**Aerodynamic Efficiency Numerical Estimation of 1 kW horizontal axis wind turbine rotor**

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## Abstract

The paper presents an estimated analysis of the aerodynamic performance of a wind rotor with a horizontal axis. It is a design stage of a low power wind turbine, ≈ 1 kW. Several airfoils are considered to indicate high performance at low Reynolds numbers (approx. 100,000). For the analysis of the performance of the wind turbine with horizontal axis, the geometric parameters for a rotor with a power of 1 kW were considered. The required geometric parameters were estimated using a calculation model developed in the MathCad application. The wind rotor was developed and simulated in the QBlade application then, for comparison, it was numerically analyzed in ANSYS Fluent. The parameter of interest is the power coefficient without considering the mechanical/electrical losses and was compared with performance of some existing rotors.

*Keywords: wind energy, blades, rotors, wind turbines, axis wind turbine rotors*

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