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Spectra of sparse regular graphs with loops

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(Submitted on 20 Jul 2011)

We derive exact equations that determine the spectra of undirected and directed sparsely connected regular graphs containing loops of arbitrary length. The implications of our results to the structural and dynamical properties of networks are discussed by showing how loops influence the size of the spectral gap and the propensity for synchronization. Analytical formulas for the spectrum are obtained for specific length of the loops.

Submission history

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