the Model
5. Lab: Using Mesh Collectors to Organize the Model
6. Defining Material Properties for a Mesh
7. Lab: Defining Material Properties for a Mesh
8. Lab: Defining Physical Properties for a Mesh
9. Creating a 3D Hexahedral Mesh
10. Splitting Complex Bodies for Hexahedral Meshing
11. Lab: Creating a 3D Hexahedral Mesh
12. Creating a 2D Mesh
13. Lab: Creating a 2D Mesh
14. Creating a 2D Mapped Mesh
15. Lab: Creating a 2D Mapped Mesh
16. Creating a 1D Mesh
17. Lab: Creating a 1D Mesh
18. Controlling the Mesh Display
19. Creating Mesh Mating Conditions to Connect Meshes
20. Lab: Creating Mesh Mating Conditions
21. Editing Meshes with Manual Mesh Techniques
22. Lab: Editing Meshes with Manual Mesh Techniques
23. Controlling Mesh Density
24. Lab: Controlling Mesh Density
25. Setting Element Size and Surface Curvature
26. Lab: Modifying Element Size
27. Lab: Creating a Structured Mesh
28. Lab Solution: Creating a Structured Mesh
29. Knowledge Check: Meshing

### 3 Modeling Connections 19 Topics

1. Modeling Connections
2. Modeling Pinned Connections
3. Lab: Modeling Pinned Connections
4. Modeling Connections with Spider Elements
5. Lab: Modeling Connections with Spider Elements
6. Modeling Glue Connections
7. Lab: Modeling Edge-Surface Glue Connections
8. Lab: Modeling Surface-Surface Glue Connections
9. Modeling Bolted Connections
10. Modeling Bolted Connections Using Nuts
11. Lab: Modeling a Bolted Connection with a Nut
12. Lab: Applying Bolt Pre-loads
13. Creating Universal Connections
14. Lab: Modeling Universal Connections
15. Lab: Connecting Bodies
16. Lab Solution: Connecting Bodies
17. Lab: Modeling Bolt Universal Connections
18. Lab Solution: Modeling Bolt Universal Connections
19. Knowledge Check: Modeling Connections

### 4 Modeling Assemblies 6 Topics

1. Modeling Assemblies
2. Modeling an Assembly FEM from a CAD Assembly
3. Modeling an Assembly FEM without a CAD Assembly
4. Lab: Modeling an Associative Assembly FEM
5. Lab: Modeling a Non-associative Assembly FEM
6. Knowledge Check: Modeling Assemblies

### 5 Applying Boundary Conditions 11 Topics

1. Applying Boundary Conditions
2. Nastran Structural Loads
3. Nastran Structural Constraints

4. Applying Loads
5. Applying Constraints
6. Lab: Applying Loads and Constraints
7. Applying Contact
8. Lab: Applying Contact
9. Lab: Applying Boundary Conditions
10. Lab Solution: Applying Boundary Conditions
11. Knowledge Check: Applying Boundary Conditions

#### 6 Defining Variable Conditions and Properties 16 Topics

1. Using Fields
2. Types of Fields
3. Using Fields to Define Boundary Conditions
4. Lab: Using Fields to Define a Boundary Condition
5. Using a Spatial Map Field to Define a Boundary Condition
6. Lab: Using a Spatial Map Field to Define a Boundary Condition
7. Using a Field to Define Material Properties
8. Lab: Using a Field to Define Nonlinear Material Properties
9. Displaying Fields
10. Lab: Displaying Fields
11. Using Expressions
12. Defining Expressions
13. Lab: Using Expressions to Define Boundary Conditions
14. Lab: Defining a Variable Boundary Condition
15. Lab Solution: Defining a Variable Boundary Condition
16. Knowledge Check: Defining Variable Conditions and Properties

#### 7 Modeling Symmetry 5 Topics

1. Symmetry Modeling Overview
2. Lab: Modeling a Cyclic Symmetric Structure
3. Lab: Modeling an Axisymmetric Structure
4. Lab: Using Plane Stress Elements in a Axisymmetric Analysis
5. Knowledge Check: Modeling Symmetry

#### 8 Checking the Model and Resolving Problems 7 Topics

1. Checking Mesh Quality
2. Techniques for Resolving Mesh Quality Issues
3. Lab: Resolving Mesh Quality Problems
4. Checking the Model Before Solving
5. Techniques for Resolving Model Quality Issues
6. Lab: Resolving Model Quality Issues
7. Knowledge Check: Checking the Model and Resolving Problems

#### 9 Assessment: Preparing the Model for Analysis 1 Topic

1. Assessment: Preparing the Model for Analysis

#### *Solving the Model 4 Chapters*

Learn how to solve a model with the Simcenter Nastran solver using structural analysis types.

#### 1 Setting Up and Running a Structural Analysis 9 Topics

1. Using Solutions and Subcases
2. Creating Solutions and Subcases
3. Lab: Creating Solutions and Subcases
4. Defining Solution Attributes
5. Setting Solver Parameters
6. Solving the Model
7. Dealing with Common Warnings from the Solve
8. Determining the Validity of Results
9. Knowledge Check: Setting Up and Running a Structural Analysis

#### 2 Introduction to Structural Analysis Workflows 10 Topics

1. Structural Analysis Overview
2. Linear Statics Analysis Workflow
3. Lab: Linear Statics Analysis Workflow
4. Normal Modes Analysis Workflow
5. Lab: Normal Modes Analysis Workflow
6. Using Subcase Constraints Versus Global Constraints
7. Linear Buckling Analysis Overview
8. Linear Buckling Analysis Workflow
9. Lab: Linear Buckling Analysis Workflow
10. Knowledge Check: Introduction to Structural Analysis Workflows

### [3 Introduction to Nonlinear Analysis Workflows 8 Topics](#)

1. Nonlinear Analysis Overview
2. Setting Up a Nonlinear Solution
3. Lab: Geometric Nonlinear Analysis
4. Using Time Steps in a Nonlinear Solution
5. Lab: Using Timesteps in a Nonlinear Solution
6. Evaluating Nonlinear Models
7. Lab: Evaluating Nonlinear Models
8. Knowledge Check: Introduction to Nonlinear Analysis Workflows

### [4 Assessment: Solving the Model 1 Topic](#)

1. Assessment: Solving the Model

### [Introduction to Response Dynamics 1 Chapter](#)

Learn how to use response dynamics to analyze a model's response to an excitation.

### [1 Response Dynamics 11 Topics](#)

1. Response Dynamics Overview
2. Setting Up and Solving a Response Dynamics Analysis
3. Lab: Part 1: Setting Up and Solving a Response Dynamics Analysis
4. Solving a Transient Analysis
5. Lab: Part 2: Solving a Response Dynamics Transient Analysis
6. Analyzing a Random Event
7. Lab: Analyzing a Random Event
8. Part 1: Analyzing Response to Harmonic and PSD Excitations
9. Part 2: Analyzing Response to Harmonic and PSD Excitations
10. Lab: Analyzing Response to Harmonic and PSD Excitations
11. Assessment: Introduction to Response Dynamics Analysis

### [Processes and Solutions 7 Chapters](#)

Learn how to analyze models using specialized Simcenter 3D tools.

### [1 Adaptive Meshing 4 Topics](#)

1. Adaptive Meshing Overview
2. Refining a Mesh with Adaptive Meshing
3. Lab: Refining a Mesh with Adaptive Meshing
4. Knowledge Check: Adaptive Meshing

### [2 Superelements 7 Topics](#)

1. Superelement Analysis Overview
2. Reducing a Subassembly to a Superelement
3. Lab: Reducing a Subassembly to a Superelement
4. System Modeling with External Superelements Overview
5. Modeling with External Superelements
6. Lab: Modeling with External Superelements
7. Knowledge Check: Superelements

### [3 Introduction to Thermal Analysis 4 Topics](#)

1. Thermal Analysis Overview
2. Setting Up and Solving a Thermal Analysis

3. Lab: Setting Up and Solving a Thermal Analysis
4. Knowledge Check: Introduction to Thermal Analysis

#### 4 Geometry Optimization 4 Topics

1. Geometry Optimization Overview
2. Geometry Optimization Workflow
3. Lab: Geometry Optimization
4. Knowledge Check: Geometry Optimization

#### 5 Simcenter Nastran Design Optimization 5 Topics

1. Simcenter Nastran Design Optimization Overview
2. Setting up the Model for Nastran Design Optimization
3. Creating Constraints and Solving for Simcenter Nastran Design Optimization
4. Lab: Simcenter Nastran Design Optimization
5. Knowledge Check: Design Optimization

#### 6 Simcenter Nastran Topology Optimization 4 Topics

1. Simcenter Nastran Topology Optimization Overview
2. Simcenter Nastran Topology Optimization Workflow
3. Lab: Simcenter Nastran Topology Optimization
4. Knowledge Check: Simcenter Nastran Topology Optimization

#### 7 Assessment: Processes and Solutions 1 Topic

1. Assessment: Processes and Solutions

#### *Reviewing Analysis Results 6 Chapters*

Learn how to display analysis results using post views, graphs, and reports.

#### 1 Displaying Results in Post Views 23 Topics

1. Displaying Results Overview
2. Displaying Results in Post Processing
3. Displaying Results in a Post View
4. Lab: Displaying Results in a Post View
5. Controlling Visibility in Post Views
6. Lab: Controlling Visibility in Post Views
7. Displaying Results in Multiple Viewports
8. Lab: Displaying Results in Multiple Viewports
9. Animating Results
10. Lab: Animating Results
11. Annotating Results
12. Lab: Annotating Results
13. Displaying More Results in Post Processing
14. Displaying Stress/Strain Results on 2D Elements
15. Lab: Displaying Stress/Strain Results on 2D Elements
16. Calculating and Displaying Beam Stresses
17. Lab: Displaying Beam Stresses
18. Displaying Symmetry Results in a Post View
19. Lab: Displaying Axisymmetric Results in a Post View
20. Displaying Results in the Results Viewer
21. Lab: Displaying Results in Post Views
22. Lab Solution: Displaying Results in Post Views
23. Knowledge Check: Displaying Results in Post Views

#### 2 Manipulating Results Data 10 Topics

1. Manipulating Results Data Overview
2. Identifying and Outputting Results
3. Lab: Identifying and Outputting Results
4. Creating Custom Results
5. Lab: Creating Custom Results
6. Combining and Enveloping Results
7. Lab: Enveloping and Combining Results

8. Creating Nodal Force Reports
9. Lab: Creating Nodal Force Reports
10. Knowledge Check: Manipulating Results Data

### 3 Graphing Results 14 Topics

1. Graphing Overview
2. Graphing Results Across FE Entities
3. Lab: Graphing Results Across FE Entities
4. Graphing Results Using a Query Curve
5. Lab: Graphing Results Using a Query Curve
6. Graphing Results Across Multiple Iterations
7. Lab: Graphing Results Across Multiple Iterations
8. Plotting Two Functions
9. Lab: Plotting Two Functions
10. Modifying Graph Display Properties
11. Lab: Modifying Graph Display Properties
12. Lab: Graphing Results
13. Lab Solution: Graphing Results
14. Knowledge Check: Graphing Results

### 4 Saving and Restoring Views 6 Topics

1. Saving and Restoring Views
2. Saving and Restoring Snapshots to Set Up Views
3. Lab: Using Snapshots to Set Up Views
4. Saving and Restoring Post View Settings
5. Lab: Saving and Restoring Post View Settings
6. Knowledge Check: Saving and Restoring Views

### 5 Generating Reports 4 Topics

1. Introduction to Creating Reports
2. Generating a Report
3. Customizing a Report Template
4. Knowledge Check: Generating Reports

### 6 Assessment: Reviewing Analysis Results 1 Topic

1. Assessment: Reviewing Analysis Results