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BUMPEN PIDCHID : AN APPLICATION OF THE BOX-JENKINS METHOD IN FORECASTING EDUCATIONAL TIME SERIES DATA WITH SEASONAL AND NONSEASONAL VARIATION. THESIS ADVISOR : ASSIST. PROF. NONGLAK WIRATCHAI, Ph.D. THESIS CO-ADVISOR : ASSO. PROF. SONGSIRI TAESOMBUT, Ph.D. 183 pp. ISBN 974-638-724-3.

This research aimed at applying the Box-Jenkins method in forecasting time series data with seasonal and nonseasonal variations in 5 lead times forecasting, and at checking the forecasting results with those results obtaining from the regression analysis, moving average and exponential smoothing methods, using 6 error measures of RMSE, MAPE, GMRAE, MdAPE, MdRAE and Percent Better as criteria. Two data bases were used in this study. The first were three sets of 65 monthly time series data with seasonal variation, namely general books, researved books and theses in circulation, obtaining from the Educational Information Center, Faculty of Education, Chulalongkorn University. The second were two sets of 60 yearly time series data with nonseasonal variation of primary and secondary school students enrollment, collecting from statistical yearbook. The research instrument were data recording forms. The data were analyzed using graph and regression analysis to check for secular trends and seasonal variations, using Box-Jenkins time series analysis to forecast and using the three forecasting methods to check the forecasting results.

The research findings were as follows :

1. Three time series data sets of general books, researved books and theses in circulation showed linear trend and seasonal variation at .01 level of statistical significance, and the integrated model was multiplicative. The primary and secondary school students enrollment showed quadratic and exponential trends respectively at .01 level of statistical significance.

2. The results from the Box-Jenkins time series analysis showed that the appropriate model for general books and theses in circulation were ARIMA (0,0,1) $\times$ SARIMA $(1,1,0)_{12}$. The forecast values in November 2540 to March 2541 for general books in circulation would be 2,757, 2,818, 2,768, 3,203 and 1,818 respectively, and for theses circulation would be 3,031, 1,754, 2,208, 2,012 and 1,264 respectively. The appropriate model for researved books in circulation was ARIMA (0,1,1) $\times$ SARIMA$(1,1,0)_{12}$, and the forecast values would be 82, 41, 39, 54 and 66 respectively. The appropriate model for primary and secondary school students enrollment were ARIMA (0,2,1) and ARIMA (0,2,3) respectively. Their forecast values in the academic year 2540-2544 would be 6,130,718, 6,009,548, 5,882,870, 5,750,685 and 5,612,992 for primary school students respectively and 4,208,097, 4,422,787, 4,604,586, 4,808,325 and 5,034,524 for secondary school students respectively.

3. The forecasting results from the regression analysis methods used in forecasting time series data with seasonal variation and the Box-Jenkins methods used in forecasting time series data with nonseasonal variations had the least error.

ภาควิชา วิจัยการศึกษา ลายมือชื่อนิสิต .....

สาขาวิชา สถิติการศึกษา ลายมือชื่ออาจารย์ที่ปรึกษา .....

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