Decay of harmonic functions for discrete time Feynman-Kac operators with confining potentials

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In this talk we present the results of our joint work with Wojciech Cygan and Kamil Kaleta, available in an article [1] referenced below; we propose and study a certain discrete time counterpart of the classical Feynman–Kac semigroup with a confining potential in a countably infinite space. For a class of long range Markov chains which satisfy the direct step property (DSP) we prove sharp estimates for functions which are (sub-, super-)harmonic in infinite sets with respect to the discrete Feynman–Kac operators. The DSP property is satisfied by a wide range of typically considered kernels; the nearest-neighbor random walks on a graph of finite geometry provide an instructive comparison, since the difference between the two cases is substantial. We also discuss applications to the decay rates of solutions to equations involving graph Laplacians and to eigenfunctions of the discrete Feynman–Kac operators.

REFERENCES

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