QUENCHED LARGE DEVIATIONS AND APPLICATIONS.

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One of the uses of large deviation theory is to prove the existence of and provide a variational formula for limits of the form

$$\lim_{n\to\infty} \frac{1}{n} \log E^P[\exp[\sum_{1=1}^{n} F_i]]$$

for certain classes of functions $F_i(\omega)$ and certain classes of probability distributions P. In studying quenched large deviations there is an extra variable in that $F = F(\omega_1, \omega_2)$ and the integration is only over ω_1. The limit therefore depends on ω_2. The problem is to examine this dependence. An example is to investigate, for a nice Markov chain $\{X_i\}$, under what conditions on $\{a_i\}$, the limit

$$\frac{1}{n} \log E^P[\exp[\sum_{i=1}^{n} f(a_i, X_i)]]$$

exists and what is it? This can then be used to examine limits of the form

$$\frac{1}{n} \log E^P[\exp[\sum_{i=1}^{n} f(X_i, X_{2i})]]$$

nice Markov chains.