ON AUTOMORPHISM GROUPS OF AT4$(7, 9, r)$-GRAPHS
AND THEIR LOCAL SUBGRAPHS

L. Yu. Tsiovkina

The paper is devoted to the problem of classification of AT4$(p, p + 2, r)$-graphs. An example of an AT4$(p, p + 2, r)$-graph with $p = 2$ is provided by the Soicher graph with intersection array $\{56, 45, 16, 1; 1, 8, 45, 56\}$. The question of existence of AT4$(p, p + 2, r)$-graphs with $p > 2$ is still open. One task in their classification is to describe such graphs of small valency. We investigate the automorphism groups of a hypothetical AT4$(7, 9, r)$-graph and of its local graphs. The local graphs of each AT4$(7, 9, r)$-graph are strongly regular with parameters $(711, 70, 5, 7)$. It is unknown whether a strongly regular graph with these parameters exists. We show that the automorphism group of each AT4$(7, 9, r)$-graph acts intransitively on its arcs. Moreover, we prove that the automorphism group of each strongly regular graph with parameters $(711, 70, 5, 7)$ acts intransitively on its vertices.

Keywords: antipodal tight graph, strongly regular graph, automorphism.

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Lyudmila Yur'evna Tsiovkina, Cand. Phys.-Math. Sci., Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg, 620990 Russia,
e-mail: l.tsiovkina@gmail.com .