Technische Universität Braunschweig

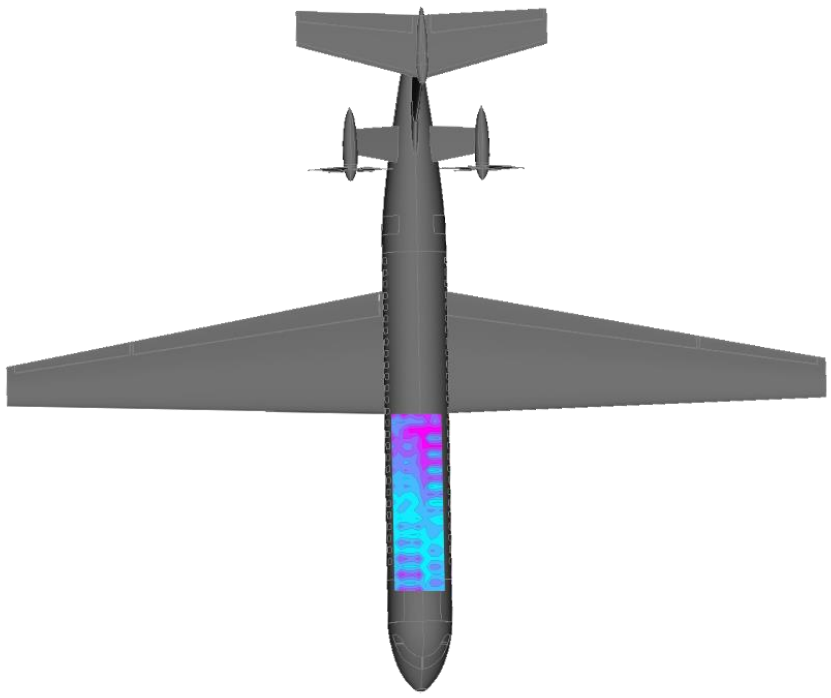
INSTITUT FÜR AKUSTIK

# Iterative solvers for large-scale sparse system of equations in vibroacoustics

## Student Project | Master Thesis

When utilizing the Finite Element Method (FEM) to solve systems such as aircraft for a simulative cabin noise assessment the underlying system of equations is of a large-scale and sparse. Direct solvers have improved drastically in recent years and allow for evaluations of models with many Degrees of Freedom (DOFs). However, direct solvers also entail a substantial amount of computational effort, where the usage of iterative solvers with preconditioned matrices may help reduce the memory and solving time requirements.

The underlying system of equations is often ill-conditioned and therefore the project at hand aims to shed light into the preconditioning as well as solving process of the obtained system matrices. Several iterative solvers shall be compared and evaluated with regards to computational effort. Furthermore, different implementations of mathematically equivalent formulations shall be evaluated for usability in vibroacoustics. The influence of preconditioning and renumbering can also play a vital role.



**Key words: FEM, solvers, domain decomposition, parallel computing**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