Modeling Stents Using Abaqus

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

Legal Notices

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

SIMULIA

Overview

- Stent Basics
- Stent Modeling
- Modeling Stents Using Abaqus

SIMULIA

Geometry and Meshing

Lecture 2

SIMULIA

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**

SIMULIA

Element Selection and Mesh Convergence

Lecture 3

SIMULIA

Overview

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

SIMULIA

Material and Section Properties

Lecture 4

SIMULIA

Overview

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

SIMULIA

Analysis Procedures

Lecture 5

Overview

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

Loads, Contact and Constraints

Lecture 6

SIMULIA

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

Lecture 7

Overview

- Introduction
- Results Visualization
- Fatigue Evaluation

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