LIST STAR EDGE-COLORING OF SUBCUBIC GRAPHS

SAMIA KERDJOU DJ

*L'IFORCE, Faculty of Mathematics
USTHB, BP 32 El-Alia, Bab-Ezzouar 16111, Algiers, Algeria*
e-mail: s_kerdjoudj@yahoo.fr

ALEXANDR KOSTOCHKA¹

*University of Illinois at Urbana-Champaign
Urbana, IL 61801, USA and Sobolev Institute of Mathematics
Novosibirsk 630090, Russia*
e-mail: kostochk@math.uiuc.edu.

AND

ANDRÉ RASPAUD²

*LaBRI (Université de Bordeaux), 351 cours de la Libération
33405 Talence Cedex, France*
e-mail: andre.raspaud@labri.fr

Abstract

A *star edge-coloring* of a graph G is a proper edge coloring such that every 2-colored connected subgraph of G is a path of length at most 3. For a graph G , let the *list star chromatic index* of G , $ch'_{st}(G)$, be the minimum k such that for any k -uniform list assignment L for the set of edges, G has a star edge-coloring from L . Dvořák, Mohar and Šámal asked whether the list star chromatic index of every subcubic graph is at most 7. We prove that it is at most 8. We also prove that if the maximum average degree of a subcubic graph G is less than $\frac{7}{3}$ (respectively, $\frac{5}{2}$), then $ch'_{st}(G) \leq 5$ (respectively, $ch'_{st}(G) \leq 6$).

Keywords: graph coloring, edge coloring, star coloring, planar graphs.

2010 Mathematics Subject Classification: 05C15.

¹Research of this author is supported in part by NSF grant DMS-1266016 and by grant 15-01-05867 of the Russian Foundation for Basic Research.

²This study has been carried out with financial support from the French State, managed by the French National Research Agency (ANR) in the frame of the "Investments for the future" Programme IdEx Bordeaux - CPU (ANR-10-IDEX-03-02).

REFERENCES

- [1] O.V. Borodin, *Criterion of chromaticity of a degree prescription*, in: Abstracts of IV All-Union Conf. on Theoretical Cybernetics, Novosibirsk (1977) 127–128, in Russian.
- [2] L. Bezegova, B. Lužar, M. Mockovčiaková, R. Soták and R. Škrekovski, *Star edge coloring of some classes of graphs*, J. Graph Theory **81** (2016) 73–82.
doi:10.1002/jgt.21862
- [3] K. Deng, X.S. Liu and S.L. Tian, *Star edge coloring of trees*, J. Shandong Univ. Nat. Sci. **46** (2011) 84–88, in Chinese.
- [4] Z. Dvořák, B. Mohar and R. Šámal, *Star chromatic index*, J. Graph Theory **72** (2013) 313–326.
doi:10.1002/jgt.21644
- [5] G. Fertin, A. Raspaud and B. Reed, *On star coloring of graphs*, Lecture Notes in Comput. Sci. **2204** (2001) 140–153.
doi:10.1007/3-540-45477-2_14
- [6] B. Grünbaum, *Acyclic colorings of planar graphs*, Israel J. Math. **14** (1973) 390–408.
doi:10.1007/BF02764716
- [7] H. Hocquard, M. Montassier, A. Raspaud and P. Valicov, *On strong-edge coloring of subcubic graphs*, Discrete Appl. Math. **161** (2013) 2467–2479.
doi:10.1016/j.dam.2013.05.021
- [8] A.V. Kostochka, M. Stiebitz and B. Wirth, *The colour theorems of Brooks and Gallai extended*, Discrete Math. **162** (1996) 299–303.
doi:10.1016/0012-365X(95)00294-7
- [9] X.S. Liu and K. Deng, *An upper bound on the star chromatic index of graphs with $\delta \leq 7$* , J. Lanzhou Univ. (Nat. Sci.) **44** (2008) 94–95.
- [10] H. Zhu and Z. Miao, *On strong list edge coloring of subcubic graphs*, Discrete Math. **333** (2014) 6–13.
doi:10.1016/j.disc.2014.06.004

Received 16 September 2015

Revised 11 May 2017

Accepted 11 May 2017