

Fuzzy time series forecasting based on hedge algebra and its application to enrollment forecasting for Nam Dinh College of Education.

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Abstract: This study proposes a novel fuzzy time series forecasting model based on hedge algebras to enhance prediction accuracy, particularly for educational enrollment data. Traditional fuzzy time series models often rely on static membership functions and arbitrary interval partitioning, which can limit their adaptability. By integrating hedge algebras, the proposed method provides a more structured and semantically meaningful approach to fuzzification, leveraging the inherent order and linguistic hedges of natural language to define dynamic intervals. The model is applied to forecast annual student enrollment at Nam Dinh College of Education. Experimental results demonstrate that the hedge algebra-based model significantly outperforms conventional fuzzy time series models, such as those by Chen and Singh, in terms of lower root mean square error (RMSE) and mean absolute percentage error (MAPE). The findings highlight the effectiveness of incorporating linguistic semantics into fuzzy forecasting, offering a robust tool for institutional planning and resource allocation in educational management.

Keywords: fuzzy time series, hedge algebras, enrollment forecasting, Nam Dinh College of Education