عنوان مقاله:

Aerodynamic Optimization of a Wind Turbine Blade for Maximum Annual Energy Production at Manjil Wind Farm

محل انتشار:

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خلاصه مقاله:

This paper aims at the improvement of the annual energy production of a horizontal axis wind turbine by aerodynamic optimization of blades at the wind conditions of the Manjil site. To achieve this goal, the Riso wind turbine, whose characteristics are publicly available, is selected, and its twist angle and chord length distributions along the blades are optimized. The blade element momentum theory with appropriate corrections is used to predict the turbine output power. The genetic algorithm optimization tool, and Weibull probability density function, for wind regime representation, are also utilized in this work. Optimization results show a 9.4% and 11.6% increase in annual energy production, respectively, for the blade with optimal twist angle and the blade with optimal chord length and twist angle distributions. Finally, the superiority of selecting annual energy production as the objective function is assessed in .comparison with other objective functions

کلمات کلیدی:

blade element momentum theory-genetic algorithm-Manjil wind farm-Weibull distribution-wind turbine optimization