



Development and Evaluation of a Graphical Framework for Throughflow Simulations of Axial Compressors

Bachelor thesis / Semester Thesis

Description: Throughflow methods are widely used in preliminary compressor design because they provide fast predictions of the meridional flow field. However, the evaluation of input data, solver convergence, and aerodynamic output quantities often requires several manual post-processing steps. The goal of this thesis is to develop a structured graphical analysis framework for MTflow simulations of axial compressors. The tool shall support the visualization of compressor geometry, blade-row positions, input data, convergence behavior, and relevant aerodynamic quantities. The framework will be tested using the FRANCC compressor.

Work packages:

- Literature review
- Familiarization with MTflow
- Development of a Python-based GUI
- Implementation of plotting routines
- Application of the tool to one or more FRANCC compressor cases

Requirements/knowledge:

- Good knowledge of Fluid Mechanics and Thermodynamics
- Good programming skills (pref. python)

Type of research: Theoretical/numerical

Begin: 01.08.2026 or later

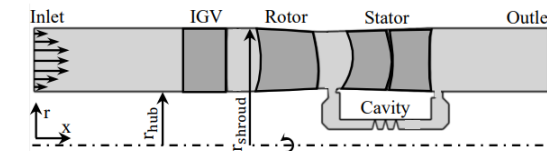


Figure 1: Meridional view of the FRANCC 1.5-stage compressor setup with single rotor and tandem stator.

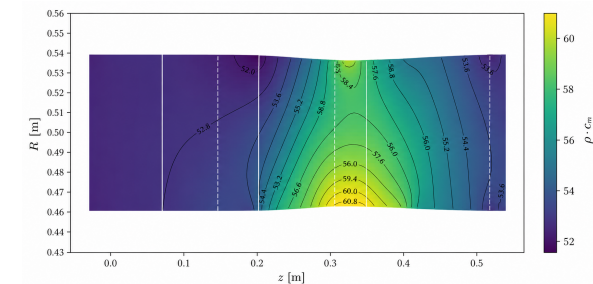


Figure 2: Contour plot of the mass-flow-density distribution ρc_m in the meridional compressor plane.