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Abstract
It is an important issue to master the characteristics of wind speed distribution exactly during estimating the wind energy. Season and weather conditions of different terrain near by the wind field affect the characteristics of wind speed distribution. To evaluate the goodness of fit of Tainan/Penghu' wind speed distribution, Statistical inference was used to conduct four different probability density functions in the thesis. There are significant differences between the characteristics of wind speed distribution in the terrain of Tainan and Penghu, The Weibull distribution is not always feasible all the time. During some specific months/seasons, the Gauss or Lognormal probability density function shows more significant identification. The moment and the maximum likelihood methods are used to estimate the shape and scale parameters of probability density function. Results show a better accuracy is conducted by the maximum likelihood method. The statistical characteristics of wind speed are also analyzed from the histograms. The interval width of histogram with interval number ranged form 5 to 50 were used to compare the resultant probability density function, on specific difference can be found by these two different approaches. The wind speed probability density function is used to conduct the wind generation of the Chung-Tun power plant, the Weibull probability density function of wind speed shows a feasible result to estimate the wind generation. After making a comparison with the statistical histograms, the fuzzy approach is proposed to estimate the new parameters of the probability density function. The Root Mean Square Error(RMSE) is used to assess these simulations. Results show probability density function of wind speed can be used to derive the appropriate wind generation.
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