Student Assistant Job: CFD code development, application and validation

Background
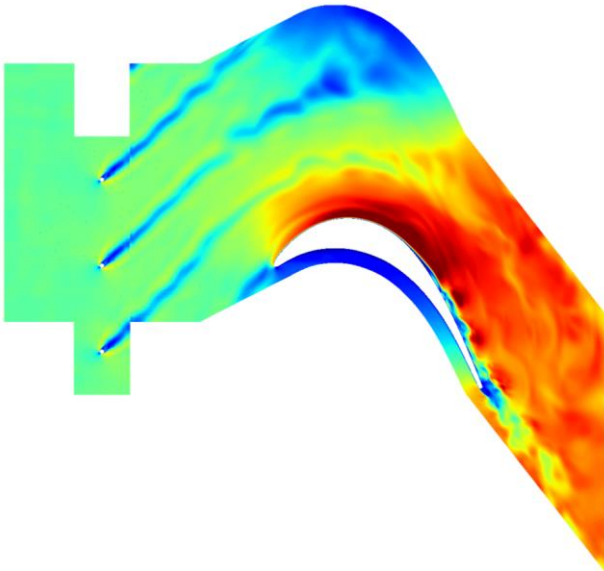

Figure 1: A turbine cascade setup with inflow turbulence with upstream wakes

In turbomachinery flows, there is often an incoming wake from the upstream rows as well as the inflow turbulence (see Figure 1). Scale-resolving simulation of the free-stream turbulence is usually handled through incorporation of synthetic eddy/turbulence generation. The inflow wakes on the other hand, are often neglected.

At the Institute of Turbomachinery and Fluid Dynamics, we conduct simulations of turbomachinery flows and develop models. Previously, we developed an inflow boundary conditions which combines synthetic eddy methods with the dynamic inflow wake (W-DFSEM). The basic idea is to replace preceding blade rows and their wake directly by means of this combination. As a support to our team with the further developments, we are looking for an enthusiastic HiWi to work on the TRACE code development of the dynamic inflow boundary conditions. TRACE is being developed by the DLR and being used by the MTU to design aircraft engines.

The Assignments

- Getting familiar with
    - the CFD software TRACE
    - W-DFSEM
    - STG (Synthetic Turbulence Generator)
- Development and implementation of the wake model
- Validation
- Documentation of the findings

Time frame

As soon as possible, with 30-40 hours per month

Requirements

The following qualities are essential for the job:

- Some CFD experience,
- A basic understanding of turbulence,
- A fairly good command of the C language,
- Eagerness to read and understand scientific articles,
- Ability to perform critical analysis and code debugging

Contact

If these altogether appeal to you, please get in touch via the email address below, preferably with your CV attached:

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