

MORE ABOUT THE HEIGHT OF FACES IN 3-POLYTOPES

OLEG V. BORODIN, MIKHAIL A. BYKOV

AND

ANNA O. IVANOVA

Institute of Mathematics Siberian Branch
Russian Academy of Sciences
Novosibirsk, 630090, Russia

e-mail: brdnoleg@math.nsc.ru
131093@mail.ru
shmgnanna@mail.ru

REFERENCES

- [1] S.V. Avgustinovich and O.V. Borodin, *Neighborhoods of edges in normal maps*, Diskretn. Anal. Issled. Oper. **2** (1995) 3–9, in Russian, translation in Ser. Mathematics and Its Applications **391** (1997) 17–22.
- [2] O.V. Borodin, *Joint generalization of the theorems of Lebesgue and Kotzig on the combinatorics of planar maps*, Diskret. Mat. **3** (1991) 24–27, in Russian.
- [3] O.V. Borodin, *Solving the Kotzig and Grünbaum problems on the separability of a cycle in planar graphs*, Mat. Zametki **46** (1989) 9–12, in Russian, translation in Math. Notes **46** (1992) 835–837.
- [4] O.V. Borodin, *Colorings of plane graphs: a survey*, Discrete Math. **313** (2013) 517–539.
doi:10.1016/j.disc.2012.11.011
- [5] O.V. Borodin, *Minimal weight of a face in planar triangulations without 4-vertices*, Mat. Zametki **51** (1992) 16–19, in Russian, translation in Math. Notes **51** (1992) 11–13.
- [6] O.V. Borodin, *Triangulated 3-polytopes with restricted minimal weight of faces*, Discrete Math. **186** (1998) 281–285.
doi:10.1016/S0012-365X(97)00240-9

- [7] O.V. Borodin, *Strengthening Lebesgue's theorem on the structure of the minor faces in convex polyhedra*, Diskretn. Anal. Issled. Oper., Ser. 1 **9** (2002) 29–39, in Russian.
- [8] O.V. Borodin and D.V. Loparev, *The height of minor faces in normal plane maps*, Diskretn. Anal. Issled. Oper. **5** (1998) 6–17, translation in Discrete Appl. Math. **135** (2004) 31–39.
doi:10.1016/S0166-218X(02)00292-5
- [9] O.V. Borodin and A.O. Ivanova, *Describing 3-faces in normal plane maps with minimum degree 4*, Discrete Math. **313** (2013) 2841–2847.
doi:10.1016/j.disc.2013.08.028
- [10] O.V. Borodin and A.O. Ivanova, *The vertex-face weight of edges in 3-polytopes*, Sibirsk. Mat. Zh. **56** (2015) 338–350, in Russian, translation in Sib. Math. J. **56** (2015) 275–284.
doi:10.1134/s003744661502007x
- [11] O.V. Borodin and A.O. Ivanova, *Heights of minor faces in triangle-free 3-polytopes*, Sibirsk. Mat. Zh. **56** (2015) 982–988, in Russian, translation in Sib. Math. J. **56** (2015) 783–788.
doi:10.1134/S003744661505002X
- [12] O.V. Borodin and A.O. Ivanova, *The weight of faces in normal plane maps*, Discrete Math. **339** (2016) 2573–2580.
doi:10.1016/j.disc.2016.04.018
- [13] O.V. Borodin and A.O. Ivanova, *Heights of faces in 3-polytopes*, Sibirsk. Mat. Zh. **58** (2017) 48–55, in Russian, translation in Sib. Math. J. **58** (2017) 37–42.
doi:10.1134/S0037446617010050
- [14] O.V. Borodin and A.O. Ivanova, *Low minor faces in 3-polytopes*, Discrete Math., accepted.
- [15] O.V. Borodin, A.O. Ivanova and A.V. Kostochka, *Describing faces in plane triangulations*, Discrete Math. **319** (2014) 47–61.
doi:10.1016/j.disc.2013.11.021
- [16] O.V. Borodin and D.R. Woodall, *The weight of faces in plane maps*, Mat. Zametki **64** (1998) 648–657, in Russian.
doi:10.4213/mzm1441
- [17] O.V. Borodin and D.R. Woodall, *Cyclic degrees of 3-polytopes*, Graphs Combin. **15** (1999) 267–277.
doi:10.1007/S003730050060
- [18] B. Ferencová and T. Madaras, *Light graphs in families of polyhedral graphs with prescribed minimum degree, face size, edge and dual edge weight*, Discrete Math. **310** (2010) 1661–1675.
- [19] B. Grünbaum, *Polytopal graphs*, in: Studies in Graph Theory, D.R. Fulkerson, Ed., MAA Studies in Mathematics **12** (1975) 201–224.

- [20] M. Horňák and S. Jendrol', *Unavoidable sets of face types for planar maps*, Discuss. Math. Graph Theory **16** (1996) 123–142.
doi:10.7151/dmgt.1028
- [21] S. Jendrol', *Triangles with restricted degrees of their boundary vertices in plane triangulations*, Discrete Math. **196** (1999) 177–196.
doi:10.1016/S0012-365X(98)00172-1
- [22] S. Jendrol' and H.-J. Voss, *Light subgraphs of graphs embedded in the plane—a survey*, Discrete Math. **313** (2013) 406–421.
doi:10.1016/j.disc.2012.11.007
- [23] A. Kotzig, *Contribution to the theory of Eulerian polyhedra*, Mat. Eas. SAV (Math. Slovaca) **5** (1955) 101–113.
- [24] A. Kotzig, *From the theory of Eulerian polyhedrons*, Mat. Eas. SAV (Math. Slovaca) **13** (1963) 20–34.
- [25] A. Kotzig, *Extremal polyhedral graphs*, Ann. New York Acad. Sci. **319** (1979) 569–570.
doi:10.1111/j.1749-6632.1979.tb32837.x
- [26] H. Lebesgue, *Quelques conséquences simples de la formule d'Euler*, J. Math. Pures Appl. **19** (1940) 27–43.
- [27] B. Mohar, R. Škrekovski and H.-J. Voss, *Light subgraphs in planar graphs of minimum degree 4 and edge-degree 9*, J. Graph Theory **44** (2003) 261–295.
doi:10.1002/jgt.10144
- [28] O. Ore and M.D. Plummer, *Cyclic coloration of plane graphs*, in: Recent Progress in Combinatorics, W.T. Tutte (Ed.), (Academic Press, New York, 1969) 287–293.
- [29] M.D. Plummer, *On the cyclic connectivity of planar graph*, Graph Theory and Application (Springer, Berlin, 1972) 235–242.
- [30] E. Steinitz, *Polyeder und Raumeinteilungen*, Enzykl. Math. Wiss. (Geometrie), 3AB **12** (1922) 1–139.
- [31] P. Wernicke, *Über den kartographischen Vierfarbensatz*, Math. Ann. **58** (1904) 413–426.
doi:10.1007/BF01444968

Received 24 May 2016
Revised 12 December 2016
Accepted 12 December 2016