DISTANCE-BIREGULAR GRAPHS AND SPECTRAL BOUNDS

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Abstract

The Moore bound is an upper bound on the number of vertices a regular graph with fixed diameter can have. Fiol and Garriga gave a local version, using the spectrum to bound the number of vertices that can be at the maximal distance from a fixed vertex in a regular graph. Cioabă, Koolen, Nozaki, and Vermette gave a spectral Mooore bound to upper bound the number of vertices of a regular graph with fixed second-largest eigenvalue, and subsequently Cioabă, Koolen, and Nozaki improved this bound for bipartite regular graphs. When any of those bounds are tight, the graph has the strong algebraic and combinatorial structure of a distance-regular graph. In this talk, we present extensions of these bounds to semiregular bipartite graphs, and characterize the extremal examples meeting these bounds as distance-biregular graphs.

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