

Modeling Stents Using Abaqus

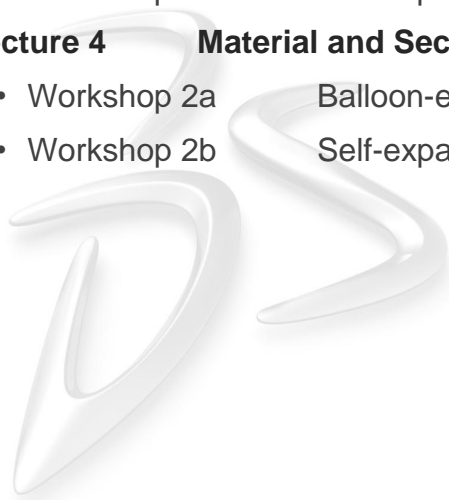
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Day 1

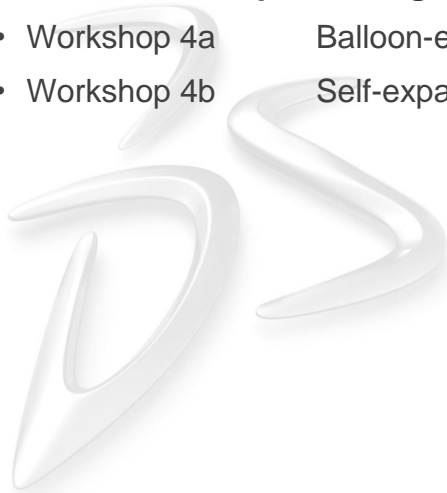
- **Lecture 1** **Introduction**
- **Lecture 2** **Geometry and Meshing**
- **Lecture 3** **Element Selection and Mesh Convergence**
 - Workshop 1a Balloon-expanded stent – geometry and meshing
 - Workshop 1b Self-expanding stent – geometry and meshing
- **Lecture 4** **Material and Section Properties**
 - Workshop 2a Balloon-expanded stent – materials and sections
 - Workshop 2b Self-expanding stent – materials and sections

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Day 2

- **Lecture 5** **Analysis Procedures**
- **Lecture 6** **Loads, Contact and Constraints**
 - Workshop 3a Balloon-expanded stent – analysis setup
 - Workshop 3b Self-expanding stent – analysis setup
- **Lecture 7** **Postprocessing Stent Analyses**
 - Workshop 4a Balloon-expanded stent – postprocessing
 - Workshop 4b Self-expanding stent – postprocessing



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Revision Status

Lecture 1	5/11	Updated for 6.11
Lecture 2	5/11	Updated for 6.11
Lecture 3	5/11	Updated for 6.11
Lecture 4	5/11	Updated for 6.11
Lecture 5	5/11	Updated for 6.11
Lecture 6	5/11	Updated for 6.11
Lecture 7	5/11	Updated for 6.11
Workshop 1a	5/11	Updated for 6.11
Workshop 1b	5/11	Updated for 6.11
Workshop 2a	5/11	Updated for 6.11
Workshop 2b	5/11	Updated for 6.11
Workshop 3a	5/11	Updated for 6.11
Workshop 3b	5/11	Updated for 6.11
Workshop 4a	5/11	Updated for 6.11
Workshop 4b	5/11	Updated for 6.11



Introduction

Lecture 1

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L1.2

Overview

- Stent Basics
- Stent Modeling
- Modeling Stents Using Abaqus

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Modeling Stents Using Abaqus

Geometry and Meshing

Lecture 2

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L2.2

Overview

- **Introduction**
- **Stents**
 - Example: create laser cut stents
 - Example: create braided wire stents
- **Expansion and crimping tools**
- **Stent residing vessels**
 - Import STL file
- **Import orphan meshes**

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Element Selection and Mesh Convergence

Lecture 3

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L3.2

Overview

- Introduction
- Solid elements
- Beam elements
- Surface and membrane elements
- Mesh convergence

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Material and Section Properties

Lecture 4

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L4.2

Overview

- Introduction
- Linear Elastic-plastic Material
- Nitinol
- Hyperelastic Material
- References

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Analysis Procedures

Lecture 5

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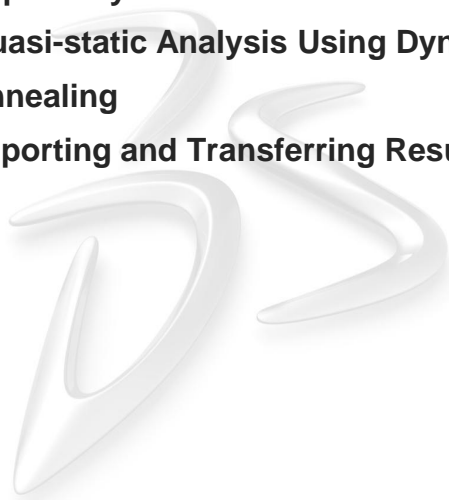
 SIMULIA

L5.2

Overview

- Introduction
- Static Analysis
- Implicit Dynamics
- Natural Frequency Extraction
- Explicit Dynamics
- Quasi-static Analysis Using Dynamic Procedures
- Annealing
- Importing and Transferring Results

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Loads, Contact and Constraints

Lecture 6

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L6.2

Overview

- Introduction
- Loads and Boundary Conditions
- Contact
 - General Contact
 - Contact Pairs
 - Local Surface Behavior
 - Contact Enforcement Methods
 - Contact Stabilization
- Constraints
- Cyclic Symmetry

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Results Postprocessing

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L7.2

Overview

- Introduction
- Results Visualization
- Fatigue Evaluation

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