TRUDY INSTITUTA MATEMATIKI I MEKHANIKI UrO RAN

Vol. 24 No. 3 **2018**

MSC: 05C25, 20B25

DOI: 10.21538/0134-4889-2018-24-3-226-232

AUTOMORPHISMS OF A DISTANCE-REGULAR GRAPH WITH INTERSECTION ARRAY $\{196, 156, 1; 1, 39, 196\}$

A. A. Tokbaeva

A. Makhnev and M. Samoilenko found intersection arrays of antipodal distance-regular graphs of diameter 3 and degree at most 1000 in which $\lambda = \mu$ and the neighborhoods of vertices are strongly regular. Automorphisms of distance-regular graphs in which the neighborhoods of vertices are strongly regular with second eigenvalue 3 except for graphs with intersection arrays $\{196, 156, 1; 1, 39, 196\}$ and $\{205, 136, 1; 1, 68, 205\}$ were found earlier. We find possible prime orders of elements in the automorphism group of a distance-regular graph with intersection array $\{196, 156, 1; 1, 39, 196\}$ as well as their fixed-point subgraphs. It is proved that the automorphism group of this graph acts intransitively on the vertex set.

Keywords: distance-regular graph, automorphism.

REFERENCES

1. Makhnev A.A., Samoylenko M.S. On distance-regular covers of cliques with strongly regular neighbourhoods of vertices. *Sovremennye problemy matematiki* (*Modern Problems in Mathematics*), *Proc. of the 46-th Int. Youth School-Conf.* (*Ekaterinburg, Russia, 2015*), pp. 13–18 (in Russian).
2. Efimov K.S., Makhnev A.A. On automorphisms of a distance-regular graph with intersection array $\{25, 16, 1; 1, 8, 25\}$. *Ural Math. J.*, 2017, vol. 3, no. 1, pp. 27–32. doi: 10.15826/umj.2017.1.001 .
3. Makhnev A.A., Shermetova M.Kh. On automorphisms of a distance-regular graph with intersection array $\{96, 76, 1; 1, 19, 96\}$. *Sib. Elektron. Mat. Izv.*, 2018, vol. 15, pp. 167–174 (in Russian). doi: 10.17377/semi.2018.15.016 .
4. Ageev P.S., Makhnev A.A. Automorphisms of a graph with intersection array $\{99, 84, 1; 1, 14, 99\}$. *Dokl. Math.*, 2014, vol. 90, no. 2, pp. 525–528. doi: 10.1134/S1064562414060015 .
5. Efimov K.S., Makhnev A.A. Automorphisms of a distance-regular graph with intersection array $\{100, 66, 1; 1, 33, 100\}$. *Sib. Elektron. Mat. Izv.*, 2015, vol. 12, pp. 795–801. doi: 10.17377/semi.2015.12.065 .
6. Kagazezheva A.M. Automorphisms of a distance-regular graph with intersection array $\{169, 126, 1; 1, 42, 169\}$. *Sib. Elektron. Mat. Izv.*, 2015, vol. 12, pp. 318–327 (in Russian). doi: 10.17377/semi.2015.12.026 .
7. Belousov I.N., Makhnev A.A. On automorphisms of a distance-regular graph with intersection array $\{176, 150, 1; 1, 25, 176\}$. *Sib. Elektron. Mat. Izv.*, 2016, vol. 13, pp. 754–761 (in Russian). doi: 10.17377/semi.2016.13.061 .
8. Makhnev A.A., Paduchikh D.V. Distance regular graphs in which local subgraphs are strongly regular graphs with the second eigenvalue at most 3. *Dokl. Math.*, 2015, vol. 92, no. 2, pp. 568–571. doi: 10.1134/S1064562415050191 .
9. Brouwer A.E., Cohen A.M., Neumaier A. Distance-regular graphs. Berlin, Heidelberg, N Y: Springer-Verlag, 1989, 495 p. ISBN: 0387506195 .
10. Cameron P. *Permutation groups*. Cambridge: Cambridge Univ. Press, 1999, 220 p. ISBN: 0-521-65302-9 .
11. Gavrilyuk A.L., Makhnev A.A. On automorphisms of distance-regular graphs with intersection array $\{56,45,1;1,9,56\}$. *Dokl. Math.*, 2010, vol. 81, no. 3, pp. 439–442. doi: 10.1134/S1064562410030282 .
12. Zavarnitsine A.V. Finite simple groups with narrow prime spectrum. *Sib. Elektron. Mat. Izv.*, 2009, vol. 6, pp. 1–12.

13. Godsil C.D., Hensel A.D. Distance-regular covers of the complete graphs. *J. Comb. Theory, ser. B*, 1992, vol. 56, no. 2, pp. 205–238. doi: 10.1016/0095-8956(92)90019-T .

The paper was received by the Editorial Office on May 21, 2018.

Al'bina Aniuarovna Tokbaeva, Cand. Sci. (Phys.-Math.), Kabardino-Balkarian State University named after H. M. Berbekov, Nal'chik, 360004 Russia, e-mail: tok2506@mail.ru .

Cite this article as:
A. A. Tokbaeva. Automorphisms of a distance-regular graph with intersection array $\{196, 156, 1; 1, 39, 196\}$, *Trudy Inst. Mat. Mekh. UrO RAN*, 2018, vol. 24, no. 3, pp. 226–232 .