Training: SOLIDWORKS Simulation Motion (1 day)

Prerequisites: Knowledge of SOLIDWORKS and the basics of the Motion Manager is required. Knowledge of basic mechanical engineering concepts is recommended.

Description: Designed for users who would like to become productive quickly in using SOLIDWORKS Motion. This 2 day course will teach you how to use the SOLIDWORKS Motion simulation package to study the kinematics and dynamic behavior of your SOLIDWORKS assembly models. The course provides an in-depth session on the basics of building, simulating and refining a mechanical design system.

Introduction

- What is SOLIDWORKS Motion?
- Mass and Inertia
- Degrees-of- Freedom
- Constraining Degrees-of- Freedom
- Motion Analysis
- Basics of Mechanism Setup in SOLIDWORKS Motion

Lesson 1: Introduction to Motion Simulation and Forces

- Basic Motion Analysis
- Case Study: Car Jack Analysis
- Forces
- Results

Lesson 2: Building a Motion Model and Post-processing

- Creating Local Mates
- Case Study: Crank Slider Analysis
- Mates
- Local Mates
- Power
- Plotting Kinematic Results

Lesson 3: Introduction to Contacts, Springs and Dampers

- Contact and Friction
- Case Study: Catapult
- Contact
- Contact groups
- Contact Friction
- Translational Spring
- Translational Damper
- Post-processing
- Analysis with Friction

Lesson 4: Advanced Contact

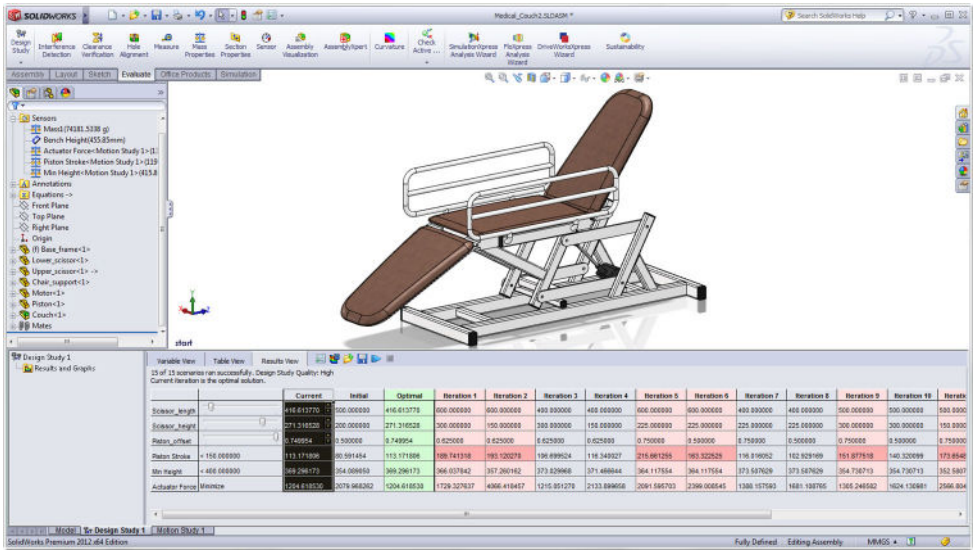
- Contact Forces
- Case Study: Latching Assembly
- STEP Function
- Contact: Solid Bodies
  - Poisson Model (Restitution Coefficient)
  - Impact Force Model
  - Closing Remarks
- Geometrical Description of Contacts
- Integrators
  - GSTIFF
  - WSTIFF
  - SI2
- Instability Points
- Modifying Result Plots
- Path Mate Motor

Lesson 5: Curve to Curve Contact

- Contact Forces
- Case Study: Geneva Mechanism
- Curve to Curve Contact
- Solid Bodies vs Curve to Curve Contact
- Solid Bodies Contact Solution
- Conveyor Belt (Curve to curve contact with friction)

Lesson 6: Cam Synthesis

- Cams
- Case Study: Cam Synthesis
- Trace Path
- Exporting Trace Path Curves
- Cycle Based Motion
- Desmodromic Cam
- Rocker Cam Profile



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Lesson 7: Motion Optimization

- Motion Optimization
- Case Study: Medical Examination Chair
- Sensors
- Optimization Analysis

Lesson 8: Flexible Joints

- Flexible Joints
- Case Study: System with Rigid Joints
- System with Flexible Joints

Lesson 9: Redundancies

- Redundancies
- Case Study: Door Hinges
- How to Check For Redundancies
- Typical Redundant Mechanisms
- Model-Part 1

Lesson 10: Export to FEA

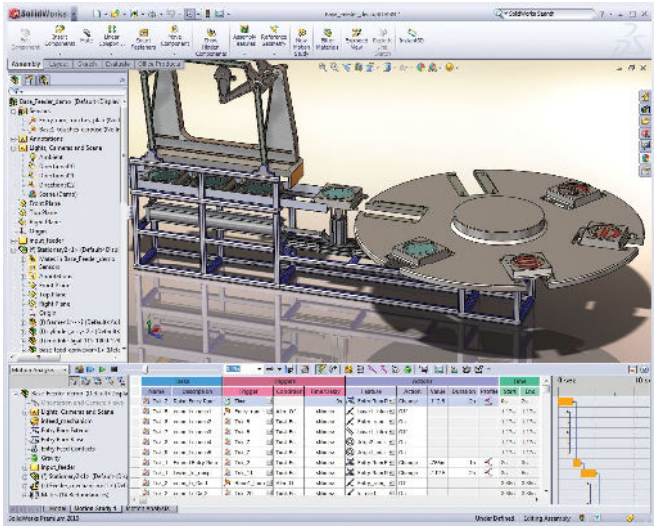
- Exporting Results
- Case Study: Drive Shaft
  - FEA Export
  - Load Bearing Faces
  - Mate Location
  - Export of Loads
  - SOLIDWORKS Simulation Users Only
- Direct Solution in SOLIDWORKS Motion

Lesson 11: Event Based Simulation

- Event Based Simulation
- Case Study: Sorting Device
- Servo Motors
- Sensors
- Task

Lesson 12: Design Project

- Design Project
- Case Study: Surgical Shear - Part 1
  - Force to Cut the Catheter
- Self Guided Problem - Part 1
- Self Guided Problem - Part 2
- Problem Solution - Part 1
- Creating the Force Function
  - Force to Cut the Catheter
  - Creating the Force Expression
- Force Expression
- Study: Surgical Shear - Part 2



Appendix A: Motion Study Convergence Solutions and Advanced Options

- Convergence
- Accuracy
- Integrator Type
  - GSTIFF
  - WSTIFF
  - Stabilized Index Two (SI2)
- Integrator Settings
  - Maximum Iterations
  - Initial Integrator Step Size
  - Min/ Max Integrator Step Size
  - Jacobian Re-evaluation

Appendix B: Mate Friction

- Concentric (Spherical) Mate Friction Model
- Coincident Translational Mate Friction Model
- Concentric Mate Friction Model
- Coincident Mate (Planar) Friction Model
- Universal Joint Friction Model
- Friction Results Reported