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Comparison Approach for Wind Resource Assessment to Determine Most Precise Approach

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Abstract : Distribution models of the wind speed data are essential to assess the potential wind speed energy because it decreases the uncertainty to estimate wind energy output. Therefore, before performing a detailed potential energy analysis, the precise distribution model for data relating to wind speed must be found. In this research, material from numerous criteria goodness-of-fits, such as Kolmogorov Simonov, Anderson Darling statistics, Chi-Square, root mean square error (RMSE), AIC and BIC were combined finally to determine the wind speed of the best-fitted distribution. The suggested method collectively makes each criterion. This method was useful in a circumstance to fitting 14 distribution models statistically with the data of wind speed together at four sites in Pakistan. The consequences show that this method provides the best source for selecting the most suitable wind speed statistical distribution. Also, the graphical representation is consistent with the analytical results. This research presents three estimation methods that can be used to calculate the different distributions used to estimate the wind. In the suggested MLM, MOM, and MLE the third-order moment used in the wind energy formula is a key function because it makes an important contribution to the precise estimate of wind energy. In order to prove the presence of the suggested MOM, it was compared with well-known estimation methods, such as the method of linear moment, and maximum likelihood estimate. In the relative analysis, given to several goodness-of-fit, the presentation of the considered techniques is estimated on the actual wind speed evaluated in different time periods. The results obtained show that MOM certainly provides a more precise estimation than other familiar approaches in terms of estimating wind energy based on the fourteen distributions. Therefore, MOM can be used as a better technique for assessing wind energy.

Keywords : wind-speed modeling, goodness of fit, maximum likelihood method, linear moment
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