Recent updates in LS-DYNA® frequency domain solvers

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Abstract

This talk gives a brief review of the recent updates in frequency domain solvers in LS-DYNA.

A series of frequency domain solvers have been implemented to LS-DYNA since ls971 R6. They include FRF (Frequency Response Functions), SSD (Steady State Dynamics), Random vibration and fatigue, Response spectrum analysis, and acoustic solvers by BEM and FEM. They are developed to meet the needs of users for solving vibration, noise and durability analysis problems. A typical application is NVH analysis of automotives.

A bunch of updates were implemented in past a few years. They include
- *computation of finite element acoustics with impedance boundary conditions, and with openings on the surface of acoustic volume;*
- *introduction of frequency dependent complex sound speed in acoustic analysis, to take into account the damping of acoustic systems;*
- *using different stress index (von-mises stress, maximum shear stress and maximum principal stress) in fatigue analysis in a sine sweep test environment;*
- *introduction of strain computation in random vibration analysis;*
- *some others*

These updates not only strengthen the current capabilities of frequency domain solvers, but also extend greatly the application area of these solvers.

Some benchmark studies, as well as industrial examples, are given to demonstrate how to use the updated frequency domain solvers.