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Multi-step Time Series Forecasting Using Ridge Polynomial Neural Network with Error-Output Feedbacks

Waddah Waheeb, Rozaida Ghazali

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Abstract. Time series forecasting gets much attention due to its impact on many practical applications. Higher-order neural network with recurrent feedback is a powerful technique which used successfully for forecasting. It maintains fast learning and the ability to learn the dynamics of the series over time. For that, in this paper, we propose a novel model, called Ridge Polynomial Neural Network with Error-Output Feedbacks (RPNN-EOF), which combines three powerful properties: higher order terms, output feedback and error feedback. The well-known Mackey–Glass time series is used to evaluate the forecasting capability of RPNN-EOF. Results show that the proposed RPNN-EOF provides better understanding for the Mackey–Glass time series with root mean square error equal to 0.00416. This error is smaller than other models in the literature. Therefore, we can conclude that the RPNN-EOF can be applied successfully for time series forecasting. Furthermore, the error-output feedbacks can be investigated and applied with different neural network models.

The full text of this paper can be downloaded from my [HomePage](#).