

MSC: 05C25, 20F65, 20F69**DOI:** 10.21538/0134-4889-2019-25-4-226-234

**ON LIMITS OF VERTEX-SYMMETRIC GRAPHS
AND THEIR AUTOMORPHISMS**

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Using a simple but rather general method of constructing Cayley graphs with trivial vertex stabilizers, we give an example of an infinite locally finite Cayley graph (and, hence, an example of an infinite connected locally finite vertex-symmetric unimodular graph) which is isolated in the space of connected locally finite vertex-symmetric graphs. We also give examples of Cayley graphs which are not isolated in this space but are isolated from the set of connected vertex-symmetric finite graphs.

Keywords: connected locally finite vertex-symmetric graph, Cayley graph, convergence of graphs.

REFERENCES

1. Grigorchuk R.I. Degrees of growth of finitely generated groups, and the theory of invariant means. *Math. USSR-Izv.*, 1985, vol. 25, no. 2, pp. 259–300. doi: 10.1070/IM1985v02n02ABEH001281 .
2. Trofimov V.I. The local structure of graphs and the polynomiality of growth. In: *Podgruppovoe stroenie grupp* (The subgroup structure of groups), Sverdlovsk: Akad. Nauk SSSR Ural. Otdel. Publ., 1988, pp. 149–152 (in Russian).
3. Trofimov V.I. On the action of primitive groups. *Algebra and Logic*, 1990, vol. 28, no. 3, pp. 220–237. doi: 10.1007/BF01978726 .
4. Trofimov V.I. Automorphism groups of graphs as topological groups. *Math. Notes*, 1985, vol. 38, no. 3, pp. 717–720. doi: 10.1007/BF01163706 .
5. Brin M. The free group of rank 2 is a limit of Thompson’s group F . *Groups Geom. Dyn.*, 2010, vol. 4, no. 3, pp. 433–454. doi: 10.4171/GGD/90 .
6. Conder M., Exoo G., Jajcay R. On the limitations of the use of solvable groups in Cayley graph cage constructions. *European J. Combin.*, 2010, vol. 31, no. 7, pp. 1819–1828. doi: 10.1016/j.ejc.2010.02.002 .
7. de Cornulier Y., Guyot L., Pitsch W. On the isolated points in the space of groups. *J. Algebra*, 2007, vol. 307, no. 1, pp. 254–277. doi: 10.1016/j.jalgebra.2006.02.012 .
8. Frisch J., Tamuz O. Transitive graphs uniquely determined by their local structure. *Proc. Amer. Math. Soc.*, 2016, vol. 144, no. 5, pp. 1913–1918. doi: 10.1090/proc/12901 .
9. Gromov M. Groups of polynomial growth and expanding maps. *Publications Mathématiques I.H.E.S.*, 1981, vol. 53, no. 1, pp. 53–73. doi: 10.1007/BF02698687 .
10. Kropholler P.H. Baumslag–Solitar groups and some other groups of cohomological dimension two. *Comment. Math. Helvetici*, 1990, vol. 65, no. 4, pp. 547–558. doi: 10.1007/BF02566625 .
11. Leemann P.-H., de la Salle M. Cayley graphs with few automorphisms. Available at: *ArXiv:1812.02199v1* [math.CO] 5 Dec 2018.
12. de la Salle M., Tessera R. Characterizing a vertex-transitive graph by a large ball. *Journal of Topology*, 2019, vol. 12, no. 3, pp. 705–743. doi: 10.1112/topo.12095 .
13. Stalder Y. Convergence of Baumslag–Solitar groups. *Bull. Belg. Math. Soc. Simon Stevin*, 2006, vol. 13, no. 2, pp. 221–233. doi: 10.36045/bbms/1148059458 .

Received September 19, 2019

Revised October 15 2019

Accepted October 21, 2019

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Cite this article as: V. I. Trofimov. On limits of vertex-symmetric graphs and their automorphisms, *Trudy Instituta Matematiki i Mekhaniki URO RAN*, 2019, vol. 25, no. 4, pp. 226–234.