



Locations:

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NVH and Frequency Domain Analysis with LS-DYNA®

Instructor: Yun Huang, LSTC

2 Days - \$400 Students \$200 w/student ID

Includes on site continental breakfasts, lunches, breaks, class dinner

Includes 30-day LS-DYNA demo license to practice

Prerequisite: Introduction to LS-DYNA Class.
Students should have a command of the LS-DYNA keywords and options associated with NVH & Frequency Domain analyses.

Description: This two day class will provide introduction to the frequency domain vibration, fatigue and acoustic features of LS-DYNA to users, and give a detailed look at the application of these features in vehicle NVH simulation.

Course contents

- **Introduction:** NVH theory and lab testing technology; overview of LS-DYNA frequency domain features and applications; Frequency domain vs. time domain; Fourier transforms;
- **FRF:** Modal superposition method; Damping; Nodal force / Resultant force FRF
- **SSD with harmonic loading:** Large mass method for enforced motion; ERP (Equivalent Radiated Power); Mode expansion with LS-PrePost
- **Random vibration with PSD loading:** Correlated and uncorrelated multiple PSD excitations; Shaker table testing; Acoustic waves; Pre-stress condition
- **Acoustics:** BEM, FEM; Vibro-acoustic problems; Acoustic panel contribution analysis; Muffler transmission loss analysis; ATV and MATV; Acoustic eigenvalue analysis; Incident waves
- **Response spectrum analysis:** Input earthquake spectrum; Modal combination methods (SRSS, CQC, etc.); Multi input spectra
- **Fatigue:** Fatigue analysis in harmonic / random vibration environment; Miner's rule; S-N curves; Dirlik method
- **Advanced topics:** SEA (Statistical Energy Analysis); Brake Squeal Analysis; NVH based on IGA
- **Workshop:** Hands-on exercise, post-processing of results