SOLIDWORKS Simulation Premium: Nonlinear and Dynamics Bundle

LENGTH: 4 DAYS

Prerequisites: Must have attended the basic SOLIDWORKS Simulation class, or must have an experience with SOLIDWORKS + working basic knowledge of finite elements and of basic mechanical principles. The knowledge of basic principles in Vibrations is strongly recommended, but not required.

Description: The best value for what you get! This 4-day class, created for SOLIDWORKS Simulation Premium users, will raise FEA skills to the next level! The first part of the course will teach you the basic and advanced topics in non-linear stress analysis. You will learn how to deal with models that exhibit large displacements and/or yielding, discuss and practice the use of many material models available in SOLIDWORKS Simulation Premium and, most importantly, how to drive a non-linear analysis to successful completion. The second part of the course will expose you to various advanced topics in Dynamics. The material covered includes the time dependent analysis, harmonic analysis and random vibrations. (Note, this course is a combination of the SOLIDWORKS Simulation Premium: Nonlinear and SOLIDWORKS Simulation Premium: Dynamics courses).

Who Should Attend: Designed for users who would like to become productive fast, the advanced course offers hands-on experience on the use of SOLIDWORKS Simulation Premium nonlinear and SOLIDWORKS Simulation Premium Dynamics modules. This 4-day course provides an overview on a wide range of nonlinear structural/mechanical and dynamic analysis topics.

Topics covered in this course are:

Nonlinear Analysis *(2 Days)*

Material Nonlinearities

- Nonlinear elasticity
- Hyperelasticity (Mooney-Rivlin, Ogden)
- Plasticity (von Mises, isotropic/kinematic/mixed hardening rules)
- Visco-elasticity and creep

Contact (Boundary) Nonlinearities

- 3D nonlinear gap/contact analysis (with or without material nonlinearities).

Numerical Procedures

- Solution control techniques (force, displacement, and Arc-Length controls)
- Equilibrium Iterations schemes (Newton-Raphson, modified Newton-Raphson)
- Termination schemes (convergence and divergence criteria)

Special Topics

- Adaptive automatic stepping algorithm
- Prescribed non-zero displacements associated with time curves
- Deformation dependent loading
- Analysis stabilization techniques

Viewing the Results

- Deflected shape plots
- Displacement and stress color filled contour plots
- Animation of deflected shape, displacement, and stress contour plots
- X-Y plots for response quantities
- Isoplanes and sectioning

Dynamics *(2 Days)*

Analyses Covered

- Modal time history analysis
- Steady-state harmonic analysis
- Random vibration
- Response spectrum analysis
- Introduction to nonlinear dynamic simulation

Damping

- Rayleigh damping, modal damping, composite damping

Excitation

- Load vs. time data for nodal forces, pressure loads
- Uniform and nonuniform base excitations in the time or frequency domain for displacement, velocity and acceleration
- Harmonic excitation for nodal forces, pressure loads, uniform and nonuniform ground motions and varied phase angles
- Power spectral density (PSD) excitation curves for nodal forces, pressure loads, uniform and nonuniform ground motions

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Training Registration
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