Relations between progressive intrinsic ultracontractivity and ergodicity of discrete Feynman–Kac semigroups

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In this talk, I will present the results of joint work with Wojciech Cygan, Kamil Kaleta and René Schilling [1][2], focused on discrete Feynman–Kac semigroups with confining potential and the direct step property (DSP). These relatively mild assumptions cover a wide class of cases, which allows us to study various examples in a simple, general framework, which is not always possible in the continuous time. We provide a characterization of asymptotic intrinsic ultracontractivity (aIUC) of discrete F-K semigroups, and introduce a more general version, called *progressive intrinsic ultracontractivity* (pIUC), originally proposed by Kaleta and Schilling[3]. Additionally, we show links between intrinsic contractivity of the semigroup and its quasi-ergodicity, as well as ergodicity of its related intrinsic semigroup.

References

[1] W. Cygan, K. Kaleta, M. liwiski, *Decay of harmonic functions for discrete time Feynman–Kac operators with confining potentials*, Latin American Journal of Probability and Mathematical Statistics, 2022.

[2] W. Cygan, K. Kaleta, R. Schilling, M. liwiski, *Heat kernels, intrinsic contractivity and ergodicity of discrete Feynman–Kac evolutions*, preprint, 2024.

[3] Kamil Kaleta, René Schilling, *Progressive intrinsic ultracontractivity and heat kernel estimates for non-local Schrdinger operators*, Journal of Functional Analysis, volume 279, Issue 6.