Historical Data Analysis for Extending Dynamic Line Ratings Across Power Transmission Systems - DTU Orbit (21/08/2019)

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Dynamic Line Rating (DLR) consists in an innovative way to operate power systems, which allows for higher power flows on transmission lines depending on weather conditions. Extending the application of DLR technology from one to numerous lines across a larger transmission power system presents challenges with respect to the scalability due to the large amount of data required. Firstly, a modified overhead line thermal model and the use of historical weather data are considered in this paper to preliminary assess the margin for increased rating of transmission lines. Secondly, spatial correlation of line ratings are analyzed and a comparison of various rating approaches, which rely on different combinations of weather variables, is presented. The resulting probability distributions of line ratings are compared with constant seasonal ratings highlighting the trade-off between those solutions that yield a large increase in rating at a cost of high volatility, against simpler approaches which are more conservative and require less information. The results reported are based on actual data of the western section of the Danish power transmission system.

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