

ON EXTENSIONS OF STRONGLY REGULAR GRAPHS WITH EIGENVALUE 4

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Received January 17, 2015

J. Koolen posed the problem of studying distance regular graphs in which neighborhoods of vertices are strongly regular graphs with the second eigenvalue $\leq t$ for a given positive integer t . This problem was solved earlier for $t = 3$. A program of studying distance regular graphs in which neighborhoods of vertices are strongly regular graphs with nonprincipal eigenvalue r , $3 < r \leq 4$, was started by the first author in his preceding paper. In this paper, a reduction to local exceptional graphs is performed.

In the present work we find parameters of exceptional strongly regular graphs with nonprincipal eigenvalue 4. In addition, we prove that a distance regular graph in which neighborhoods of vertices are exceptional nonpseudogeometric strongly regular graphs with nonprincipal eigenvalue 4 has degree at most 729.

Keywords: graph spectrum, strongly regular graph, distance regular graph.

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Cite this article as:

A. A. Makhnev, D. V. Paduchikh, On extensions of strongly regular graphs with eigenvalue 4, *Tr. Inst. Mat. Mekh. UrO RAN*, 2015, vol. 21, no. 3, pp. 233-255.