
Moulinath Banerjee

University of Michigan

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1 Instructor information.

Instructor: Moulinath Banerjee.

Office: 451, West Hall

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Course web-page: www.stat.lsa.umich.edu/~moulib/emp-proc.html

Office Hours: By appointment.

2 Course information.

Coursework: Solving homework problems assigned by instructor.

Topics:

• Introduction And Overview: Classical Glivenko Cantelli and Donsker Theorems; General Empirical Processes; Motivating Statistical Examples

• Extended Weak Convergence Theorems: Handling nonmeasurability; Representation Theorems; Characterizing weak convergence in function spaces.

• Maximal Inequalities, Chaining, Symmetrization: Dealing with suprema of collections of random variables; Symmetrized Processes using Rademacher multipliers; Hoeffding’s inequality

• Glivenko-Cantelli Theorems: Characterizing classes of functions satisfying the law of large numbers uniformly; preservation of such properties; Uniformity in the underlying distribution.
• Donsker Theorems: Uniform Central Limit Theorems in terms of conditions on entropy and bracketing numbers.

• Entropy Considerations: Bounds on entropy and bracketing numbers for ‘well-behaved’ classes; VC (Vapnik-Chervonenkis) and BUEI (bounded uniform entropy integral) classes; preservation of Donsker properties.

• Central Limit Theorems for Processes.

• Applications: Maximum Likelihood Estimation.

• Applications: M estimation (estimators characterized as maximizers of random criterion functions) – argmax continuous mapping theorem, rate of convergence theorems, applications of continuous mapping.

• Applications: Z estimation (estimators characterized as zeroes of estimating equations)

• Functional Delta Method: Extension of the usual delta method for dealing with appropriately differentiable functionals of stochastic processes.

• Time permitting, some discussion on the bootstrap.

3 References

Major References:


Also check out http://www.stat.washington.edu/jaw/COURSES/EPWG/sp09.html


Other References:


