

ON THE DECOMPOSITIONS OF COMPLETE GRAPHS INTO CYCLES AND STARS ON THE SAME NUMBER OF EDGES

ATIF A. ABUEIDA AND CHESTER LIAN

*Department of Mathematics
University of Dayton
300 College Park, Dayton, OH 45469-2316*
e-mail: aabueida1@udayton.edu
lianc1@udayton.edu

Abstract

Let C_m and S_m denote a cycle and a star on m edges, respectively. We investigate the decomposition of the complete graphs, K_n , into cycles and stars on the same number of edges. We give an algorithm that determines values of n , for a given value of m , where K_n is $\{C_m, S_m\}$ -decomposable. We show that the obvious necessary condition is sufficient for such decompositions to exist for different values of m .

Keywords: cycles, stars, graph-decompositions.

2010 Mathematics Subject Classification: 05C70.

REFERENCES

- [1] A. Abueida, S. Clark and D. Leach, *Multidecomposition of the complete graph into graph pairs of order 4 with various leaves*, Ars Combin. **93** (2009) 403–407.
- [2] A. Abueida and M. Daven, *Multidesigns for graph-pairs of order 4 and 5*, Graphs Combin. **19** (2003) 433–447.
doi:10.1007/s00373-003-0530-3
- [3] A. Abueida and M. Daven, *Multidecompositions of the complete graph*, Ars Combin. **72** (2004) 17–22.
- [4] A. Abueida, M. Daven and K. Roblee, *λ -fold multidesigns for graphs pairs on 4 and 5 vertices*, Australas. J. Combin. **32** (2005) 125–136.
- [5] A. Abueida and T. O’Neil, *Multidecomposition of λK_m into small cycles and claws*, Bull. Inst. Combin. Appl. **49** (2007) 32–40.

- [6] B. Alspach, *Research problems, Problem 3*, Discrete Math. **36** (1981) 333.
doi:10.1016/S0012-365X(81)80029-5
- [7] B. Alspach and H. Gavlas, *Cycle decompositions of K_n and $K_n - I$* , J. Combin. Theory (B) **81** (2001) 77–99.
doi:10.1006/jctb.2000.1996
- [8] D. Bryant, D. Horsley, B. Maenhaut and B. Smith, *Cycle decompositions of complete multigraphs* J. Combin. Des. **19** (2011) 42–69.
doi:10.1002/jcd.20263
- [9] M. Šajna, *Cycle decomposition III: complete graphs and fixed length cycles*, J. Combin. Des. **10** (2002) 27–78.
doi:10.1002/jcd.1027
- [10] T. Shyu, *Decomposition of complete graphs into paths and stars*, Discrete Math. **310** (2010) 2164–2169.
doi:10.1016/j.disc.2010.04.009
- [11] T. Shyu, *Decomposition of complete graphs into paths and cycles*, Ars Combin. **97** (2010) 257–270.
- [12] D. Sotteau, *Decomposition of $K_{m,n}(K_{m,n}^*)$ into cycles (circuits) of length $2k$* , J. Combin. Theory (B) **30** (1981) 75–81.
doi:10.1016/0095-8956(81)90093-9
- [13] S. Yamamoto, H. Ikeda, S. Shige-eda, K. Ushio, and N. Hamada, *On claw-decomposition of complete graphs and complete bigraphs*, Hiroshima Math. J. **5** (1975) 33–42.

Received 29 August 2012
 Revised 22 December 2012
 Accepted 22 December 2012