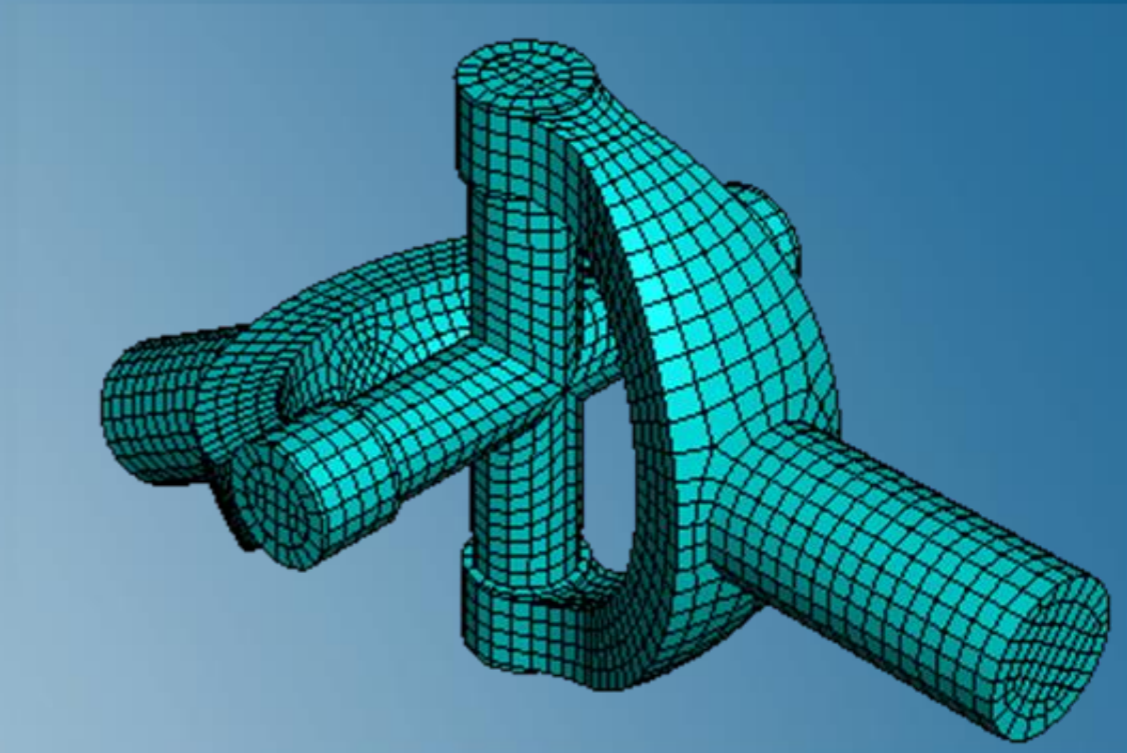


Abaqus/CAE: Geometry Import and Meshing

Abaqus 2022



3DEXPERIENCE[®]

About this Course

Course objectives

Upon completion of this course you will be able to:

- ▶ Import, edit, and repair CAD geometry.
- ▶ Import and edit orphan meshes.
- ▶ Use virtual topology to ease the meshing of complicated geometry.
- ▶ Partition geometry to enable different meshing techniques.

Targeted audience

Simulation Analysts

Prerequisites

None



2 days

Day 1

- ▶ Lesson 1 Geometry Import and Repair
 - Demonstration 1 Geometry Import and Repair: Lens Model
 - Demonstration 2 Geometry Import, Diagnostics, and Defeaturing
 - Workshop 1 Geometry Import and Repair: Machine Part
 - Workshop 2 Geometry Repair: Piston Model
 - Workshop 3 Creating a Shell From a Thin Solid

- ▶ Lesson 2 Orphan and Native Meshes
 - Demonstration 3 Importing and Editing an Orphan Mesh
 - Demonstration 4 Virtual Topology: Piston Model
 - Demonstration 5 Virtual Topology: U-Joint Model
 - Workshop 4 Importing, Editing, and Extracting Geometry from a Mesh
 - Workshop 5 Virtual Topology: Bracket Model

Day 2

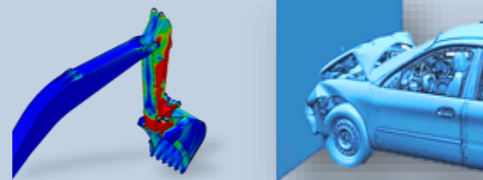
- ▶ Lesson 3 Meshing and Partitioning
 - Demonstration 6 Partitioning and Mixed Meshing
 - Demonstration 7 Sweep Meshing Techniques
 - Workshop 6 Hex Meshing Intersecting Pipes
 - Workshop 7 Hex Meshing a Cardan Joint
 - Workshop 8 Additional Geometry Repair and Meshing Exercises

- ▶ Lesson 4 Bottom-Up Meshing
 - Demonstration 8 Bottom-Up Meshing
 - Workshop 9 Bottom-Up Meshing

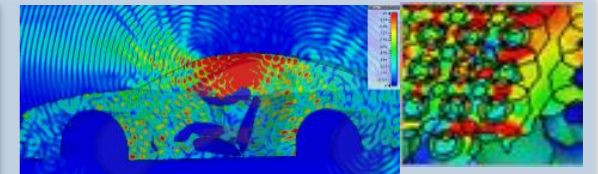
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- ▶ Advanced simulation portfolio covering simulation disciplines such as structural mechanics, computational fluid dynamics and electromagnetic field simulation, for a true multiphysics simulation approach.

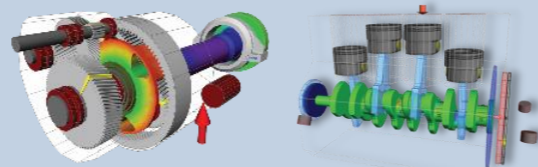
Structures



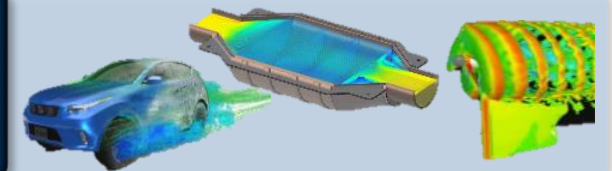
Electromagnetics



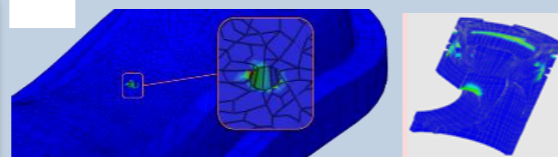
Multibody



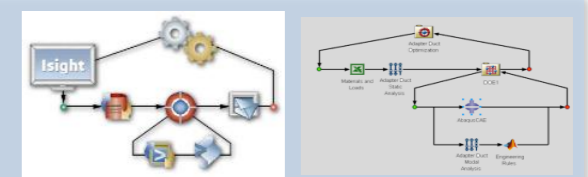
Fluids



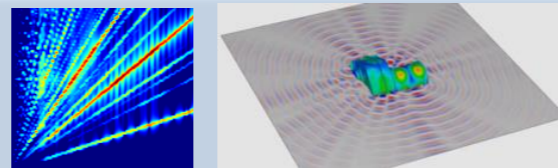
Durability



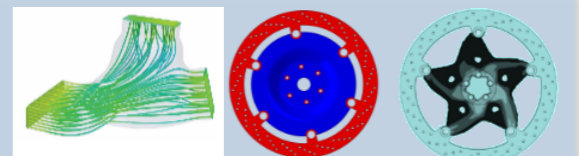
Automation



Vibro-acoustics



Optimization



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Revision Status

Lesson 1	11/21	Updated for Abaqus 2022
Lesson 2	11/21	Updated for Abaqus 2022
Lesson 3	11/21	Updated for Abaqus 2022
Lesson 4	11/21	Updated for Abaqus 2022
Demonstration 1	11/21	Updated for Abaqus 2022
Demonstration 2	11/21	Updated for Abaqus 2022
Demonstration 3	11/21	Updated for Abaqus 2022
Demonstration 4	11/21	Updated for Abaqus 2022
Demonstration 5	11/21	Updated for Abaqus 2022
Demonstration 6	11/21	Updated for Abaqus 2022
Demonstration 7	11/21	Updated for Abaqus 2022
Demonstration 8	11/21	Updated for Abaqus 2022
Workshop 1	11/21	Updated for Abaqus 2022
Workshop 2	11/21	Updated for Abaqus 2022
Workshop 3	11/21	Updated for Abaqus 2022
Workshop 4	11/21	Updated for Abaqus 2022
Workshop 5	11/21	Updated for Abaqus 2022
Workshop 6	11/21	Updated for Abaqus 2022
Workshop 7	11/21	Updated for Abaqus 2022
Workshop 8	11/21	Updated for Abaqus 2022
Workshop 9	11/21	Updated for Abaqus 2022

Lesson 1: Geometry Import and Repair

Lesson content:

- ▶ Introduction
- ▶ Geometry Import
- ▶ CAD Associative Import
- ▶ CAD Standalone Import
- ▶ Neutral Geometry Formats
- ▶ Geometry Repair
- ▶ Query and Diagnostics Tools
- ▶ Geometry Import Flowchart
- ▶ Example
- ▶ Shell Midsurface Creation
- ▶ Workshop Preliminaries
- ▶ Demonstration 1 Geometry Import and Repair: Lens Model
- ▶ Demonstration 2 Geometry Import, Diagnostics, and Defeaturing
- ▶ Workshop 1 Geometry Import and Repair: Machine Part
- ▶ Workshop 2 Geometry Repair: Piston Model
- ▶ Workshop 3 Creating a Shell From a Thin Solid



4 hours

Lesson 2: Orphan and Native Meshes

Lesson content:

- ▶ Introduction
- ▶ Dependent and Independent Part Instances
- ▶ Orphan Meshes
- ▶ Mesh Editing
- ▶ Creating Geometry from an Orphan Mesh
- ▶ Combined Orphan and Native Meshes
- ▶ Mesh Generation Techniques
 - Free meshing
 - Swept meshing
 - Structured meshing
- ▶ Virtual Topology
- ▶ Demonstration 3: Importing and Editing an Orphan Mesh
- ▶ Demonstration 4: Virtual Topology: Piston Model
- ▶ Demonstration 5: Virtual Topology: U-Joint Model
- ▶ Workshop 4: Importing, Editing, and Extracting Geometry from a Mesh
- ▶ Workshop 5: Virtual Topology: Bracket Model



3.5 hours

Lesson 3: Meshing and Partitioning

Lesson content:

- ▶ Enabling Various Meshing Techniques
- ▶ Controlling Mesh Density and Gradation
- ▶ Methods of Gaining More Control over the Mesh
- ▶ Creating and Merging Meshable Regions
- ▶ Hex Meshing Revolved Regions
- ▶ Mesh Stack Direction
- ▶ Parametric Modeling
- ▶ Assigning Element Types
- ▶ Verifying Mesh Quality
- ▶ Mass and Mesh Queries
- ▶ Midside Nodes
- ▶ Demonstration 6: Partitioning and Mixed Meshing
- ▶ Demonstration 7: Sweep Meshing Techniques
- ▶ Workshop 6: Hex Meshing Intersecting Pipes
- ▶ Workshop 7: Hex Meshing a Cardan Joint
- ▶ Workshop 8: Additional Geometry Repair and Meshing Exercises



4 hours

Lesson 4: Bottom-Up Meshing

Lesson content:

- ▶ Introduction
- ▶ Basic Features
- ▶ Example
- ▶ Summary
- ▶ Demonstration 8: Bottom-Up Meshing
- ▶ Workshop 9: Bottom-Up Meshing



75 minutes