

Wind Farm Power Performance Verification Using Non-Parametric Statistical Inference

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Abstract : Accurate determination of wind turbine performance is necessary for economic operation of a wind farm. At present, the procedure to carry out the power performance verification of wind turbines is based on a standard of the International Electrotechnical Commission (IEC). In this paper, nonparametric statistical inference is applied to designing a simple, inexpensive method of verifying the power performance of a wind turbine. A statistical test is explained, examined, and the adequacy is tested over real data. The methods use the information that is collected by the SCADA system (Supervisory Control and Data Acquisition) from the sensors embedded in the wind turbines in order to carry out the power performance verification of a wind farm. The study has used data on the monthly output of wind farm in the Republic of Macedonia, and the time measuring interval was from January 1, 2016, to December 31, 2016. At the end, it is concluded whether the power performance of a wind turbine differed significantly from what would be expected. The results of the implementation of the proposed methods showed that the power performance of the specific wind farm under assessment was acceptable.

Keywords : canonical correlation analysis, power curve, power performance, wind energy

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