

AN IMPROVED MODEL OF FUZZY TIME SERIES  
BASED ON FIBONACCI SEQUENCE FOR KLCI  
STOCK INDEX FORECASTING

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AN IMPROVED MODEL OF FUZZY TIME SERIES BASED ON FIBONACCI  
SEQUENCE FOR KLCI STOCK INDEX FORECASTING

By  
CHAI YOKE LING

A final year project submitted in partial fulfillment of  
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**JABATAN MATEMATIK  
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**PENGAKUAN DAN PENGESAHAN LAPORAN MAT 4499 B**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk **An Improved Model of Fuzzy Time Series Based on Fibonacci sequence for KLCI Stock Index Forecasting** oleh **Chai Yoke Ling** No. Matriks: **UK 13119** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Matematik sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Matematik Kewangan, Fakulti Sains dan Teknologi, UMT.

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## DECLARATION

I hereby declare that this Final Year Project entitled **An Improved Model of Fuzzy Time Series Based on Fibonacci sequence for KLCI Stock Index Forecasting** is the result of my own research except as cited in the references.

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## **PEMBAIKAN MODEL SIRI MASA KABUR BERDASARKAN RANGKAIAN FIBONACCI DALAM PERAMALAN STOK INDEKS KLCI**

### **ABSTRAK**

Model siri masa telah digunakan untuk meramal pergerakan data dalam pelbagai kawasan seperti pergerakan harga stok, pergerakan akademik, suasana dan lain-lain lagi. Dalam penggunaan model siri masa kabur dalam prestasi peramalan, Tai-Liang Chen, Ching-Hsue Cheng dan Hia Jong Teoh telah membentuk satu model baru, dimana ianya menggunakan konsep rangkaian Fibonacci, model kaca Song and Chissom dan model pengimbang Yu. Pembentukan model tersebut ditunjukkan di dalam jurnal mereka yang bertajuk "*Fuzzy time-series based on Fibonacci sequence for stock price forecasting (2007)*". Kami mendapati bahawa selang jarak mempengaruhi prestasi model siri masa setelah mana yang didacangkan oleh Huarng (2000) yang memperdebatkan selang jarak berlainan mendorong ke hasil dan ralat peramalan yang berbeza. Sebagai akibatnya, ia mempengaruhi prestasi model cadangan Chen, T.L., Cheng and Teoh (2007). Oleh itu, model kami mempergunakan pembahagian frekuensi-densiti-dasar untuk membandingkannya dengan penggunaan pembahagian selang jarak secara rawak yang asal. Jurnal ini melibatkan penggunaan 2-tahun data mingguan Kuala Lumpur Composite Index (KLCI) sebagai data set eksperimen. Menerusi perbandingan prestasi oleh model kami dengan model asal, kami mendapati bahawa model kami menghasilkan ralat peramalan yang lebih kecil. Dengan itu, kami memberi kesimpulan bahawa model kami adalah model pembaikan dari model cadangan Chen, T.L., Cheng and Teoh (2007) sebelum ini.

Kata kunci: Siri masa kabur ; Rangkaian Fibonacci; Peramalan stok masa; Pembolehubah linguistik kabur.

# AN IMPROVED MODEL OF FUZZY TIME SERIES BASED ON FIBONACCI SEQUENCE FOR KLCI STOCK INDEX FORECASTING

## ABSTRACT

Time series models have been utilized to make reasonably accurate predictions in the areas of stock price movements, academic enrollments, weather and many more. For promoting the forecasting performance of fuzzy time-series models, Tai-Liang Chen, Ching-Hsue Cheng and Hia-Jong Teoh had proposed a new model, which incorporates the concept of the Fibonacci sequence, the framework of Song and Chissom's model and the weighted method of Yu's model. Their findings were shown in the journal entitled "*Fuzzy time-series based on Fibonacci sequence for stock price forecasting (2007)*". We noticed that length of intervals somehow affects the performance of fuzzy time series as proposed by Huarng (2000) who argued that different lengths of intervals lead to different forecasting results and forecasting errors. Consequently, it affects the performance of the model proposed by Chen, T.L., Cheng and Teoh (2007). Therefore, we employ the frequency-density-based partitioning into their model in order to compare it with its original randomly chosen length of intervals partitioning. This paper employs a 2-year weekly period of Kuala Lumpur Composite Index (KLCI) stock index data as experimental datasets. Through comparison of the forecasting performances of our model with their model, we noticed that our model has smaller forecasting error. Hence, conclude that our model is an improved model of the model proposed by Chen, T.L., Cheng and Teoh (2007) previously.

Keywords: Fuzzy time series; Fibonacci sequence; Stock price forecasting; Fuzzy linguistic variable.