

ON q -POWER CYCLES IN CUBIC GRAPHS

JULIEN BENSMAIL

Department of Applied Mathematics and Computer Science
Technical University of Denmark
DK-2800 Lyngby, Denmark

e-mail: julien.bensmail.phd@gmail.com

Abstract

In the context of a conjecture of Erdős and Gyárfás, we consider, for any $q \geq 2$, the existence of q -power cycles (i.e., with length a power of q) in cubic graphs. We exhibit constructions showing that, for every $q \geq 3$, there exist arbitrarily large cubic graphs with no q -power cycles. Concerning the remaining case $q = 2$ (which corresponds to the conjecture of Erdős and Gyárfás), we show that there exist arbitrarily large cubic graphs whose all 2-power cycles have length 4 only, or 8 only.

Keywords: cubic graphs, q -power cycles, Erdős-Gyárfás conjecture.

2010 Mathematics Subject Classification: 68R10, 05C38.

REFERENCES

- [1] P. Erdős, *Some old and new problems in various branches of combinatorics*, *Discrete Math.* **165/166** (1997) 227–231.
doi:10.1016/S0012-365X(96)00173-2
- [2] D. Daniel and S.E. Shauger, *A result on the Erdős-Gyárfás conjecture in planar graphs*, *Congr. Numer.* **153** (2001) 129–139.
- [3] C.C. Heckman and R. Kravovski, *Erdős-Gyárfás conjecture for cubic planar graphs*, *Electron. J. Combin.* **20** (2013) #P7.
- [4] K. Markström, *Extremal graphs for some problems on cycles in graphs*, *Congr. Numer.* **171** (2004) 179–192.
- [5] P.S. Nowbandegani, H. Esfandiari, M.H.S. Haghghi and K. Bibak, *On the Erdős-Gyárfás conjecture in claw-free graphs*, *Discuss. Math. Graph Theory* **34** (2014) 635–640.
doi:10.7151/dmgt.1732

- [6] S.E. Shauger, *Results on the Erdős-Gyárfás conjecture in $K_{1,m}$ -free graphs*, Congr. Numer. **134** (1998) 61–65.
- [7] D. West, *Erdős-Gyárfás conjecture on 2-power cycle lengths*, Open Problems—Graph Theory and Combinatorics.
<http://www.math.illinois.edu/~dwest/openp/2powcyc.html>

Received 3 October 2015

Revised 18 March 2016

Accepted 30 March 2016