PROBABILITY & STATISTICS(MA20104)

BUDDHANANDA BANERJEE

Contents

Date: Updated on January 1, 2019, Weekly classes:Mon(8-10am), Fri(12-1pm) at NR221.

1. Syllabus

Probability.

(1) Probability: Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence.
(2) Random Variables: Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, moment generating function, Chebyshev's inequality.
(3) Special Distributions: Discrete uniform, binomial, geometric, negative binomial, hypergeometric, Poisson, uniform, exponential, gamma, normal, beta, lognormal, Weibull, Laplace, Cauchy, Pareto distributions. Functions of a Random Variable.
(4) Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation, independence of random variables, bivariate normal distribution, simple, multiple and partial correlation, regression.
(5) Sampling Distributions: Law of large numbers, Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions.

Statistics.

(1) Estimation: The method of moments and the method of maximum likelihood estimation, properties of best estimates, confidence intervals for the mean(s) and variance(s) of normal populations.
(2) Testing of Hypotheses: Null and alternative hypotheses, the critical and acceptance regions, two types of error, power of the test, the most powerful test and Neyman-Pearson Fundamental Lemma, standard tests for one and two sample problems for normal populations.

2. Books

(1) 1. An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md. E. Saleh
(2) Probability and Statistical Inference by Hogg, R. V., Tanis, E. A. & Zimmerman D. L.
(3) Probability and Statistics in Engineering by W.W. Hines, D.C. Montgomery, D.M. Goldsman, C.M. Borror
(4) Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross
(5) Introduction to Probability and Statistics by J.S. Milton & J.C. Arnold.
(6) Introduction to Probability Theory and Statistical Inference by H.J. Larson
(7) Probability and Statistics for Engineers and Scientists by R.E. Walpole, R.H. Myers, S.L. Myers, Keying Ye
(8) Modern Mathematical Statistics by E.J. Dudewicz & S.N. Mishra
(9) Introduction to the Theory of Statistics by A.M. Mood, F.A. Graybill and D.C. Boes

3. Evaluation

- Mid-Semester [30 marks] + End-Semester [50 Marks] + TA [20 marks]

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