**Abstract**
The surprising evolution from the last decade in the area of renewable energy has triggered the emergence of the new technical challenges for both the power system operators and for the project developers of this area. One of this challenges refer to the analysis, from the statistical view, of the wind parameters (speed, direction, frequency, amplitude) on relevant time intervals. A detailed analysis of the wind speed values recorded in a specific site leads to the generation of results that can lead to the determination of optimal values for the electric power generated at each time point by the wind turbine located in that area. Very important is the identification of sign changes and hence the time intervals during which the wind turbine does not work because these has a major importance in the stage of initial estimation of power energy generated and also for the estimation of average lifetime of a wind turbine on a specific site with various variation regimes of wind speed.

**Key words**: wind turbine, wind speed, power systems, roughness coefficient