

Assessment and analysis of wind energy generation and power control of wind turbine system

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Abstract: This study concerns the evaluation of wind power potential and the choice of a wind turbine to be installed near Rabah Bitat international airport of Annaba. Furthermore, the performances of power control of this turbine are developed. For this, the wind speed data measured by meteorological station of the airport are used. At the first time, a statistical analysis of wind characteristics and the extrapolation of weibull parameters are presented. Otherwise, the analysis of the power produced and the capacity factor led to the choice of the wind turbine Enercon E-82/2000 whose characteristics: Rated wind speed (13 m / s), the cut-in wind speed (2.5 m / s) and rated power of 2000 kW. Finally, the control of the active and reactive power, by adaptive fuzzy gain scheduling of proportional integral controller is simulated using software Matlab/Simulink, studies on a 2 MW DFIG wind generation system. Performance and robustness results obtained are presented and analyzed.

Keywords : Wind energy, wind speed, weibull distribution, capacity factor, power output.