

REASE



THESIS PROPOSALS – update 01/02/2019

WIND ENERGY

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THESIS PROPOSAL #1

TITLE: Development of an Actuator Line Model (ALM) for horizontal-axis wind turbines (HAWTs) for use in the commercial solver ANSYS FLUENT

BRIEF DESCRIPTION: The research group makes use of the commercial solver ANSYS FLUENT for a long time in wind energy applications. In the last few years, an improved actuator disk model has been developed for siting purposes. The thesis work will develop an Actuator Line Model (ALM) to increase the accuracy of the simulation that can be now run in the unsteady mode. Validation on a real test case.

INSTRUMENTS: CFD (ANSYS FLUENT and its compiler for User Defined Functions (UDFs))

NOTES: innovative, practical use for industry (a partner is prompting us), at least one scientific publication will be included

THESIS PROPOSAL #2

TITLE: Further development of an Actuator Line Model (ALM) for vertical-axis wind turbines (VAWTs) for use in the commercial solver ANSYS FLUENT

BRIEF DESCRIPTION: The research group has already developed and validated an Actuator Line Model (ALM) in ANSYS FLUENT for vertical-axis wind turbines in 2D. The thesis work will further develop the model, extending it to the 3D case, with particular focus on the development of an improved dynamic stall model. Comparison with experiments in cooperation with TU Delft.

INSTRUMENTS: CFD (ANSYS FLUENT and its compiler for User Defined Functions (UDFs))

NOTES: innovative, at least one scientific publication will be included

THESIS PROPOSAL #3

TITLE: Optimization of Gurney Flaps (GFs) for use on Darrieus VAWTs

BRIEF DESCRIPTION: In a recent work, the research group has demonstrated the interesting potential of Gurney Flaps (conventionally used in the spoilers of sport cars) for the power augmentation of Darrieus wind turbine. The thesis work will further develop the concept, exploring different GF geometries and/or thinking about a rotating GF.

INSTRUMENTS: CFD (ANSYS FLUENT)

NOTES: innovative, at least one scientific publication will be included