Stat-412 Multivariate Analysis

100 Marks: 03 Credits

Number of Class: 35-40

Introduction: Concept of multivariate data, examples from real life and uses of multivariate analysis.

Multivariate Normal Distribution: Meaning, derivation and properties of normal distribution, multivariate determining probability density contour, maximum likelihood estimator of mean vector and variance covariance matrix. Evaluating normality of univariate and multivariate normal distribution and normal distribution by P-P and Q-Q plot, steps in detecting outliers and cleaning data, transformation to near normality by square root, logit, fisher's and box-cox transformation.

Multivariate Sampling Distributions: The Distribution of Hotelling's T^2 and its properties. Study of the Wishart distribution and its Properties, Bartlett's decomposition and the generalized variance. The distribution of latent roots of a dispersion matrix.

Principal Components: Introduction to the principal components analysis. ML estimator of the principal components and their variances. Sampling properties of the Sample principal components. Statistical inference.

Factor Analysis: Definition and purpose of factor analysis, the mathematical model for factor structure. ML estimators for random orthogonal factors. Estimation for fixed factors. Testing the goodness of Fit of the factor model. Factor interpretation and transformation.

Canonical correlation and Canonical Variables: Concepts of Canonical Variables and canonical correlation, Estimation of canonical correlation and varieties, Large sample Statistical Inference of canonical correlation.

Discriminant Analysis: Meaning and goals of Discriminantions and Classification, Fisher's linear discriminant function, Classification into one of two and into one of more than two multivariate populations. Quadratic discriminators. Test of a discriminant function.

Text

1. Johnson, R.A. & Wichern, D.W. (2007): *Applied Multivariate Statistical Analysis,* Prentice –Hall Inc.
2. Anderson, T. W. (1984), *Introduction to Multivariate Analysis,* 2nd edition, 1984, John Wiley, New York.

References

1. Bhuiyan, K.C, (2006) *Multivariate Analysis and its Application.*
2. Goldstein, M. D.: *Multivariate Analysis: methods Applications.*
3. Kendell. M.G.: *Multivariate Analysis,* New York,
4. Kshiragar, A.M: *Multivariate Analysis,* Marcell Dekkar Inc .New York.
5. Mardia, K.V., Kent, J.T. and Bibby, J.M. (1979): *Multivariate Analysis*, Academic Press, London.