Columbia University

Department of Statistics

Fall 2014

G8325 - Topics in Advanced mathematical Statistics

Professor Madan Puri, Indiana University, Bloomington

Mondays, 10:00-12:00

Room 1025SSW

1. Preliminaries ( Rapid Review of Basic Probability):

Modes of convergence: Convergence in law, convergence in probability, convergence in the rth mean,almost sure convergence, the relationships among these convergences, laws of large numbers, central limittheorem (for independent and dependent random variables), Slutsky theorem (univariate as well as multivariate),some examples,The Wald-Wolfowitz limit theorem, functions of sample moments, stationary m-dependentsequences, asymptotic distribution of sample quantiles.

1. Nonparametric Estimation and Testing:
2. U-statistics, statistical functional, limit distributions, density estimation
3. Rank-based statistics, tests and estimates based on ranks, exact distributions under the hypotheses, limit distributions under the hypotheses and under the alternatives, rates of convergence,efficiency considerations
4. Contiguity of Probability Measures. Some applications in statistics
5. If the time permits, one of the following papers will be presented jointly with the students:
6. George Haiman and Madan L. puri (1993). A strong invariance principle concerning the jth upper order statistics for stationary Gaussian Sequences. Annals of Probability,21, 86-135.
7. Marc Hallin and Madan L. Puri (1994). Aligned rank tests for linear models with autocorrelatederror terms. Journal of Multivariate Analysis, 48, 175-237.
8. Michel Harel and Madan L. puri (1990). Weak convergence of serial rank statistics under dependence with applications in time series and Markov processes. Annals of Probability, 18, 1361-1387.