REGRESSION AND TIME SERIES MODELS

Prerequisites(If any): Probability and Statistics/ Probability and Stochastic Process
Video lectures : https://www.youtube.com/watch?v=VVYLpmKRfQ8&list=PLbMVogVj5nJQrzbAweTVvnH6-vG5A4aN5
Category : (Modified)**MA31020/MA41025 (LTP- 3-1-0,CRD- 4)**

Tentative	Exam 1	Exam 2	Exam 3
Dare	10-09-2021	08-10-2021	19-11-2021
Time	8am-9am	8am-9am	12Noon-1pm

Regression

1. Regression problem
2. Basic Linear Algebra : Vector Space, Subspace, Linear independence, Basis & dimension, projection space, Projection Matrix.
3. Multivariate Statistics: Multivariate normal distribution, distribution of quadratic forms, Cochran's Theorem,
4. Simple Linear Regression
5. Multiple Linear Regression
6. Polynomial Regression, Orthogonal Polynomial Regression
7. Multicollinearity: PCA Regression, RIDGE, LASSO
8. Model Adequacy Checking & diagnostics for leverage and influence
9. Transformation of variables
10. Logistic regression

Timeseries

1. Classical decomposition : smoothing and difference table
2. Mean and Auto-covariance
3. Stationary Time series : Strong and Weak
4. Linear process: Classification of WN, AR, MA
5. Estimation of Trend and Seasonality
6. Testing the Estimated Noise Sequence
7. Auto correlation function (ACF), Partial auto correlation function (PACF)
8. Classification of ARMA, ARIMA and Seasonal ARIMA
9. Prediction methods
10. Elements of ARCH and GARCH
11. Spectral decomposition, Spectrum, Identification in time domain

Text:

1. Introduction to Linear Regression Analysis, 5th Edition: Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining
2. Time Series Analysis and Its Applications: With R Examples : Robert H. Shumway , David S. Stoffer

References:

3. Applied regression analysis: a research tool.: John O. Rawlings Sastry G. Pantula David A. Dickey
4. Linear Algebra and Linear Models: Ravindra B. Bapat
5. Linear Models : An Integrated Approach: Debasis Sengupta, Sreenivasa Rao Jammalamadaka
6. Introduction to Time Series and Forecasting : Brockwell, Peter J., Davis, Richard A.
7. Time Series: Theory and Methods : Peter J. Brockwell, and Richard A. Davis
8. Time series Analysis with application in R: Jonathan D. Cryer and Kung-Sik Chan