

Project

Vibro-Acoustic Finite Element Simulation

Initial Information

In case of question relative to the usage of Actran (not about the physical interpretation of the results), you can contact the support by email at: support@fft.be Please indicate clearly that you are a student related to this project. Do not hesitate to send the report folder and input file (.edat file located in the working directory), you can also send screenshots of your issue.

Step 1: Original System

During this project, you will be asked to perform the analysis of a vibro-acoustic model. The system is similar to the one used in exercise session 6:

- An aluminum plate with dimensions 75cm by 40 cm and thickness 3mm is excited by a point load. The plate is simply supported on each of its edges.
- A cavity (filled with air) is connected to the plate on one of its side, the cavity's depth is 65cm.

Perform the vibro-acoustic response of this plate-cavity system.

- Compare the vibration of the plate with and without the presence of the cavity.
- Observe and comment the acoustic response at the microphones located inside the cavity.
- Observe the behavior (color maps and deformation) at the first few peaks.

Step 2: Treated System

It is then proposed to reduce the vibro-acoustic response of the system by using two independent solutions:

1. Higher damping coefficient for the plate
2. Porous elements in the cavity

Consider those two modifications independently from each other then jointly while proceeding as explained in the document: [Coupled_plate_cavity_damping_foam.pdf](#).

Required files are provided along the way. Compare both vibration and pressure responses of the three systems (original, high damping plate, porous in cavity).

Step 3: Variations

Perform variations on this system. Suggestions:

- boundary conditions (e.g. clamped vs. simply supported),
- material properties (air, temperature changes, pressure changes, Helium, ...),
- position and type of excitation,
- dimensions, ...