Proving a ratio limit theorem for random walks on groups using the variational principle.

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(This talk will be close the topic of group extensions.) There are strong results for certain random walks on groups when we have enough structure, such as the random walk being symmetric and the group having some good structure. We can manage without symmetry if the group is small enough e.g. abelian.
We will be interested in the case of a non-degenerate (non-symmetric in general) random walk on an amenable group. We are able to obtain a ratio limit theorem, which says that the probability to return to g in n steps is asymptotically proportional to that of returning to some fixed origin; and we have an explicit description of the constant in terms of g.
We'll describe how this result follows from large deviations and the variational principle.
This is joint work with Richard Sharp.