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HAMILTONIAN AND PANCYCLIC GRAPHS IN THE CLASS OF SELF-CENTERED GRAPHS WITH RADIUS TWO

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Abstract

The paper deals with Hamiltonian and pancyclic graphs in the class of all self-centered graphs of radius 2. For both of the two considered classes of graphs we have done the following. For a given number n of vertices, we have found an upper bound of the minimum size of such graphs. For $n \leq 12$ we have found the exact values of the minimum size. On the other hand, the exact value of the maximum size has been found for every n. Moreover, we have shown that such a graph (of order n and) of size m exists for every m between the minimum and the maximum size. For $n \leq 10$ we have found all nonisomorphic graphs of the minimum size, and for $n = 11$ only for Hamiltonian graphs.

Keywords: self-centered graph with radius 2, Hamiltonian graph, pancyclic graph, size of graph.

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References

[1] J. Akiyama, K. Ando and D. Avis, *Miscellaneous properties of equi-eccentric graphs*, in: Convexity and Graph Theory, Proceedings of the Conference on Convexity and Graph Theory (Jerusalem, 1981), M. Rosenfeld and J. Zaks (Ed(s)), (North-Holland Math. Stud. 87, North-Holland, Amsterdam, 1984) 13–23. doi:10.1016/S0304-0208(08)72802-0

[2] F. Buckley, *Self-centered graphs with a given radius*, Congr. Numer. **23** (1979) 211–215.

[3] F. Buckley and F. Harary, Distance in Graphs (Addison-Wesley Publishing Company, Redwood City, CA, 1990).

[4] J.L. Gross, J. Yellen and P. Zhang, Handbook of Graph Theory (CRC Press, 2014).

[5] A. Haviar, P. Hrnčiar and G. Monoszová, *Eccentric sequences and cycles in graphs*, Acta Univ. M. Belii Ser. Math. **11** (2004) 7–25.

[6] P. Hrnčiar, *On cycles in graphs with specified radius and diameter*, Acta Univ. M. Belii Ser. Math. **20** (2012) 7–10.

[7] P. Hrnčiar and G. Monoszová, *Minimal two-valued eccentric sequences*, Int. J. Pure Appl. Math. **84** (2013) 139–152.

[8] D. Palumbíny, *Sul numero minimo degli spigoli di un singramma di raggio e diametro eguali a due*, Ist. Lombardo Accad. Sci. Lett. Rend. A **106** (1972) 704–712, in Italian.

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