

Coustyx Top Use Cases

Acoustic Analysis Software by ANSOL



Altair | Partner Alliance

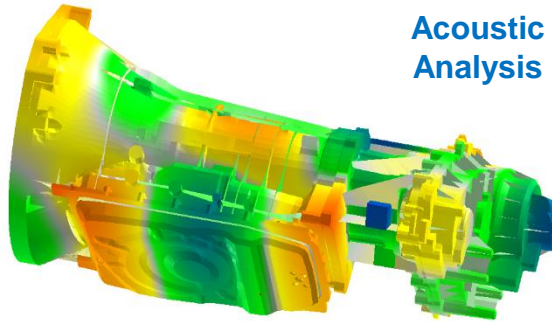
Coustyx for Vibro-Acoustic Analysis – Use Case 1

Challenge

- Estimate the sound power radiated by a power train housing

Solution

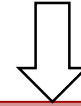
- Forced Response of the power train housing is used as the boundary condition for acoustic analysis
- Acoustic radiation problem is solved in Coustyx to estimate radiated sound power



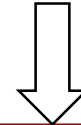
Housing
Forced
Response
Analysis

Acoustic
Analysis

Estimate & apply
bearing loads &
constraints on power
train housing

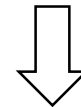


**Optistruct
(FEM)**



Housing FRF

**Coustyx
(FMM-BEM)**



Sound power
Panel contributions
Sound pressure

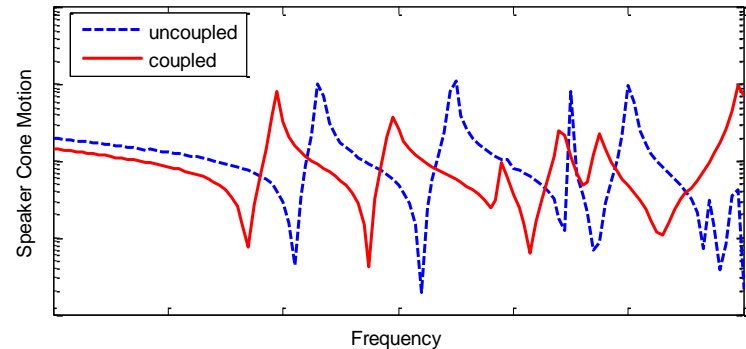
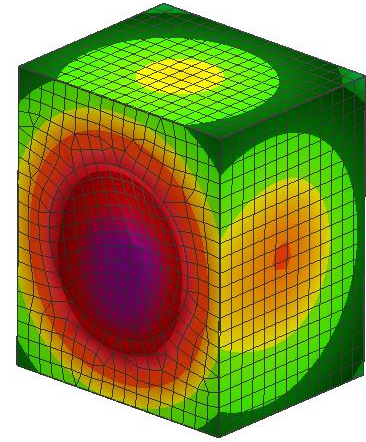
Coustyx for Vibro-Acoustic Analysis – Use Case 2

Challenge

- Speaker enclosure acoustics effect the frequency response of a speaker

Solution

- Perform a coupled acoustic-structural analysis
- In Coustyx, acoustic domain is modeled using FMM-BEM and structure (Speaker cone + enclosure) is represented by the invacuo modes loaded from Optistruct



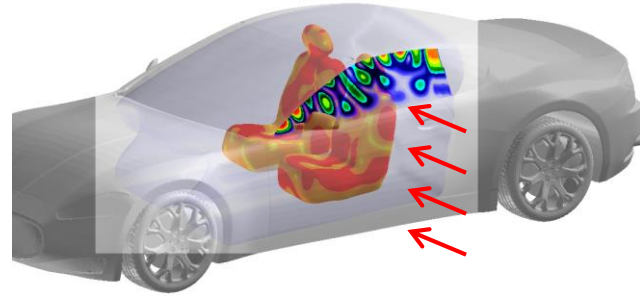
Coustyx for Vibro-Acoustic Analysis – Use Case 3

Challenge

- Estimate the sound transmitted from the exterior of the car to the interior of the car through window panel coupling

Solution

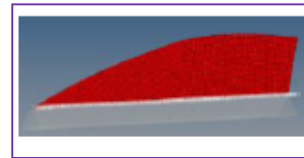
- Exterior and interior domains are modeled using Coustyx where as the window panel structure is modeled using invacuo modes from Optistruct modal analysis
- Multi-domain acoustic-structural coupling formulation is used



- Car size: 4.7 m x 2 m x 1.3 m
- Number of Surface (BE) elements: 600 K (Exterior) + 70 K (Interior)
- Average BE element size: 1 cm
- Maximum frequency: 5 kHz



Exterior Domain (Coustyx)



Elastic Panel (Optistruct)



Interior Domain (Coustyx)