

Bachelorarbeit / Masterarbeit

CFD studies on the flow characteristics of a vertical axis wind turbine employed with Gurney flaps

Dynamic stall is a highly unsteady phenomenon occurring on any lifting surfaces with rapid variation of the incoming flow conditions. The phenomenon is complex but holds a significant role in many engineering applications such as the flow over helicopter and wind turbine rotors. On vertical axis wind turbines, dynamic stall is not only dangerous for the structural strength but also influences significantly the power production up to 22% azimuthal portion of the blade rotation. Therefore, controlling the dynamic stall effect is important to enhance the performance of this turbine type. The dynamic stall effects reduce with increasing airfoil thickness. Ironically the obtained power coefficient decreases with airfoil thickness as well. As an attempt to solve for this issue, control strategies will be developed at IAG employing numerical approaches.

Proposed tasks:

- Getting used to CFD solver FLOWer at IAG.
- Mesh studies.
- Parametric studies on Gurney flap geometries.
- Writing the report

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Begin date: The offer remains open until a candidate is found.

Not interested in the above topic but would like to work on other CFD/numerical studies for wind turbine applications? other thesis offers are available per email.