

Actuator design of a variable outlet geometry for a hydrogen aero engine combustor

Type: Semesterarbeit
Content: theoretical / experimental
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. To bridge this knowledge gap, we will test a novel hydrogen combustor at our state-of-the-art test rig. Using an advanced actuator, the combustor's outlet geometry can be dynamically adjusted during testing, allowing precise control over its combustion dynamics and thermoacoustic behavior.

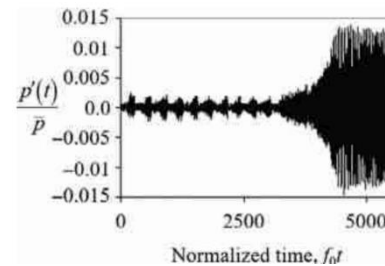


Figure 1 – Data showing growth and saturation of instability amplitude. Image taken from Lieuwen: *Unsteady Combustor Physics* (2021).

Your Tasks

- Literature research on thermoacoustic instabilities of gas turbine combustors
- Conception and design of an actuator, which acts as a tunable acoustic boundary condition of the combustion chamber, to investigate thermoacoustic instabilities of a hydrogen burner

Our Requirements

- Basic knowledge of acoustics in technical applications and ideally of thermoacoustics
- 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 thermoacoustic design 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.