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LIST EDGE COLORING OF PLANAR GRAPHS WITHOUT 6-CYCLES WITH TWO CHORDS

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Abstract

A graph G is edge-L-colorable if for a given edge assignment $L = \{L(e) : e \in E(G)\}$, there exists a proper edge-coloring φ of G such that $\varphi(e) \in L(e)$ for all $e \in E(G)$. If G is edge-L-colorable for every edge assignment L such that $|L(e)| \geq k$ for all $e \in E(G)$, then G is said to be edge-k-choosable. In this paper, we prove that if G is a planar graph without 6-cycles with two chords, then G is edge-k-choosable, where $k = \max\{7, \Delta(G) + 1\}$, and is edge-$t$-choosable, where $t = \max\{9, \Delta(G)\}$.

Keywords: planar graph, edge choosable, list edge chromatic number, chord.

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References

[1] M. Bonamy, *Planar graphs with $\Delta \geq 8$ are $(\Delta+1)$-edge-choosable*, SIAM J. Discrete Math. **29** (2015) 1735–1763. doi:10.1137/130927449

[2] J.A. Bondy and U.S.R. Murty, Graph Theory with Applications (North-Holland, New York, 1976).

[3] O.V. Borodin, *An extension of Kotzig's theorem and the list edge coloring of planar graphs*, Mat. Zametki **48** (1990) 22–48.

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[4] O.V. Borodin, A.V. Kostochka and D.R. Woodall, *List edge and list total colourings of multigraphs*, J. Combin. Theory Ser. B **71** (1997) 184–204. doi:10.1006/jctb.1997.1780

[5] J.S. Cai, J.F. Hou, X. Zhang and G.Z. Liu, *Edge-choosability of planar graphs without non-induced* 5*-cycles*, Inform. Process. Lett. **109** (2009) 343–346. doi:10.1016/j.ipl.2008.12.001

[6] J.S. Cai, *List edge coloring of planar graphs without non-induced* 6*-cycles*, Graphs Combin. **31** (2015) 827–832. doi:10.1007/s00373-014-1420-6

[7] F. Galvin, *The list chromatic index of a bipartite multigraph*, J. Combin. Theory Ser. B **63** (1995) 153–158. doi:10.1006/jctb.1995.1011

[8] R. Hägkvist and J. Janssen, *New bounds on the list-chromatic index of the complete graph and other simple graphs*, Combin. Probab. Comput. **6** (1997) 295–313. doi:10.1017/S0963548397002927

[9] R. Hägkvist and A. Chetwynd, *Some upper bounds on the total and list chromatic numbers of multigraphs*, J. Graph Theory **16** (1992) 503–516. doi:10.1002/jgt.3190160510

[10] A.J. Harris, Problems and conjectures in extrema graph theory, Ph.D. Dissertation (Cambridge University, UK, 1984).

[11] J.F. Hou, G.Z. Liu and J.S. Cai, *List edge and list total colorings of planar graphs without* 4*-cycles*, Theoret. Comput. Sci. **369** (2006) 250–255. doi:10.1016/j.tcs.2006.08.043

[12] J.F. Hou, G.Z. Liu and J.S. Cai, *Edge-choosability of planar graphs without adjacent triangles or without* 7*-cycles*, Discrete Math. **309** (2009) 77–84. doi:10.1016/j.disc.2007.12.046

[13] T.R. Jensen and B. Toft, Graph Coloring Problems (Wiley, New York, 1995).

[14] M. Juvan, B. Mohar and R. Šrekovski, *Graphs of degree* 4 *are* 5*-choosable*, J. Graph Theory **32** (1999) 250–262. doi:10.1002/(SICI)1097-0118(199911)32:3⟨250::AID-JGT5⟩3.0.CO;2-R

[15] A.V. Kostochka, *List edge chromatic number of graphs with large girth*, Discrete Math. **101** (1992) 189-201. doi:10.1016/0012-365X(92)90602-C

[16] B. Liu, J.F. Hou and G.Z. Liu, *List edge and list total colorings of planar graphs without short cycles*, Inform. Process. Lett. **108** (2008) 347–351. doi:10.1016/j.ipl.2008.07.003

[17] Y. Shen, G. Zheng, W. He and Y. Zhao, *Structural properties and edge choosability of planar graphs without* 4*-cycles*, Discrete Math. **308** (2008) 5789–5794. doi:10.1016/j.disc.2007.09.048

[18] W.F. Wang and K.W. Lih, *Structural properties and edge choosability of planar graphs without* 6*-cycles*, Combin. Probab. Comput. **10** (2001) 267–276.

[19] W.F. Wang and K.W. Lih, *Choosability, edge choosability and total choosability of outerplanar graphs*, European J. Combin. **22** (2001) 71–78.
doi:10.1006/eujc.2000.0430

[20] W.F. Wang and K.W. Lih, *Choosability and edge choosability of planar graphs without five cycles*, Appl. Math. Lett. **15** (2002) 561–565.
doi:10.1016/S0893-9659(02)80007-6

[21] J.L. Wu and P. Wang, *List-edge and list-total colorings of graphs embedded on hyperbolic surfaces*, Discrete Math. **308** (2008) 6210–6215.
doi:10.1016/j.disc.2007.11.044

[22] L. Zhang and B. Wu, *Edge choosability of planar graphs without small cycles*, Discrete Math. **283** (2004) 289–293.
doi:10.1016/j.disc.2004.01.001

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