Week 3 Assignment – 60 Points

1. (30 Points) We use “pneu\_flu.rda” timeseries dataset. This timeseries dataset contains monthly pneumonia and influenza deaths per 10,000. However, the values are logged!
   1. Read timesereis .rda data with the following R codes

readRDS(“pneu\_flu.rda”) #you need to have package “zoo” installed and activated

* 1. Install package “tsfeatures” and activate it, then you can use the tsfeatures() to extract your timeseries dataset features.
  2. What is the start and end points in this timeseries. How many time series observations are in this dataset? Is there any trend and seasonality? If yes then, what are:
     1. Frequency
     2. Number of periods
     3. Seasonal period
     4. Trend constant value

Must show how you got these information.

* 1. What the decompose timeseries tells you. How the decomposition information is compared with extracted features.
  2. Partition dataset into train and validation. Make a reasonable choice for partitions’ size
  3. Use Holts-Winter algorithm to build a forecasting model. Apply the model on validation. Use these constants for Holts-Winter algorithm

alpha = 0.2, beta = 0.1, gamma = 0.1

* 1. Plot training, actual validation, forecast validation, residuals, and errors in one plot. Interpret the result through your visualizations
  2. Forecast for the next six month in the future.
  3. Plot the dataset and the 3 years forecast in one plot. What can you say for your forecast errors?

1. (30 Points)

Use air passengers count in “AirPassenger.csv” file to:

* 1. Built timeseries of this data
  2. Get the AirPassengers timeseries components
  3. Plot AirPassengers timeseries with trend. Make sure your trend is accurately identified.
  4. Partition data in 24 month validation and rest for training
  5. Build naïve and seasonal naïve models to forecast validation dataset, get the accuracy of these models.
  6. Use the appropriate model setting for Exponential Smoothing function ets() to build a forecast model. Apply the model to forecast validation time series.
  7. Get the accuracy forecast and compare the RMSE, MAE, and MAPE of this model with your benchmark model
  8. Put are models’ forecast and timeseries in the same plot