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Prediction of the Mechanical Power in Wind Turbine Powered Car Using Velocity Analysis

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Abstract : Savonius is a drag type vertical axis wind turbine. Savonius wind turbines have a low cut-in speed and can operate at low wind speed. This makes it suitable for electricity or mechanical generation in low-power applications such as individual domestic installations. Therefore, the primary purpose of this work was to investigate the relationship between the type of Savonius rotor and the torque and mechanical power generated. And it was to illustrate how the type of rotor might play an important role in the prediction of mechanical power of wind turbine powered car. The main purpose of this paper is to predict and investigate the aerodynamic effects by means of velocity analysis on the performance of a wind turbine powered car by converting the wind energy into mechanical energy to overcome load that rotates the main shaft. The predicted results based on theoretical analysis were compared with experimental results obtained from literature. The percentage of error between the two was approximately around 20%. Prediction of the torque was done at a wind speed of 4 m/s, and an angular velocity of 130 RPM according to meteorological statistics in Northern Cyprus.

Keywords : mechanical power, torque, Savonius rotor, wind car
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