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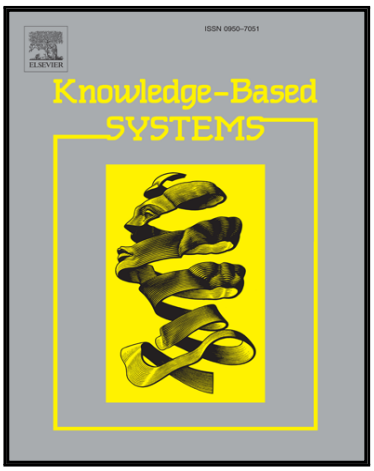

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A new weighted CEEMDAN-based prediction model: An experimental investigation of decomposition and non-decomposition approaches

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Abstract

In recent years, empirical mode decomposition based models for signal analysis and prediction have been introduced into a various fields such as electricity loading, crude oil pricing, wind speed assessment, energy consumption, foreign exchange rates, and tourist arrivals, and have shown good performances for both non-linear and non-stationary time series predictions. This study incorporates a nonlinear autoregressive neural network with exogenous inputs (NARX) into a decomposition based forecasting framework to propose a weighted recombination model for one-step ahead forward predictions. This proposed model is based on the assumption that as the complete ensemble empirical mode decomposition with adaptive noise (CEEMDAN) model derives different components from the given data series, it makes different contributions to the final prediction results. A weight function is therefore introduced to determine suitable weights for each individual prediction result derived from the decomposed components and the corresponding NARX model. Finally, a new weighted decomposition based forecasting model is developed that is combined with the NARX model and the weight function. To justify and compare the effectiveness of the new pro-

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