

MATH/STAT 491/8
INTRODUCTION TO STOCHASTIC PROCESSES

FALL 2018/WINTER 2019

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Lectures: MWF: 1130-1220 MEB 242

MATH/STAT 491/8 is a two-quarter course sequence in place of MATH/STAT 491/2 for the B.S. in Mathematics degree option.

The sequence provides a relatively complete introduction to core problems in stochastic processes.

These provide answers to questions such as:

- Why is a drunken person (who is capable of staying on their feet) unlikely to walk very far?
- On average, could a gambler gain something by stopping play based on the information obtained so far?
- Is there much difference in terms of waiting time if there is only one or multiple servers in the line?
- How do we understand the observed motion of small particles immersed in water?
- How do we understand the stock market? Why do we study logarithmic returns? Why is Brownian motion used as a model?
- How do stochastic processes results help solve statistics and machine learning problems?

Tentative outline of topics covered:

- Probability basics
- Random walk and martingales
- Markov chains
- Poisson processes
- Brownian motion
- Applications to statistics/machine learning