**ECOM90024**

**Forecasting in Economics and Business**

**Tutorial 3 Questions**

1. Using the housing starts data contained in the file ushstarts.csv, estimate a seasonal dummy model in which there are four seasons corresponding to the meteorological seasons in the northern hemisphere defined by:

Using the estimates from your model:

1. Compute and plot the seasonal factors.
2. Generate and plot forecasts (point, confidence intervals and prediction intervals) for the forecast horizon .

1. You are a research analyst for the Reserve Bank of Australia, monitoring the household consumption expenditures of Australian households. You are tasked with analysing a sample of quarterly Household Final Consumption Expenditure data from the September quarter of 1959 to the December quarter of 2018.

Download the data from the Australian Bureau of Statistics website and plot the data in R. The data is located in Table 2 of the Australian National Accounts. (see: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5206.0Dec%202018?OpenDocument>)

1. Import the original series located in column *FM* of sheet *Data1* (series ID: A2302484C) and generate an appropriate plot of the data. Describe the primary visual features of the time series.
2. Using the decompose() function, generate and plot a seasonally adjusted version of the series (i.e., the original series with the seasonal component removed). Make sure to justify any choices that you have made performing the seasonal adjustment.
3. Compare the seasonally adjusted series that you have computed with the seasonally adjusted data that is contained in column *CI* of sheet *Data1* (series ID: A2304081W).
4. Using the seasonally adjusted series that you have computed, estimate a quadratic trend model and use your model estimates to generate and plot the fitted trend.
5. Using your estimated model, generate and plot forecasts (point, confidence intervals and prediction intervals) for the forecast horizon . For your interval forecasts, let .