MATH 7360-1: Probability Theory

Time: MWF 2:40–3:30

Room: Lockett 113

Prerequisite

Math 7311 (Real Analysis I) or equivalent

Textbooks

1. Itô, K.: Introduction to probability theory, Cambridge University Press, 1978
2. Lamperti, J.: Probability, W. A. Benjamin, 1966

Reference book

1. Durrett, R.: Probability: Theory and Examples, Third edition, Thomson Brooks/Cole, 2005

Coverage

This course does not require previous knowledge of measure theory. In the first week I will give a brief review of elementary probability theory (Math 3355). In the following two weeks I will describe the construction of probability spaces and random variables. The probabilistic aspects of measure theory is developed along the way. Here is a list of topics to be covered:

1. Review of elementary probability theory
2. Kolmogorov's extension theorem
3. Random variables and expectations
4. Convergence concepts
5. Weak and strong laws of large numbers
6. Convergence of random series
7. Law of iterated logarithm
8. Characteristic functions
9. Bochner theorem
10. Levy's continuity theorem
11. Levy's equivalence theorem
12. Central limit theorem
13. Stable and infinitely divisible laws
14. Brownian motion
15. Conditional expectations and martingales

Grading

The grade is determined by homework (70%) and the final exam (30%). Tentative scale: A 90%; B 80%; C 70%; D 60%; F below 60%

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