

## AAE 8194: RANDOM DYNAMICAL SYSTEMS

3 CREDITS

MW, 2:20 – 3:40 pm, Bolz Hall, Room 124

Instructor: Mrinal Kumar

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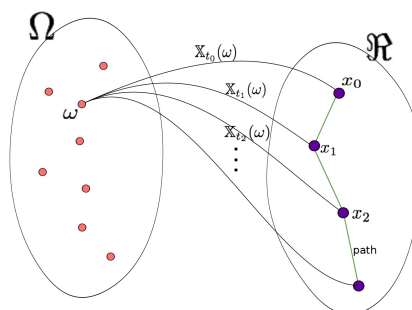
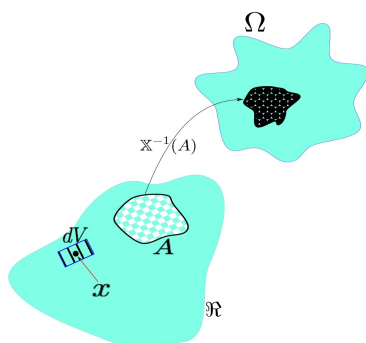
Office: E530 Scott Labs. Phone: (614) 292-5027

Overview: This course is designed for graduate students of engineering and physical sciences interested in the subject of stochastic processes and engineering tools used for uncertainty quantification in nonlinear dynamic systems.

Pre-requisites: ECE 6001 (Probability and Random Variables) or equivalent; and basic knowledge of functional analysis **or instructor permission**. Must know one programming language, e.g., MATLAB®

## TOPICS AND TENTATIVE SCHEDULE

Material	Week #	Assignment Due?
Deterministic dyn sys, steady state, numerical sims, linear perturbation theory	1	×
	2	✓
Review: axiomatic theory of prob, theory and tools for discrete and cts random variables	3	✓
	4	✓
Martingales, crossings, stopping times. Random walks, Wiener process (noise model), Brownian Motion. Markov processes	5	×
	6	✓
	7	✓
	8	×
Stochastic diff eqs, existence of solutions, numerical simulation, Chapman-Kolmogorov and Fokker-Planck equations, the filtering problem	9	×
	10	✓
	11	✓
	12	✓
Stochastic linearization, direct moment closure	13	×
	14	✓
Sequential Monte Carlo, Markov chain Monte Carlo	15	✓
	16	×

Departure from *Gaussianity*