

MATH 544 – Stochastic Dynamics

Course Description from Bulletin: This is an introductory course in mathematical modeling by stochastic differential equations. It is especially appropriate for graduate students who would like to use stochastic methods in their research, or to learn these methods for long term career development. Topics include random variables, mean and variance, Brownian motion, stochastic integration and Ito calculus, stochastic differential equations, random dynamics, numerical simulation, and applications to scientific, engineering and financial problems.

Enrollment: Graduate elective

Textbook(s):

c. Liapunov exponents and ergodic theory	3
d. Stochastic bifurcation	3
e. Phenomena induced by noise	3
f. Impact of noise	3
g. Invariant manifold reduction of random systems	3
h. Macroscopic modeling of random system	3
i. Slow invariant manifolds and non-equilibrium dynamics	3

Assessment:	Homework	10-30%
	Computer Programs/Project	10-20%
	Quizzes/Tests	20-50%
	Final Exam	30-50%

Syllabus prepared by: Jeffrey Duan and Tom Bielecki

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