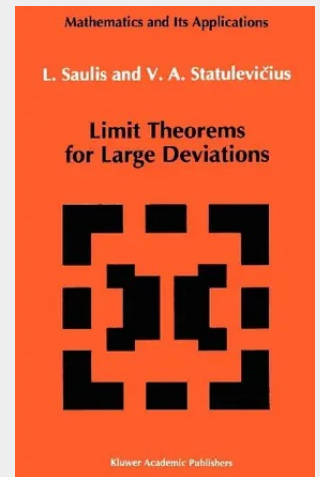


Limit Theorems for Large Deviations

"Et moi, si j'avait su comment en revenir. One service mathematics has rendered the je n'y serais point t aile." human race. It has put common sense back Jules Verne where it belongs, on the topmost shelf next to the dusty canister labelled 'discarded non- The series is divergent; therefore we may be sense'. able to do something with it. Eric T. Bell O. H ea viside Mathematics is a tool for thought. A highly necessary tool in a world where both feedback and non linearities abound. Similarly, all kinds of parts of mathematics serve as tools for other parts and for other sciences. Applying a simple rewriting rule to the quote on the right above one finds such statements as: 'One service. topology has rendered mathematical physics.': 'One service logic has rendered computer science.'; 'One service category theory has rendered mathematics.'. All arguably true. And all statements obtainable this way form part of the raison d 'e1:re of this series.

1. The main notions.- 2. The main lemmas.- 2.1. General lemmas on the approximation of distribution of an arbitrary random variable by the normal distribution.- 2.2. Proof of lemmas 2.1-2.4.- 3. Theorems on large deviations for the distributions of sums of independent random variables.- 3.1. Theorems on large deviations under Bernstein's condition.- 3.2. A theorem of large deviations in terms of Lyapunov's fractions.- 4. Theorems of large deviations for sums of dependent random variables.- 4.1. Estimates of the kth order centered moments of random processes with mixing.- 4.2. Estimates of mixed cumulants of random processes with mixing.- 4.3. Estimates of cumulants of sums of dependent random variables.- 4.4. Theorems and inequalities of large deviations for sums of dependent random variables.- 5. Theorems of large deviations for polynomial forms, multiple stochastic integrals and statistical estimates.- 5.1. Estimates of cumulants and theorems of large deviations for polynomial forms, polynomial Pitman estimates and U-statistics.- 5.2. Cumulants of multiple stochastic integrals and theorems of large deviations.- 5.3. Large deviations for estimates of the spectrum of a stationary sequence.- 6. Asymptotic expansions in the zones of large deviations.- 6.1. Asymptotic expansion for distribution density of an arbitrary random variable.- 6.2. Estimates for characteristic functions.- 6.3. Asymptotic expansion in the Cramer zone for distribution density of sums of independent random variables.- 6.4. Asymptotic expansions in integral theorems with large deviations.- 7. Probabilities of large deviations for random vectors.- 7.1. General lemmas on large deviations for a random vector with regular behaviour of cumulants.- 7.2. Theorems on large deviations for sums of random vectors and quadratic forms.- Appendices.- Appendix 1. Proof of inequalities for moments and Lyapunov's fractions.- Appendix 2. Proof of the lemma on the representation of cumulants.- Appendix 3. Leonov - Shiryayev's formula.- References.



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