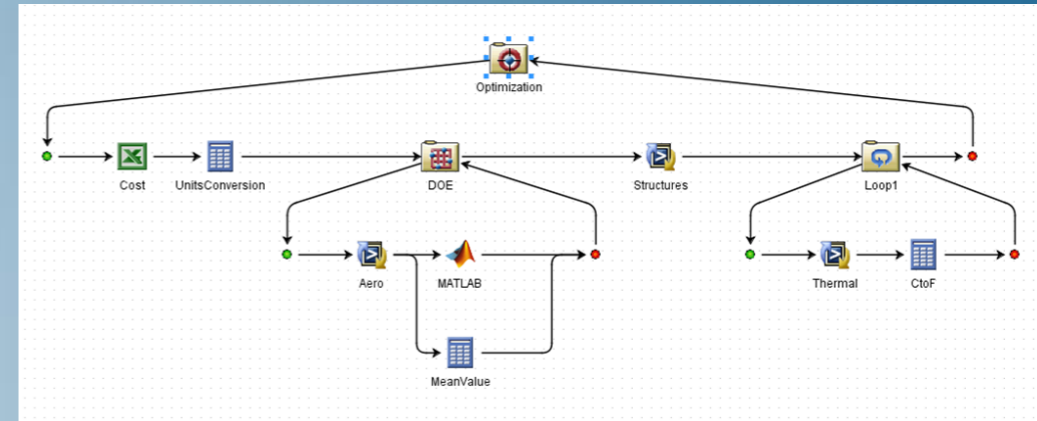


Introduction to Isight

Isight 2019



3DEXPERIENCE[®]



About this Course

Course objectives

Upon completion of this course you will be able to:

- ▶ Automate a series of functions to create a Sim-flow
- ▶ Add components to a Sim-flow
- ▶ Set up the core component
- ▶ Configure components to pass data to/from each other
- ▶ Execute a Sim-flow
- ▶ Visualize Sim-flow results
- ▶ Evaluate design alternatives
- ▶ Create a Sim-flow to capture a process, by integrating various software in the company.
- ▶ Perform Design Optimization and gain Design Space understanding by using various techniques such as DOE, Optimization, Monte Carlo etc.

Targeted audience

Simulation Analysts

Prerequisites

None



2 days

Day 1

- ▶ Lecture 1 Introduction
 - Demonstration

- ▶ Lecture 2 Isight Overview
 - Workshop 1 Exploration of an Isight Model

- ▶ Lecture 3 Design of Experiments
 - Workshop 2 I-Beam DOE

- ▶ Lecture 4 Optimization
 - Workshop 3 I-Beam Optimization

- ▶ Lecture 5 Monte Carlo and Six Sigma
 - Workshop 4 Plate Weld Monte Carlo and Six Sigma

Day 2

- ▶ Lecture 6 Approximations
- ▶ Workshop 5 I-Beam Approximations

- ▶ Lecture 7 Isight Components (Part 1)
 - Workshop 6 SimCode Component – EngSim
 - Workshop 7 Calculator Component
 - Workshop 8 Mapping and Parallel Sim-flows
 - Workshop 9 Excel Component

- ▶ Lecture 8 File Handling
 - Workshop 10 Advanced Parsing
 - Workshop 11 Loops and Publishing
 - Workshop 12 Combining Models
 - Workshop 13 File Parameters
 - Workshop 14 Data Management

- ▶ Lecture 9 Isight Components (Part 2)
 - Workshop 15a Data Matching (*for non-Abaqus users*)
 - Workshop 15b Data Matching on Abaqus Results (*for Abaqus users*)

Additional Material

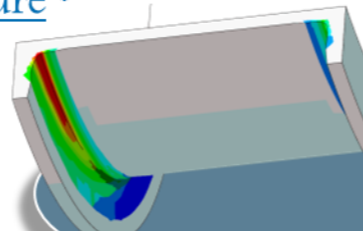
- ▶ Appendix 1 Isight Components (Part 3)

SIMULIA

- ▶ SIMULIA is the Dassault Systèmes brand for Realistic Simulation solutions
- ▶ Portfolio of established, best-in-class products
 - Abaqus, Isight, Tosca, fe-safe, Simpack

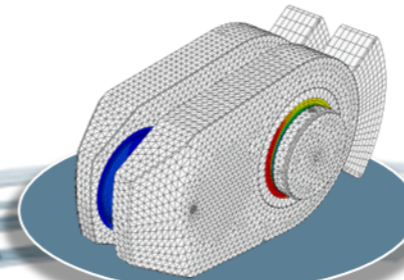
Design Optimization: Tosca Structure *

Simulation-driven design refinement to improve performance



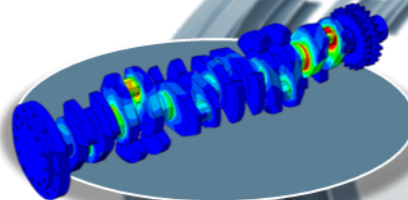
Durability Assessment: fe-safe *

Accurate life estimation to achieve certification



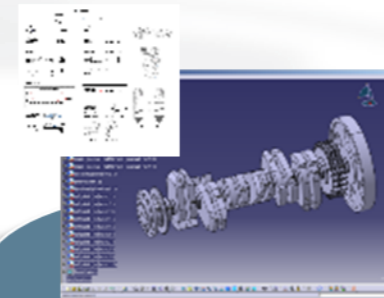
FEA Stress Analysis: Abaqus *

Detailed stress analysis using extracted load history from MBS



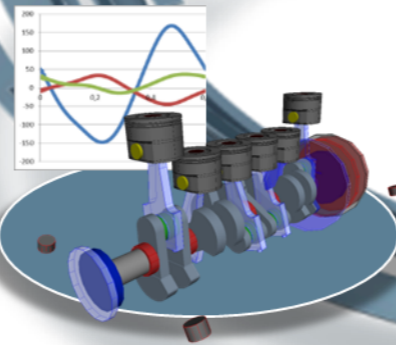
CAD Geometry: CATIA

Fully parameterized 3D geometry; FEA model generation via associative interface



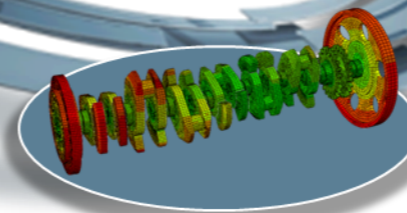
Multibody Simulation: Simpack

System analysis to extract virtual load history of complete working cycle



Mesh Calibration: Isight *

Automated mesh calibration; sufficient mesh quality for accurate results

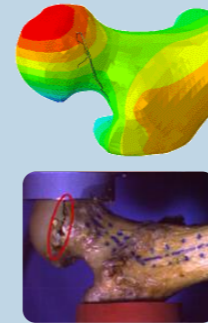


* Included in extended licensing pool

SIMULIA's Power of the Portfolio

Abaqus

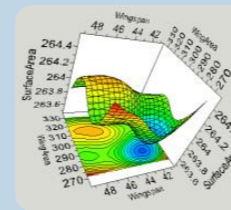
- Routine and Advanced Simulation
- Linear and Nonlinear, Static and Dynamic
- Thermal, Electrical, Acoustics
- Extended Physics through Co-simulation
- Model Preparation and Visualization



Realistic Human Simulation
High Speed Crash & Impact
Noise & Vibration

Isight

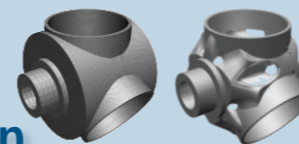
- Process Integration
- Design Optimization
- Parametric Optimization
- Six Sigma and Design of Experiments



Material Calibration
Workflow Automation
Design Exploration

Tosca

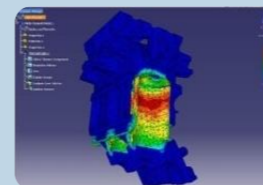
- Non-Parametric Optimization
- Structural and Fluid Flow Optimization
- Topology, Sizing, Shape, Bead Optimization



Conceptual/Detailed Design
Weight, Stiffness, Stress
Pressure Loss Reduction

fe-safe

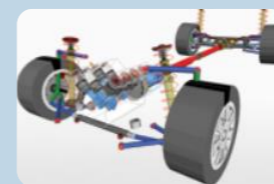
- Durability Simulation
- Low Cycle and High Cycle Fatigue
- Weld, High Temperature, Non-metallics



Safety Factors
Creep-Fatigue Interaction
Weld Fatigue

Simpack

- 3D Multibody Dynamics Simulation
- Mechanical or Mechatronic Systems
- Detailed Transient Simulation (Offline and Realtime)



Complete System Analyses
(Quasi-)Static, Dynamics, NVH
Flex Bodies, Advanced
Contact

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Revision Status

Lecture 1	12/18	Updated for Isight 2019
Lecture 2	12/18	Updated for Isight 2019
Lecture 3	12/18	Updated for Isight 2019
Lecture 4	12/18	Updated for Isight 2019
Lecture 5	12/18	Updated for Isight 2019
Lecture 6	12/18	Updated for Isight 2019
Lecture 7	12/18	Updated for Isight 2019
Lecture 8	12/18	Updated for Isight 2019
Lecture 9	12/18	Updated for Isight 2019
Appendix 1	12/18	Updated for Isight 2019

Workshop 1	12/18	Updated for Isight 2019
Workshop 2	12/18	Updated for Isight 2019
Workshop 3	12/18	Updated for Isight 2019
Workshop 4	12/18	Updated for Isight 2019
Workshop 5	12/18	Updated for Isight 2019
Workshop 6	12/18	Updated for Isight 2019
Workshop 7	12/18	Updated for Isight 2019
Workshop 8	12/18	Updated for Isight 2019
Workshop 9	12/18	Updated for Isight 2019
Workshop 10	12/18	Updated for Isight 2019
Workshop 11	12/18	Updated for Isight 2019
Workshop 12	12/18	Updated for Isight 2019
Workshop 13	12/18	Updated for Isight 2019
Workshop 14	12/18	Updated for Isight 2019
Workshop 15a	12/18	Updated for Isight 2019
Workshop 15b	12/18	Updated for Isight 2019

Lesson 1: Introduction

Lesson content:

- ▶ What is Isight?
- ▶ How does Isight Help Product Development?
- ▶ Automated Design Strategies
- ▶ Isight as the Simulation Flow Integrator
- ▶ Isight Components
- ▶ Isight as a Formalizer of the Engineering Problem
- ▶ Isight as a Driver of Sim-flows
- ▶ Isight Drivers
- ▶ Isight as an Engineering Data Analysis Tool
- ▶ Isight as an Integral Part of SIMULIA's SLM Offering
- ▶ Isight and the SIMULIA Execution Engine
- ▶ Isight Summary



30 minutes

Lesson 2: Isight Overview

Lesson content:

- ▶ Design Gateway
- ▶ Model Assembly
- ▶ Model Execution
- ▶ Runtime Gateway
- ▶ Design Process
- ▶ Example: I-Beam – The Problem
- ▶ 5 Steps for Using Isight
- ▶ Workshop Preliminaries
- ▶ Workshop 1: Exploration of an Isight model



30 minutes

Lesson 3: Design of Experiments

Lesson content:

- ▶ Motivation
- ▶ Techniques
- ▶ Factors, Levels, and Responses
- ▶ Design Matrix
- ▶ Execution
- ▶ Postprocessing
- ▶ Factor Configuration with Values
- ▶ Factor Configuration with Ranges
- ▶ DOE Technique Comparisons
- ▶ Considerations
- ▶ Workshop 2: I-Beam DOE



30 minutes

Lesson 4: Optimization

Lesson content:

- ▶ Introduction
- ▶ Optimization Techniques
- ▶ Gradient Methods
- ▶ Direct Methods
- ▶ Exploratory Methods
- ▶ Genetic Algorithms
- ▶ Comparing Optimization Techniques
- ▶ Pointer
- ▶ Pointer2
- ▶ Multi-Objective Optimization
- ▶ Optimization Analogy: The Big Telescope
- ▶ Workshop 3: I-Beam Optimization



1 hour

Lesson 5: Monte Carlo and Six Sigma

Lesson content:

- ▶ Monte Carlo Overview
- ▶ Why use Monte Carlo Simulation?
- ▶ Key Components
- ▶ Terminology
- ▶ Basic Approach
- ▶ Random Variable Distributions
- ▶ Skewed Normal Distribution
- ▶ Sampling Techniques
- ▶ Results
- ▶ Estimating Reliability
- ▶ Probability Table
- ▶ Six Sigma Overview
- ▶ Six Sigma Analysis Types
- ▶ Six Sigma Results Aggregate Parameter
- ▶ Workshop 4: Plate Weld Monte Carlo and Six Sigma



30 minutes

Lesson 6: Approximations

Lesson content:

- ▶ Background
- ▶ Approximation in Isight
- ▶ Response Surface Model (RSM)
- ▶ Orthogonal Polynomial (Chebyshev)
- ▶ Polynomial Approximations: Summary
- ▶ Radial Basis Functions (RBF)
- ▶ Elliptical Basis Functions (EBF)
- ▶ Radial and Elliptical Basis Functions: Summary
- ▶ Kriging
- ▶ Effect of Sample Size
- ▶ Advantages and Disadvantages of RBF/EBF/Kriging
- ▶ Recommendations for Technique Selection
- ▶ Approximation
- ▶ Approximation Wizard
- ▶ Verifying Approximation Accuracy
- ▶ Visualization and Design Space Surfing
- ▶ Workshop 5: I-Beam Approximations



30 minutes

Lesson 7: Isight Components (Part 1)

Lesson content:

- ▶ Data Exchanger Component
- ▶ OS Command Component
- ▶ Simcode Component
- ▶ Excel Component
- ▶ Calculator Component
- ▶ Workshop 6: SimCode Component – EngSim
- ▶ Workshop 7: Calculator Component
- ▶ Workshop 8: Mapping and Parallel Sim-flows
- ▶ Workshop 9: Excel Component



45 minutes

Lesson 8: File Handling

Lesson content:

- ▶ Introduction
- ▶ Where Does Isight Execute?
- ▶ Overriding Defaults
- ▶ Isight File Handling & Execution
- ▶ File Parameters
- ▶ Component Execution Sequence
- ▶ Configuring Input File Parameters
- ▶ Configuring Output File Parameters
- ▶ File Parameter File Handlers
- ▶ “In Model” File Parameters
- ▶ Configuring the “Save to DB” option for File Parameters
- ▶ Using File Sets
- ▶ Isight Database
- ▶ The Loop Component
- ▶ Workshop 10: Advanced Parsing
- ▶ Workshop 11: Loops and Publishing
- ▶ Workshop 12: Combining Models
- ▶ Workshop 13: File Parameters
- ▶ Workshop 14: Data Management (optional)



45 minutes

Lesson 9: Isight Components (Part 2)

Lesson content:

- ▶ Abaqus Component
- ▶ Data Matching Component
- ▶ Workshop 15a: Data Matching
- ▶ Workshop 15b: Data Matching on Abaqus Results



See Appendix 1 for
more on Components



30 minutes

Appendix 1: More Components

Appendix content:

- ▶ MATLAB Component



45 minutes