Lehrstuhl für
Hubschraubertechnologie

|Bachelor thesis|Semester thesis|Master thesis|

Fluid Structure Interaction Investigation of a Dynamically Camber Morphing and Pitching Rotor Airfoil

Background:

Active camber morphing airfoils have a major potential to improve the efficiency of rotor blades by adapting to the various inflow conditions occurring over a rotor revolution. In comparison to traditional trailing edge flaps the continuous changes in camber show improvements for the lift-to-drag ratios by maintaining a similar lift. The Fish Bone Active Camber (FishBAC) device was shown to be a promising approach for implementation. Due to the highly flexible structure of the FishBAC, aeroelastic effects play a crucial role and can have a vast influence on the aerodynamic performance of the airfoil. In previous studies a high-fidelity fluid-structure interaction simulation was build up with the CFD-solver TAU, the FEM-solver Calculix and the coupling library preCICE.
A major part of further development is the investigation of the elastic dynamic motion of the structure with the help of Finite-Element Method, to improve the accuracy of the coupled simulation. Furthermore, the influence of the fluid structure coupling under different flow conditions, morphing frequencies and geometry variations must be examined . Within this framework, we are looking for a motivated student who wants to write his/her **Bachelorthesis**, **Semesterthesis** or **Masterthesis** at the chair of Helicopter technology. The student is also welcome to use any other coupling framework, in case he/she is familiar to work with other FEM or CFD solvers.

If you want to learn about a multidiciplinary field of research and acquire a broad knowledge in FEM, CFD, multiphysic coupling and programming feel free to get in touch.

Recommended Skills:
CFD, FEM, python
Language:
German or English
Start:
Flexible (Best April 2023)
Contact:
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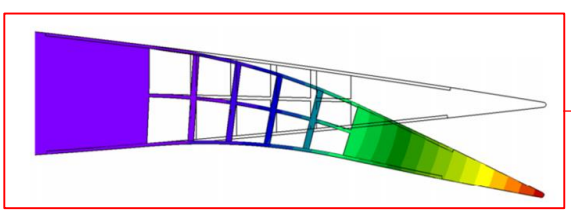

Active camber section