

Investigation of acoustic eigenmodes in a hydrogen aero-engine combustor test-rig

Type: Semesterarbeit/ Masterarbeit
Content: theoretical / numerical
Possible start: 01.03.2025

Assistant Professorship for Sustainable Future Mobility

Our group carries out research in the areas of novel concepts in aviation, propulsion, and Hyperloop technology as well as safety technology. We use the principles of technical thermodynamics as a focus in research supported by elements of fluid mechanics, heat and mass transfer, acoustics, chemical reaction kinetics and systems dynamics.

Job Description

You will have the opportunity to participate in research to hydrogen combustion for the next generation of aero engines. Unlike stationary gas turbine technology, hydrogen combustion in aero engines lacks comprehensive understanding of its combustion behavior. In the upcoming 'H2-LoNOCS' project, a novel test-rig will be designed to facilitate the measurements of the stationary and dynamic behaviors, as well as emissions of hydrogen flames in aero engine combustion.

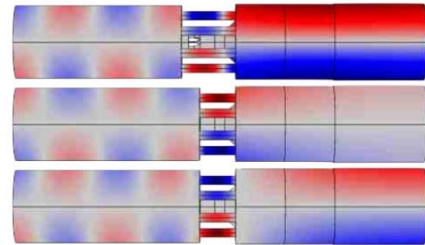


Figure 1 – Numerical results of acoustic pressure mode shapes investigation. Image taken from Rosenkranz et al. 2023.

Your Tasks

- Literature research on thermoacoustic modeling in gas turbine combustors
- Development of an acoustic network model for the test-rig
- Validation of the network model via a numerical acoustic model with the help of a multi-physics software (e.g. COMSOL)

Our Requirements

- Basic knowledge of acoustics in technical applications and ideally of thermoacoustics
- Knowledge of CAE software, such as COMSOL
- Independent and structured way of working
- Ideally very good knowledge of German and English

Our Offer

- Insight into research topics for sustainable future air transportation
- Deep knowledge of acoustic modeling for gas turbine combustors
- Learn both soft and hard skills vital for engineers' daily tasks

Contact

If you are interested in working in our team, please send your application together with a motivation and a record of performance to Adrian Hochmuth (adrian.hochmuth@tum.de). If you have any questions, do not hesitate to contact us.