Semester / Master Thesis

Institute of Rotorcraft and Vertical Flight

VTOL Propeller Model

(Simulation / Structural Model / Method Implementation)

Keywords: propeller, nonaxial inflow, structural dynamics, VTOL

Background: An increasing number of different VTOL configurations are being designed with propellers. For these concepts, the propellers often have to pass through a transition phase of the aircraft where they experience varying angles and speeds of inflow. This is not the design case for a normal propeller and therefore requires further investigation. In order to be able to investigate many different influencing factors of the propeller design, a flexible parametric propeller model is to be included in the multibody simulation code at the chair. In the course of this we offer the possibility for several master and semester theses. These will be around implementing the model using a structural beam model and simple aerodynamics as well as to perform parametric studies of the influence of design parameters on the propeller behavior.

Goal: The implementation of an elastic blade model to include it into a parametric propeller model and a parameter study of the propeller design and different inflow cases, to further increase the understanding oft the effects occuring during aircraft transition phases. This goal can be partly or fully covered in the thesis depending on progress and difficulties.

About us: We are looking for independent and highly motivated Master's students who want to develop their knowledge in the areas of propeller and inflow dynamics, multibody simulation, structural dynamics and propeller forces in nonideal inflow situations. These theses offer an excellent opportunity to participate in applied and industry-related research. If you are interested, please contact us personally. We will be happy to discuss all possibilities! We currently offer a large selection of theses.

Abilities: High motivation and the ability to familiarize yourself independently with new topics. Experience with inflow modeling, rotor and propeller dynamics as well as structural dynamics is beneficial. Coding experience in C++ would be preferable.

Language: Englisch/Deutsch
Start: from Dec. 2023
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