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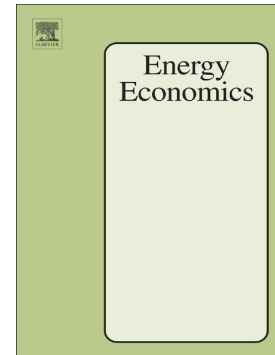
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# The prediction of oil price turning points with log-periodic power law and multi-population genetic algorithm

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## Abstract

The turning points in international oil price are the most significant and sudden corrections in prices in the world market. Accurate prediction of turning points can help governments and enterprises develop effective oil reserve strategies and economic decisions. Nevertheless, forecasting the turning points poses great challenges in both methodology and computational effort. Log-periodic power law (LPPL) is one state-of-the-art method to predict turning points. In this research, we propose an improved version of LPPL forecasting model by incorporating a method called multi-population genetic algorithm (MPGA) to search for optimal values of parameters in the LPPL model. By doing so, the improved LPPL model provided significantly superior performance in predicting the turning points compared to prior researches. To verify the quality of the improved LPPL model, we collected the data of WTI spot price in the period starting from April 2003 to November 2016 and used the improved LPPL model to predict the three turning points in this period based on the data prior to the turning points. In addition, we compared the improved LPPL model with three LPPL models that use other approaches to search for parameters, including simulated annealing, standard genetic and particle swarm optimization. We showed that the results from our LPPL model are superior to other three search approaches. We also

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