

Introduction to Probability

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Probability

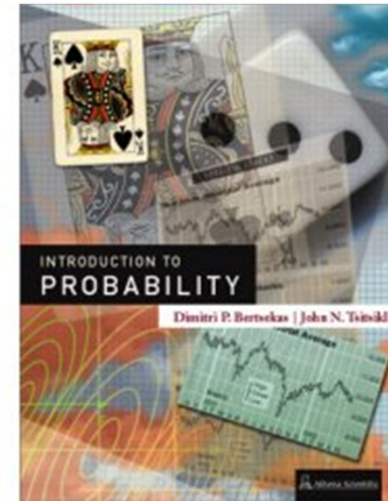
- Probability and its relatives (Possible, Probable, Likely) were read in many contexts
- Probability was developed to describe phenomena that cannot be predicted with certainty
 - Frequency of occurrences
 - Subjective beliefs
- Everyone accepts that the probability (of a certain thing to happen) is a number between 0 and 1 (?)

Main Objectives

- Develop the art of describing uncertainty in terms of probabilistic models
 - Fundamentals of probability theory: discrete/continuous random variables, multiple random variables, limit theorems, etc.
 - Definitions, axioms, and inferences following the axioms
 - Further topics: transforms, a more advanced view of conditioning, sums of random variables, etc.
- Learn the skills of probabilistic reasoning
 - E.g., the use of Bayesian statistics (Bayes' rule)

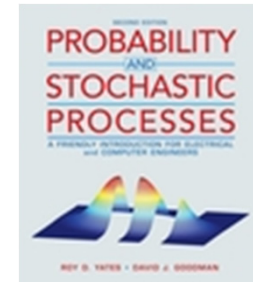
Textbook

- D. P. Bertsekas, J. N. Tsitsiklis, “*Introduction to Probability*,” Athena Scientific, 2nd Edition
- Website
 - <http://www.athenasc.com/probbook.html>
- Supplement problems of textbook
 - Theoretic problems (marked by *)
 - Problems in the text (various levels of difficulty)
 - Supplementary problems (at the book’s website)



Reference Books

- Roy D. Yates, David J. Goodman, “*Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers*,” 2nd Edition, Wiley, 2004
- Abraham H. Haddad, “*Probabilistic Systems and Random Signals*,” Prentice Hall, 2005



Tentative Topic List

1.	Course Overview & Introduction
2.	Sample Space and Probability
3.	Discrete Random Variables
4.	Continuous Random Variables
5.	Further Topics on Random Variables and Expectations
6.	Limit Theorems

Grading (*Tentatively!*)

- Midterm and Final: 45%
- Quizzes (≥ 5 times) and Homework: 45%
- Attendance/Other: 10%

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