Introduction to Isight
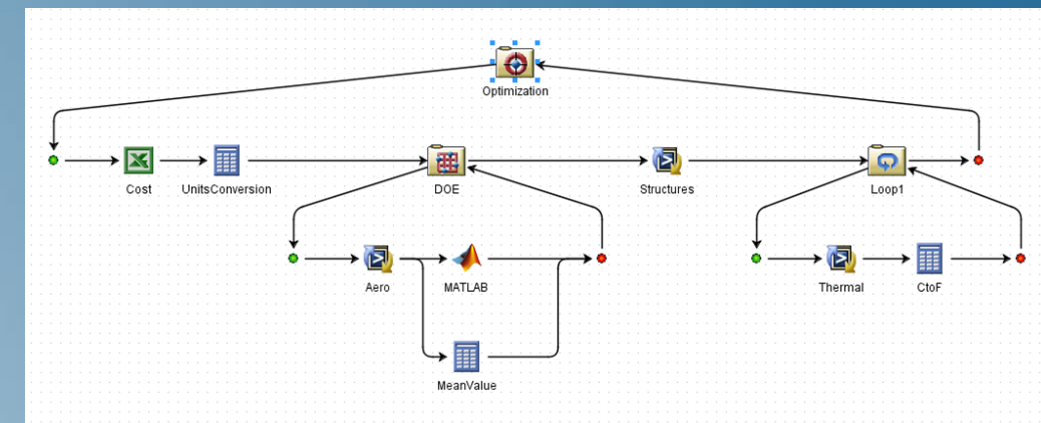
Isight 2021

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

▷ Lesson 1   Introduction
     ▫ Demonstration

▷ Lesson 2   Isight Overview
     ▫ Workshop 1   Exploration of an Isight Model

▷ Lesson 3   Design of Experiments
     ▫ Workshop 2   I-Beam DOE

▷ Lesson 4   Optimization
     ▫ Workshop 3   I-Beam Optimization

▷ Lesson 5   Monte Carlo and Six Sigma
     ▫ Workshop 4   Plate Weld Monte Carlo and Six Sigma

Day 2

▷ Lesson 6   Approximations

▷ Workshop 5   I-Beam Approximations

▷ Lesson 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

▷ Lesson 8   File Handling
- ▢ Workshop 10   Advanced Parsing
- ▢ Workshop 11   Loops and Publishing
- ▢ Workshop 12   Combining Models
- ▢ Workshop 13   File Parameters
- ▢ Workshop 14   Data Management (optional)

▷ Lesson 9   Isight Components (Part 2)
- ▢ Workshop 15a Data Matching (*for non-Abaqus users*)
- ▢ Workshop 15b Data Matching on Abaqus Results (*for Abaqus users*)
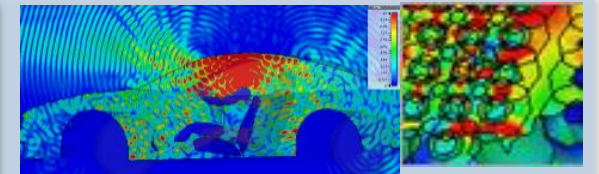
Additional Material

SIMULIA

▷ SIMULIA is the Dassault Systèmes brand for realistic simulation solutions.

▷ Advanced simulation portfolio covering simulation disciplines such as structural mechanics, computational fluid dynamics and electromagnetic field simulation, for a true multiphysics simulation approach.
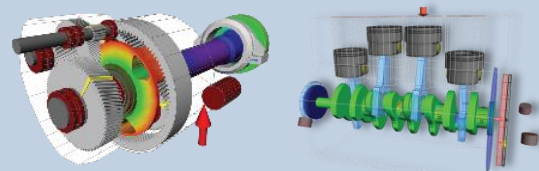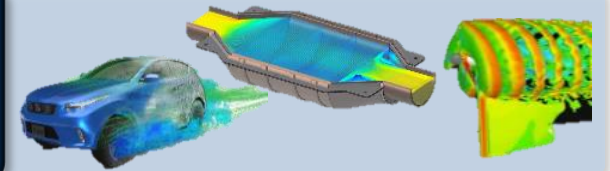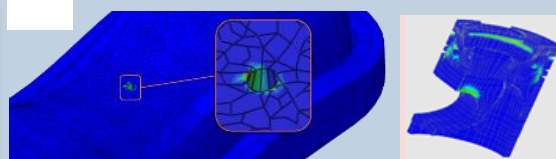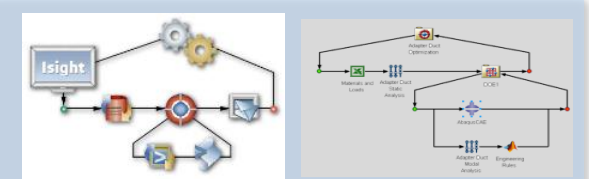
Structures
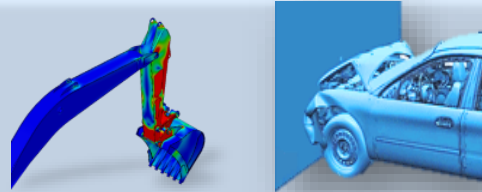
Electromagnetics

Multibody

Fluids

Durability

Automation

Vibro-acoustics
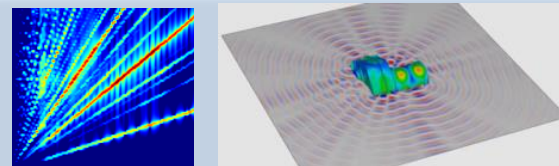
Optimization
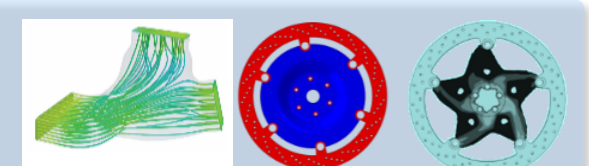
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SIMULIA Training

https://www.3ds.com/products-services/simulia/training/

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Revision Status

Lesson 1	**11/20**	**Updated for Isight 2021**	**Workshop 1**	**11/20**	**Updated for Isight 2021**
Lesson 2	**11/20**	**Updated for Isight 2021**	**Workshop 2**	**11/20**	**Updated for Isight 2021**
Lesson 3	**11/20**	**Updated for Isight 2021**	**Workshop 3**	**11/20**	**Updated for Isight 2021**
Lesson 4	**11/20**	**Updated for Isight 2021**	**Workshop 4**	**11/20**	**Updated for Isight 2021**
Lesson 5	**11/20**	**Updated for Isight 2021**	**Workshop 5**	**11/20**	**Updated for Isight 2021**
Lesson 6	**11/20**	**Updated for Isight 2021**	**Workshop 6**	**11/20**	**Updated for Isight 2021**
Lesson 7	**11/20**	**Updated for Isight 2021**	**Workshop 7**	**11/20**	**Updated for Isight 2021**
Lesson 8	**11/20**	**Updated for Isight 2021**	**Workshop 8**	**11/20**	**Updated for Isight 2021**
Lesson 9	**11/20**	**Updated for Isight 2021**	**Workshop 9**	**11/20**	**Updated for Isight 2021**
Appendix 1	**11/20**	**Updated for Isight 2021**	**Workshop 10**	**11/20**	**Updated for Isight 2021**
			Workshop 11	**11/20**	**Updated for Isight 2021**
			Workshop 12	**11/20**	**Updated for Isight 2021**
			Workshop 13	**11/20**	**Updated for Isight 2021**
			Workshop 14	**11/20**	**Updated for Isight 2021**
			Workshop 15a	**11/20**	**Updated for Isight 2021**
			Workshop 15b	**11/20**	**Updated for Isight 2021**

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

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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