P. Dupuis, R. S. Ellis: 

A WEAK CONVERGENCE APPROACH TO 
THE THEORY of LARGE DEVIATIONS

John Wiley & Sons, 1997. xvii + 479 pp., DM 189.80


$$
\lim_{n \to \infty} n^{-1} \log E \exp \{-nh(X^n)\} = -\inf_x [h(x) + I(x)].
$$

Here $I(x)$ is the rate function, which is also present in the classical setting; the difference is that now $-h$ formally replaces the logarithm of an indicator function. The variational representation of the expectation in this formula in terms of the mean value of $h$ with regard to some measure and the relative entropy between the distribution of $X^n$ and this measure allows the determination of the rate $I$ as the limit of normalized information numbers.

Several important examples including empirical measures of i.i.d. random variables or on Markov chains are studied from the point of view of this theory (Chapters 2, 8 and 9). In Chapters 3, 5, 6, 7 and 10 the authors explore random walks associated with random perturbations of dynamical systems and Markov processes with continuous time including diffusion and jump processes.

Summing up, the material presented here is rich, and the method of weak convergence turns out to be unifying for a wide range of important problems of probability theory.

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