Design of wind turbines using detrended fluctuation analysis

Sponsor : LAU

Project Overview
Wind speed is one of the most important variables of wind phenomena. To correctly select a wind turbine, it is important to investigate the main temporal and spatial characteristics of the wind speed to benefit from its power. This could be achieved thru a systematic analysis used in detecting long-term correlations, known as detrended fluctuation analysis (DFA). Thus, one of the objectives of this FYP is to optimally size wind turbines that harvest the maximum wind power at a given site. Another objective is to design the turbines' layout to maximize their number for a given area while maintaining minimal flow interference. The design will be modeled with ANSYS fluent Software and will take into account the effect of topographic properties (elevation and distance from the sea).

Project Areas
• Fluids/ Energy (2 MEE Students)

Project Deliverables
Project deliverables consist of the following: • Development of a new computer program to analyze unsteady wind speeds. • Selection of wind turbines that maximize the wind power harvesting • Design a layout for wind turbines utilizing ANSYS CFD software

Project Constraints
• NA

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Students:

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