

Measure Theory

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1. Introduction: a Non-Measurable Set
2. Classes of Subsets (Semi-Algebras, Algebras and Sigma-Algebras), and Set Functions
3. Set Functions
4. Caratheodory Theorem
5. Monotone Classes
6. The Lebesgue Measure I
7. The Lebesgue Measure II
8. Complete Measures
9. Approximation Theorems
10. Integration: Measurable and Simple Functions
11. Measurable Functions
12. Definition of the Integral
13. Integral of Simple Functions
14. Properties of the Integral I
15. Properties of the Integral II
16. Theorems on the Convergence of Integrals
17. Product Measures
18. Measure on a Countable Product of Spaces
19. Fubini's Theorem
20. Hahn-Jordan Theorem
21. Radon-Nikodym Theorem
22. Almost Sure and Almost Uniform
23. Convergence in Measure

24. Hölder and Minkowski Inequalities
25. L_p Spaces
26. From Convergence in Measure to Convergence in L_p
27. Bounded Linear Operators in L_p
28. Vitali's Covering Lemma
29. Differentiability of Functions of Bounded Variations
30. Absolutely Continuous Functions
31. Decomposition of Distribution
32. Cantor Ternary Set and Function
33. Solution of Exercise 3.2.4
34. Solution of Exercise 6.4.3
35. Solution of Exercise 9.2.3
36. Materials

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