ON LIGHT EDGES IN 1-PLANAR GRAPHS

DÁVID HUDÁK AND PETER ŠUGEREK

Faculty of Science

P.J. Šafárik University in Košice

e-mail: david.hudak@student.upjs.sk, peter.sugerek@student.upjs.sk

Following the famous theorem of A. Kotzig on light edges in 3-connected planar graphs we investigate light edges in certain nonplanar graphs, which can be drawn in the plane with at most one crossing per each edge; such graphs are called 1-planar. We prove that each 1-planar graph of minimum degree $\delta \geq 4$ contains an edge with degrees its endvertices of type $(4,\leq 13)$ or $(5,\leq 9)$ or $(6,\leq 8)$ or $(7,7)$. We also show that for $\delta \geq 5$ are these bounds best possible and that the list of edge types is minimal.

Keywords: light edge, 1-planar graph.

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References

[1] A. Kotzig, Contribution to the theory of eulerian polyhedra, Math. Čas. SAV (Math. Slovaca) 5 (1955) 111–113.