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AERODYNAMIC OPTIMIZATION FOR WIND TURBINE BLADE-SECTION

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ABSTRACT

In this paper an airfoil optimization for wind turbine application is to be performed, starting from NREL S809 low Reynold's number airfoil as base design shape at Reynolds number of 5.5×10^5 and at linear range of angles of attack. One efficient method for such design and optimization research is using a combination of potential flow solvers and numerical search tools such as genetic search algorithms (GAs). A MATLAB code prepared and verified by the author is used as aerodynamic design tool. Class-Shape-Transformation (CST) method is used for airfoil shape parameterization through all the design process. The design process arrives at an optimum airfoil shape with significant-drag minimization at the desired operating conditions.

Keywords: Wind turbine blade-section, Optimization, Aerodynamic efficiency, Airfoil parameterization, Airfoil optimization.