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Spectral computations for self-similar groups

Grigorchuk and Żuk used a representation of the lamplighter group as a self-similar group to compute the spectral measure of a simple random walk on this group. They also introduced the notion of the Kesten–von Neumann–Serre (KNS) spectral measure for a self-similar group and gave several examples of the computation of such spectral measures.

In joint work with Kambites and Silva, we characterized when the (KNS) spectral measure coincides with the usual spectral measure; in light of our results and an unpublished result of Abert, this coincidence of measures will occur for any self-similar action of a non-elementary hyperbolic group and for any bireversible automaton group. Using a self-similar representation constructed earlier by the speaker and Silva, we computed the spectral measure for a simple random walk on a wreath product $G \wr \mathbb{Z}$, where G is any finite group. This same result was obtained by Dicks and Schick via a different method.