

## EDGE-CONNECTIVITY AND EDGES OF EVEN FACTORS OF GRAPHS

NASTARAN HAGHPARAST AND DARIUSH KIANI

*Department of Mathematics and Computer Sciences  
Amirkabir University of Technology, Tehran, Iran*

**e-mail:** nhaghpast@aut.ac.ir  
dkiani@aut.ac.ir

### Abstract

An even factor of a graph is a spanning subgraph in which each vertex has a positive even degree. Jackson and Yoshimoto showed that if  $G$  is a 3-edge-connected graph with  $|G| \geq 5$  and  $v$  is a vertex with degree 3, then  $G$  has an even factor  $F$  containing two given edges incident with  $v$  in which each component has order at least 5. We prove that this theorem is satisfied for each pair of adjacent edges. Also, we show that each 3-edge-connected graph has an even factor  $F$  containing two given edges  $e$  and  $f$  such that every component containing neither  $e$  nor  $f$  has order at least 5. But we construct infinitely many 3-edge-connected graphs that do not have an even factor  $F$  containing two arbitrary prescribed edges in which each component has order at least 5.

**Keywords:** 3-edge-connected graph, 2-edge-connected graph, even factor, component.

**2010 Mathematics Subject Classification:** 05C70, 05C45.

### REFERENCES

- [1] J.A. Bondy and U.S.R. Murty, *Graph Theory with Applications* (North-Holland, NewYork-Amsterdam-Oxford, 1982).
- [2] N. Haghparast and D. Kiani, *Even factor of bridgeless graphs containing two specified edges* (2017), *Czechoslovak Math. J.*, submitted.
- [3] B. Jackson and K. Yoshimoto, *Even subgraphs of bridgeless graphs and 2-factors of line graphs*, *Discrete Math.* **307** (2007) 2775–2785.  
doi:10.1016/j.disc.2006.11.023

- [4] B. Jackson and K. Yoshimoto, *Spanning even subgraphs of 3-edge-connected graphs*, J. Graph Theory **62** (2009) 37–47.  
doi:10.1002/jgt.20386
- [5] F. Jaeger, *A note on sub-Eulerian graphs*, J. Graph Theory **3** (1979) 91–93.  
doi:10.1002/jgt.3190030110
- [6] M. Kano, C. Lee and K. Suzuki, *Path and cycle factors of cubic bipartite graphs*, Discuss. Math. Graph Theory **28** (2008) 551–556.  
doi:10.7151/dmgt.1426
- [7] H.-J. Lai, *Eulerian subgraphs containing given edges*, Discrete Math. **230** (2001) 63–69.  
doi:10.1016/S0012-365X(00)00070-4

Received 28 April 2017  
Revised 28 August 2017  
Accepted 28 August 2017