

A Mixture Vine Copula Structures Model for Dependence Wind Speed among Wind Farms and Its Application in Reactive Power Optimization

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Abstract : This paper aims at exploring the impacts of high dimensional dependencies of wind speed among wind farms on probabilistic optimal power flow. To obtain the reactive power optimization faster and more accurately, a mixture vine Copula structure model combining the K-means clustering, C vine copula and D vine copula is proposed in this paper, through which a more accurate correlation model can be obtained. Moreover, a Modified Backtracking Search Algorithm (MBSA), the three-point estimate method is applied to probabilistic optimal power flow. The validity of the mixture vine copula structure model and the MBSA are respectively tested in IEEE30 node system with measured data of 3 adjacent wind farms in a certain area, and the results indicate effectiveness of these methods.

Keywords : mixture vine copula structure model, three-point estimate method, the probability integral transform, modified backtracking search algorithm, reactive power optimization

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020