Clustering Wind Speed Data by Hyperbolic Smoothing Clustering Method

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Abstract

The wind is an abundant and clean resource to electric power generation, but it is a non controllable resource. The wind variability put challenges to the integration of wind power plants to the electric grid. In this context, the understanding about daily profile of wind speed can mitigate the effects of the uncertainties in wind behaviour on the electric power system. The typical daily profiles of wind speed are valuable information to short-term wind speed forecast and to the design of wind power plants. The typical daily profiles can be obtained by clustering techniques applied to a set of wind speed measurements. In this paper we show the typical profiles of wind speed at an anemometric station operated by the SONDA project. The typical profiles were obtained by Hyperbolic Smoothing Clustering Method (HSCM), a relatively new and powerful method for cluster analysis.

Keywords: wind speed; wind power; cluster analysis; hyperbolic smoothing clustering method.