

Topology and Shape Optimization in Abaqus

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Overview

- **Lecture 1** **Overview**
- **Lecture 2** **Background on Topology Optimization**
- **Workshop 1** **Topology Optimization of a Gear**
 - Stiffness method
 - General method
- **Lecture 3** **Topology Optimization: Setup Options and Postprocessing**
- **Workshop 2** **Topology Optimization of a Cantilever Beam**
 - Stamping geometric restrictions
 - Demold control geometric restrictions
 - Symmetry geometric restrictions
- **Lecture 4** **Shape Optimization: Background, Setup Options and Postprocessing**
- **Workshop 3** **Shape Optimization of a Plate with a Hole**
- **Lecture 5** **A Case for Including Nonlinear Geometric Effects in Topology Optimization**

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Revision Status

| | | |
|-------------|------|--------------|
| Lecture 1 | 6/11 | New for 6.11 |
| Lecture 2 | 6/11 | New for 6.11 |
| Lecture 3 | 6/11 | New for 6.11 |
| Lecture 4 | 6/11 | New for 6.11 |
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| Workshop 1b | 6/11 | New for 6.11 |
| Workshop 2a | 6/11 | New for 6.11 |
| Workshop 2b | 6/11 | New for 6.11 |
| Workshop 2c | 6/11 | New for 6.11 |
| Workshop 3 | 6/11 | New for 6.11 |



Introduction

Lecture 1

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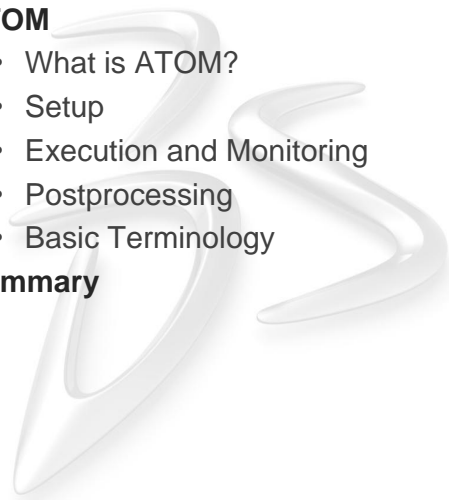


L1.2

Overview

- **Overview of Optimization**
 - Optimization
 - SIMULIA's Optimization tools
 - Structural Optimization
 - Topology Optimization
 - Shape Optimization
- **ATOM**
 - What is ATOM?
 - Setup
 - Execution and Monitoring
 - Postprocessing
 - Basic Terminology
- **Summary**

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Background on Topology Optimization

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L2.2

Overview

- **Topology Optimization**
 - Problem Statement
 - Integer Value Problems to Continuous problems
 - Material Interpolation
 - Sensitivity-based Update
- **Stiffness and Controller-based Topology Optimization**
- **Filters and Additional Constraints**
- **Summary**
- **Workshop**

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ATOM: Workflow and Options

Lecture 3

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L3.2

Overview

- **Topology Optimization Setup**
 - Preparing the Abaqus model
 - Optimization Tasks
 - Design Responses
 - Objective functions
 - Constraints
 - Geometric Restrictions
 - Stop Conditions
- **Topology Optimization Postprocessing**
- **Summary**
- **Workshop**

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Background on Shape Optimization, Setup Options and Postprocessing

Lecture 4

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L4.2

Overview

- **Background on Shape Optimization**
- **Shape Optimization Setup**
 - Optimization Tasks
 - Design Responses
 - Objective functions
 - Constraints
 - Geometric Restrictions
 - Stop Conditions
- **Shape Optimization Postprocessing**
- **Summary**
- **Workshop**

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A Case for Nonlinear Geometric Effects in Topology Optimization

Lecture 5

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L5.2

Overview

- Problem Statement
- Topology Optimization – Results
- Topology Optimization – Results Examination
- Topology Optimization – Analysis
- Conclusions

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