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Application of Remote Sensing in Wind Resource Assessment: A Comparative Analysis

Vilas Warudkar, Siraj Ahmed Khan and Prem Kumar Chaurasiya

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Abstract:

The successful development of wind power depends on accurate assessment of wind potential and characteristics of wind in each location like different heights, rotor area and wind speeds in upstream and downstream. To accomplish this, it is relevant to place emphasis on new observation and assessment methods and strategies. Wind speed and direction are sensed on several spatial extents. Wind sensing over the ocean is usually done by satellite mounted radar or radiometers. On a smaller scale wind flows are sensed with several technologies which can be divided into direct or remote sensing. Most promising application of remote sensing techniques are sound based (SODAR) and laser light based (LIDAR) of Doppler principle. This paper outlines the working principle and application of remote sensing instrument in wind energy assessments. It also presents the comparative analysis of measurements campaign conducted at Kayathar, Tamil Nadu, India at a height of 60 m and 80 m. The comparative results between traditional measuring technique (meteorological mast) and remote sensing techniques analyzed and studied. It also outlines advantages and limitations of both approaches.

Fabrication study on CFRP lightweight vertical axis wind turban

Hiroki Endo

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Abstract:

This study is fabricated CFRP lightweight vertical axis turbine to be used in the high altitude wind power generation.This power generation system employed high altitude wind energy with the airborne technique of a kite and a balloon.This study is covered “tether sprocket system”, which drive generator on the ground by the tether sprocket system transports a vertical axis turbine.Turbine demand strength and lightness in this time.So, that manufactured the turbine of chord length 100mm, diameter of 600mm, the blade turbo width 600mm, the weight 1.8kg to using CFRP and the FDM3D printer.This time show the turbine, which manufacturing process and experiment result of wind tunnel.

A Hybrid Method Based on Empirical Mode Decomposition and Pipelined Recurrent Neural Networks for Wind Speed Forecasting

Quan Long and Dongxiang Jiang

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Abstract:

Wind speed is an important factor for the wind farm site selection and wind power generation. In this paper, we proposed a wind speed forecasting method based on empirical mode decomposition (EMD) and pipelined current neural networks (PRNN). Wind speed is a nonlinear and non-stationary signal while it has a wealth of periodic variation elements, such as annual periodicity, lunar periodicity, weekly periodicity and even the offshore wind speed will show the daily periodicity. The EMD method can extract the intrinsic mode function of this kind of signal. On the other hand, the PRNN, with the characteristics of fast training speed, is suitable for the strong correlation time series data. It meets the high speed variation of wind. In this study, the wind speed is decomposed by the EMD, and then the PRNN is used to predict the variation of the modal components. We use the combination of the two methods and have achieved the purpose of forecasting wind speed.