
Statistics 8540
Topics in Advanced Stochastic Processes
Statistical Inference for Stochastic Differential Equations
Spring 2015

CONTACT INFORMATION

Lecturer Radu Herbei, Ph.D.
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Office hours: Wednesdays, 12:30pm - 2:30pm, CH223, and by appointment.

CLASS INFORMATION

Location: Lecture: TR 9:35am – 10:55am Scott Lab E241.
Website: <http://www.stat.osu.edu/~herbei/8540/>

REFERENCES:

- *Statistics of Stochastic Processes I and II* by R.S. Lipster, A.N. Shiryaev and B. Aries, Springer, 2000;
- *Statistical Inference for Ergodic Diffusion Processes* by Y. Kutoyants, Springer, 2010;
- *Brownian Motion and Stochastic Calculus* by I. Karatzas and S. Shreve, Springer, 1991;
- *Probability and Measure*, by Patrick Billingsley, Wiley, 1995.

COURSE DESCRIPTION AND OBJECTIVES

Stochastic differential equations (SDEs) model the stochastic evolution of a system as time evolves. These models have a variety of applications in many disciplines (economics, mathematical finance, biology, genetic analysis, oceanography, ecology, etc.) and emerge naturally in the study of many phenomena. This course will introduce the audience to the fundamental concepts used in SDEs, with emphasis on statistical estimation in the parametric and nonparametric setting. Structurally the course will be divided in three parts: 1) a primer on stochastic processes, stochastic calculus and stochastic differential equations; 2) estimation methods for SDEs accompanied by numerical simulations and 3) applications and case studies.

PREREQUISITES

Students are expected to have a minimal understanding of differential equations, sufficient background in advanced probability (STAT 7201 or equivalent), advanced inference and basic knowledge of a scientific programming language (R, Matlab, Fortran or C).

EVALUATION

Evaluation will be based on in-class participation (30%) and two take-home assignments (70%).

ATTENDANCE POLICY

It is strictly required to attend all the classes. It is the student's responsibility to make up for the material covered in class during any absence.

SPECIAL ACCOMMODATIONS

If you need any accommodations based on the impact of a documented disability, contact the instructor privately to discuss specific needs, within a week. You should also contact the Office of Disability Services to coordinate special accommodations.

ACADEMIC MISCONDUCT

Academic misconduct **will not be tolerated** and will be dealt with procedurally in accordance with university policy.

DISCLAIMER

This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it and in particular I reserve the right to change the methods of assessment. Official announcements will ALWAYS be those made in class.