New Trends in Onedimensional Dynamics
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Title: Amenable graphs and their spectral radius

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Abstract: The amenability criteria of Kesten and Day are classic results from probability theory. They relate amenability of a group to the behaviour of random walks on the group, that is to the exponential decay of return probabilities and the spectral radius of the associated Markov operator, respectively. Stadlbauer and Jaerisch generalised these results to group extensions of topological Markov chains.

In this work, we extend this approach to graph extensions of Markov maps with full branches defined on the interval. That is, we consider the time evolution of the second coordinate of

$$T : X \times \mathcal{G} \to X \times \mathcal{G}, (x, g) \mapsto (\theta(x), \kappa_x(g)),$$

where $\theta : X \to X$ is a Markov map with countably many full branches, $\kappa_x : V \to \mathbf{V}$ a bijection which is constant on injectivity intervals and $\mathcal{G}$ is a graph with vertices $\mathbf{V}$ and edges $\mathbf{E}$.

We say that $\mathcal{G}$ is an amenable graph if

$$\inf \left\{ \frac{|\partial K|}{|K|} : K \subset \mathbf{V}, |K| < \infty \right\} = 0.$$

We extend Days result to this setting: We prove under some mild assumptions that the graph $\mathcal{G} = (\mathbf{V}, \mathbf{E})$ is amenable if only if the spectral radius of the transfer operators of T and θ coincide.

Joint work with Johannes Jaerisch and Manuel Stadlbauer.