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Measure & probability.

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This is textbook on the measure, integration and probability basics written for bachelor and master students in mathematics. The first chapter deals with the fundamentals of measure theory, the Caratheodory extension, the Lebesgue measure and its connection to Bernoulli trials. In Chapter 2, the theory of Lebesgue integration is developed. Chapter 3 introduces probability laws, independence, and conditional expectations. Probability measures on (infinite) product spaces and the Kolmogorov consistency theorem are considered in Chapter 4. In Chapter 5 the main limit theorems of the probability theory are proven: the law of large numbers and the central limit theorem. Chapter 6 is devoted to the theory of discrete time Markov chains with a countable state space. In the final Chapter 7 the authors study complex measures, L^p spaces, Radon-Nikodym's theorem, and the Riesz's representation. Each chapter is provided with numerous exercises. The attention of an interested reader should be attracted to not too standard proofs of the strong law of large numbers and the Riesz representation. Finally, the Appendix contains basic information on metric and topological spaces, compactness and the Stone-Weierstrass theorem. *Ilya Pavlyukevich (Berlin)*

Classification: K55 K65 I55

Keywords: Bernoulli trials; Lebesgue measure; law of large numbers; central limit theorem; Kolmogorov's consistency theorem; Markov chain; Riesz's representation; Radon-Nikodym's theorem; Stone-Weierstrass theorem