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Short-Term Wind Power Prediction Using a Wavelet Support Vector Machine

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This paper proposes a wavelet support vector machine (WSVM)-based model for short-term wind power prediction (WPP). A new wavelet kernel is proposed to improve the generalization ability of the support vector machine (SVM). The proposed kernel has such a general characteristic that some commonly used kernels are its special cases. Simulation studies are carried to validate the proposed model with different prediction schemes by using the data obtained from the National Renewable Energy Laboratory (NREL). Results show that the proposed model with a fixed-step prediction scheme is preferable for short-term WPP in terms of prediction accuracy and computational cost. Moreover, the proposed model is compared with the persistence model and the SVM model with radial basis function (RBF) kernels. Results show that the proposed model not only significantly outperforms the persistence model but is also better than the RBF-SVM in terms of prediction accuracy.