

# Assignment-6

## Time Series Forecasting

First 6 Question Carries 15 Marks Each & 7<sup>th</sup> Question and Viva-Voce carries 10 Marks

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1. Write a modularized python code to predict the number of Lynx (an animal) trapped in a forest. Use time series forecasting and linear regression to predict the future values. Use a 70-30 percent train test split ratio.
2. Write a modularized python code to predict the number of Lynx (an animal) trapped in a forest. Use time series forecasting and Multilayer Perceptron (MLP) model to predict the future values. Since MLP is a stochastic model, repeat the simulations for 10 independent times and measure the mean of train and test RMSE and MAE. Use a 70-30 percent train test split ratio.
3. Test whether the Lynx time series has cyclicity or not. If it has cyclicity, what is the cyclicity length? Plot the autocorrelation plot and draw inferences from it. Treat the cyclicity by subtracting cyclic average and model it using Linear Regression and Predict the future values. Use a 70-30 percent train test split ratio.
4. Rewrite the Question-3 using Multilayer Perceptron. Repeat the simulations 10 independent times and measure the mean train and test RMSE and MAE.
5. Treat the cyclicity by differencing and predict it using Linear Regression. Use a 70-30 percent train test split ratio.
6. Rewrite the Question-5 using Multilayer Perceptron. Repeat the simulations 10 independent times and measure the mean train and test RMSE and MAE.
7. Which model is more appropriate for predicting the Lynx time series. Whether treatment of cyclic component improve the performance or not? If yes which cyclic component treatment method is more appropriate.