

## **Abstract**

### **Navier-Stokes simulation of flow past pitched-regulated wind turbines using sliding meshes**

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In the work the technique of sliding meshes is applied for simulation of flow past wind turbines with pitched-regulated blades. In the technique a structural and moving mesh is associated with the moving blades and a stationary mesh is associated with the ground, tower and nacelle. Between the two meshes, communications are achieved through the interfaces where one side is moving in relation to another side. The technique permits to treat the problem of bodies in relative motion in a simple way with a low computational cost.

The developed technique will provide the basis for evaluating a wind turbine design and performing the analysis in detail of the aerodynamic behavior of the blades, the nacelle and the tower as well as unsteady rotor aerodynamics including wake interaction. In a future a parametrical study will be carried out to simulate and analyze various operating conditions of a wind turbine, such as yaw, pitch regulation and turbulent inflow. Furthermore, the use of various pitching controllers for power control will be investigated.