



Γ -supermagic labeling of 4-regular Archimedean graphs with dihedral groups

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Abstract. A Γ -supermagic labeling of a graph $G = (V, E)$ is a bijection from E to a group Γ of order $|E|$ such that for every vertex $x \in V$ a product of labels of all edges incident with x is equal to the same element $\mu \in \Gamma$. D_{2k} -supermagic labelings of the Cartesian, direct, and strong product of cycles C_m and C_n by dihedral group D_{2k} for any $m, n \geq 3$ were found recently. In this paper we present D_{2k} -supermagic labelings of the four 4-regular Archimedean graphs, antiprisms, and their non-planar generalizations, j -antiprisms.

References

- [1] D. Froncek, Supermagic labelings of $C_n \square C_m$, (2022), <https://arxiv.org/2212.14836>.
- [2] D. Froncek, Γ -supermagic labeling of products of two cycles with dihedral groups, submitted.
- [3] D. Froncek, J. McKeown, J. McKeown and M. McKeown, Z_{2nm} -supermagic labeling of $C_n \square C_m$, *Indones. J. Combin.* **2**(2) (2018), 57–71.
- [4] D. Froncek and M. McKeown, Note on diagonal construction of Z_{2nm} -supermagic labeling of $C_n \square C_m$, *AKCE Int. J. Graphs Comb.* **17**(3) (2020), 952–954.
- [5] D. Froncek, P. Paananen and L. Sorensen, Group-supermagic labeling of Cartesian product of two odd cycles, *Bull. Inst. Combin. Appl.* **101** (2024), 39–53.
- [6] D. Froncek, P. Paananen and L. Sorensen, Group-supermagic labeling of Cartesian product of two even cycles, *Discrete Math.* **347**(8) (2024), Paper No. 113741.

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- [7] J. Ivančo, On supermagic regular graphs, *Math. Bohem.* **125** (2000), 99–114.
- [8] D.L. Kreher, personal communication.
- [9] P. Paananen, Γ -*supermagic labeling of $C_m \square C_n$* , MS Thesis, University of Minnesota Duluth, Duluth, MN, U.S.A., 2021.
- [10] J. Sedláček, Problem 27, in: M. Fiedler (Ed.), *Theory of Graphs and Its Applications*, Praha, 1964, pp. 163–164.
- [11] L. Sorensen, Γ -*supermagic labeling of $C_m \square C_n$* , MS Thesis, University of Minnesota Duluth, Duluth, MN, U.S.A., 2020.
- [12] R. Stanley, Linear homogeneous diophantine equations and magic labelings of graphs, *Duke Math. J.* **40** (1973), 607–632.
- [13] R. Stanley, Magic labelings of graphs, symmetric magic squares, systems of parameters, and Cohen-Macaulay rings, *Duke Math. J.* **43** (1976), 511–531.
- [14] B.M. Stewart, Magic graphs, *Canad. J. Math.* **18** (1996), 1031–1059.