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The spectral excess theorem for distance-regular graphs: a global (over)view. (English)

Zbl 1180.05130

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Summary: Distance-regularity of a graph is in general not determined by the spectrum of the graph. The spectral excess theorem states that a connected regular graph is distance-regular if for every vertex, the number of vertices at extremal distance (the excess) equals some given expression in terms of the spectrum of the graph. This result was proved by *M.A. Fiol* and *E. Garriga* ["From local adjacency polynomials to locally pseudo-distance-regular graphs", J. Comb. Theory, Ser. B 71, No. 2, 162–183 (Zbl 0888.05056)] using a local approach. This approach has the advantage that more general results can be proven, but the disadvantage that it is quite technical. The aim of the current paper is to give a less technical proof by taking a global approach.

MSC:

05E30 Association schemes, strongly regular graphs

05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)

Cited in **24** Documents

Keywords:

distance-regular graphs; eigenvalues of graphs; spectral excess theorem

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