Introduction to Abaqus Scripting

Abaqus 2019
Course objectives

- Help students to develop a high level understanding of the Abaqus scripting capabilities.
- Organize and present the technical details of Python and the Abaqus Scripting Interface.
- Expose the strengths and weaknesses of Abaqus scripting.
- Encourage the student to use scripting in new ways.

Targeted audience

Simulation Analysts

Prerequisites

None
Day 2

- Lecture 5: Abaqus Scripting Interface Basics
  - Workshop 7: Creating a Macro and Getting Input interactively

- Lecture 6: Abaqus Object Model
  - Workshop 8: Working with the Session Object

- Lecture 7: Postprocessing with Abaqus Scripting
  - Workshop 9: Working with the ODB Object
  - Workshop 10: Linear Superposition of Results

- Lecture 8: Miscellaneous Topics
  - Workshop 11: Creating Kernel and GUI Scripts
  - Workshop 12: Setting Abaqus Defaults
Additional Material

- Appendix 1
- Optional Topics
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- Six Sigma and Design of Experiments

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- Non-Parametric Optimization
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- Topology, Sizing, Shape, Bead Optimization

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- Low Cycle and High Cycle Fatigue
- Weld, High Temperature, Non-metallics

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  - Weight, Stiffness, Stress Pressure Loss Reduction
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## Revision Status

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Lesson 1: Overview of Scripting in Abaqus

Lesson content:

- Overview
- Terminology
- Types and Languages for Customizing Abaqus
- Abaqus Python Resources
- Examples
- Abaqus Scripting Interface Basics
- Workshop Preliminaries
- Workshop 1: Creating a Basic Abaqus Script
Lesson content:

- High Level Description of the Language
- Why Python?
- Growing Python Universe
- Running Python
- Lexical Convention and Syntax
- Workshop 2: Running Python
Lesson 3: Python Core Language Part 1

Lesson content:

- Types Overview
- Principal built-in types
- Operators and Expressions
- Workshop 3: Python Types, Operators, and Expressions
- Objects
- Workshop 4: Investigating Python Objects
Lesson content:

- Control Flow
- Functions
- Workshop 5a: Defining functions
- Workshop 5b: Defining a Function for a Series Calculation (optional)
- Modules
- Namespaces
- Exceptions
- Common Issues for New Users
- Workshop 6: Modules
Lesson 5: Abaqus Scripting Interface Basics

Lesson content:

- Abaqus PDE
- Abaqus Namespaces
- Abaqus Macro Scripts
- Abaqus Python Style Guide
- Getting Input
- Workshop 7: Creating a Macro and Getting Input interactively
Lesson 6: Abaqus Object Model

Lesson content:

- Introduction to Object Oriented Programming
- Abaqus Object Model Basics
- The Session Object
- The Mdb Object
- Exploring Your Data
- Abaqus Data Types
- Abaqus Modules
- Workshop 8: Working with the Session Object

1.5 hours
Lesson 7: Postprocessing with Abaqus Scripting

Lesson content:

- The Odb Object
- Writing to the Odb
- Examples
- Workshop 9: Working with the ODB Object
- Workshop 10: Linear Superposition of Results

2.5 hours
Lesson 8: Miscellaneous Topics

Lesson content:

- Plug-ins
- Really Simple GUI (RSG)
- Job Monitoring
- Custom Data
- Setting Abaqus Defaults
- Workshop 11: Creating Kernel and GUI Scripts
- Workshop 12: Setting Abaqus Defaults

2.5 hours
Appendix 1: Optional Topics

**Appendix content:**

- Data Types
- Objects
- Common Issues for New Users
- Setting Abaqus Defaults
- Copy of Objects
- Custom Data
- Abaqus PDE Extras
- Object Oriented Programming: Inheritance

30 minutes