

NOTE

ON DOUBLE-STAR DECOMPOSITION OF GRAPHS

SAIEED AKBARI^a, SHAHAB HAGHI^b

HAMIDREZA MAIMANI^b AND ABBAS SEIFY^{1,b}

^a*Department of Mathematical Sciences*
Sharif University of Technology
Tehran, Iran, P.O. Box 11365-11155

^b*Mathematics Section, Department of Basic Sciences*
Shahid Rajaei Teacher Training University
Tehran, Iran, P.O. Box 16783-163

e-mail: s.akbari@sharif.edu
sh.haghi@ipm.ir
maimani@ipm.ir
abbas.seify@gmail.com

Abstract

A tree containing exactly two non-pendant vertices is called a double-star. A double-star with degree sequence $(k_1 + 1, k_2 + 1, 1, \dots, 1)$ is denoted by S_{k_1, k_2} . We study the edge-decomposition of graphs into double-stars. It was proved that every double-star of size k decomposes every $2k$ -regular graph. In this paper, we extend this result by showing that every graph in which every vertex has degree $2k + 1$ or $2k + 2$ and containing a 2-factor is decomposed into S_{k_1, k_2} and $S_{k_1 - 1, k_2}$, for all positive integers k_1 and k_2 such that $k_1 + k_2 = k$.

Keywords: graph decomposition, double-stars, bipartite graph.

2010 Mathematics Subject Classification: 05C51, 05C05.

REFERENCES

- [1] J. Akiyama and M. Kano, *Factors and Factorizations of Graphs* (London, Springer, 2011).
doi:10.1007/978-3-642-21919-1
- [2] A. Bondy and U.S.R. Murty, *Graph Theory* (Graduate Texts in Mathematics, Springer, 2008).

¹Corresponding author.

- [3] S.I. El-Zanati, M. Ermete, J. Hasty, M.J. Plantholt and S. Tipnis, *On decomposing regular graphs into isomorphic double-stars*, Discuss. Math. Graph Theory **35** (2015) 73–79.
doi:10.7151/dmgt.1779
- [4] M. Jacobson, M. Truszczyński and Zs. Tuza, *Decompositions of regular bipartite graphs*, Discrete Math. **89** (1991) 17–27.
doi:10.1016/0012-365X(91)90396-J
- [5] F. Jaeger, C. Payan and M. Kouider, *Partition of odd regular graphs into bistars*, Discrete Math. **46** (1983) 93–94.
doi:10.1016/0012-365X(83)90275-3
- [6] A. Kötzig, *Problem 1*, in: Problem session, Proceedings of the Tenth Southeastern Conference on Combinatorics, Graph Theory and Computing, Congr. Numer. **XXIV** (1979) 913–915.
- [7] G. Ringel, *Problem 25*, in: Theory of Graphs and its Applications, Proc. Symposium Smolenice 1963 (Prague, 1964), 162.

Received 4 August 2015

Revised 9 May 2016

Accepted 9 May 2016