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Wind energy exploration fractal perspectives

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The wind energy conversion heavily depends on wind speed fluctuation demanding new and more durable materials. The great deal of resistance to wind depends on wind speed series that are known to have fractal character and are characterized by (Hausdoff) fractal dimension. The accurate prediction of wind speed is essential in order to improve performances of wind energy systems. In order to improve the prediction performance of the wind speed series, the fractal characteristics of the wind speed series were analyzed. An improved fractal interpolation prediction method is proposed to predict the wind speed series. According to the non-linear self-similarity characteristic and the scale invariance, the extrapolation prediction can be performed by extending the fractal characteristic to external interval. In this work, the optimal input combination for wind speed prediction at certain height is given. The reliability of the computational models was analyzed based on simulation results and using three statistical tests including Pearson correlation coefficient, coefficient of determination and root-mean-square error.

Biography

Vojislav Mitić in 1995 has completed his PhD from University of Nis (Serbia). He is a Full Professor at University of Belgrade and Nis. In 1995-2006, he was the Director of Electronic Industry Corporation, Serbia – Ei. He has published more than 200 papers in reputed journals and has been serving as an Editorial Board Member of reputed. He is a Scientific Adviser at the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts. He is a member of European Academy of Sciences and Arts, member of World Academy of Ceramics and President of Serbian Ceramics Society.

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