Technische Universität Braunschweig

Institut für Akustik und Dynamik

Design Studies and Sensitivity Analysis of a Vibroacoustic Finite Element Model

Hiwi, Studien- oder Masterarbeit

Reducing aircraft cabin noise is a key design objective for novel aircraft configurations. To understand the vibroacosutic properties of such complex systems, Finite Element Simulations are conducted to simulate the sound pressure in the aircraft cabin. Such simulation models are then used for parameter studies or design optimization tasks.
In this spirit, the task of this student project is to establish an automated model generation pipeline. After defining a design space, such a pipeline shall automatically create CAD models and perform the meshing for numerical simulation. Once established, this pipeline can be used for advanced studies, such as uncertainty quantification or sensitivity analysis.

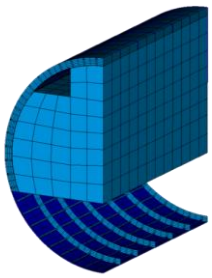
Requirements:

- Fundamental knowledge in vibroacoustics
- Good understanding of the Finite Element Method
- Good programming skills in Python

Tasks:

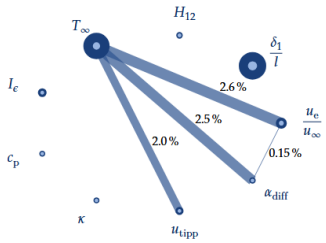
- Automatically generate CAD geometries with Salome
- Mesh analysis / Convergence studies of the automatically generated models
- Design space definition including constraints
- Uncertainty quantification / Sensitivity analysis

CAD Modelling



FE - Computation

Sensitivity analysis



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