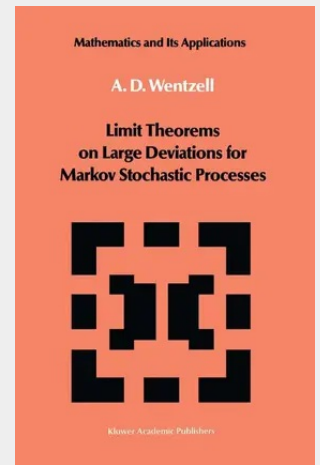


Limit Theorems on Large Deviations for Markov Stochastic Processes

One service mathematics has rendered the 'Et BIOi. si j'avait su comment en revenir. human race. It has put common sense back je n'y serais point aile.' 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. Heaviside Math@ematics 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'être of this series.

0.1 Problems on large deviations for stochastic processes.- 0.2 Two opposite types of behaviour of probabilities of large deviations.- 0.3 Rough theorems on large deviations; the action functional.- 0.4 Survey of work on large deviations for stochastic processes.- 0.5 The scheme for obtaining rough theorems on large deviations.- 0.6 The expression: $k(?) S(?)$ is the action functional uniformly over a specified class of initial points.- 0.7 Chapters 3 - 6: a survey.- 0.8 Numbering.- 1. General Notions, Notation, Auxiliary Results.- 1.1. General notation. Legendre transformation.- 1.2. Compensators. Lévy measures.- 1.3. Compensating operators of Markov processes.- 2. Estimates Associated with the Action Functional for Markov Processes.- 2.1. The action functional.- 2.2. Derivation of the lower estimate for the probability of passing through a tube.- 2.3. Derivation of the upper estimate for the probability of going far from the sets $\{\Phi_{\{x\}_0}\left[0, T\right]\}\left(i\right), \{\bar{\Phi}_{\{x\}_0}\left[0, T\right]\}\left(i\right)$.- 2.4. The truncated action functional and the estimates associated with it.- 3. The Action Functional for Families of Markov Processes.- 3.1. The properties of the functional $\{S_{\{T\}_1}, \{T\}_2\}\left(\phi\right)$.- 3.2. Theorems on the action functional for families of Markov processes in R^r . The case of finite exponential moments.- 3.3. Transition to manifolds. Action functional theorems associated with truncated cumulants.- 4. Special Cases.- 4.1. Conditions A - E of § 3.1. - § 3.3.- 4.2. Patterns of processes with frequent small jumps. The cases of very large deviations, not very large deviations, and super-large deviations.- 4.3. The case of very large deviations.- 4.4. The case of not very large deviations.- 4.5. Some other patterns of not very large deviations.- 4.6. The case of super-large deviations.- 5. Precise Asymptotics for Large Deviations.- 5.1. The case of the Wiener process.- 5.2. Processes with frequent small jumps.- 6. Asymptotics of the Probability of Large Deviations Due to Large Jumps of a Markov Process.- 6.1. Conditions imposed on the family of processes. Auxiliary results.- 6.2. Main theorems.- 6.3. Applications to sums of independent random variables.- References.



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