Injective coloring of planar graphs

Darko Dimitrov

Institut für Informatik, Freie Universität Berlin,
Takustraße 9, D–14195 Berlin, Germany
darko@inf.fu-berlin.de

Abstract

The *injective coloring* of a graph G is a mapping $c : V(G) \to \{1, 2, \ldots, k\}$ such that $c(u) \neq c(v)$ for every $u, v \in V(G)$ that have a common neighbor. The least k such that G is injectively colored is the *injective chromatic number* of G, denoted by $\chi_i(G)$. The concepts of the injective coloring and the injective chromatic number were introduced by Hahn, Kratochvíl, Širáň and Sotteau [1] in 2002. They obtained general upper and lower bounds. Namely, they proved that $\Delta \leq \chi_i(G) \leq \Delta^2 - \Delta + 1$, where Δ denotes the maximum degree of the graph G, and characterized the graphs for which the lower or the upper bound is achieved in the inequalities.

Here, we consider injective coloring of planar graphs. Lužar, Škrekovski, and Tancer [2] have proved that every subcubic planar graph of girth at least 7 is 5-colorable. We extend this result to higher degree graphs by showing that every planar graph of maximum degree Δ and with girth at least 7 is injectively $(\Delta + 2)$-colorable.

This is joint work with Borut Lužar and Riste Škrekovski.

References

[1] G. Hahn, J. Kratochvíl, J. Širáň, D. Sotteau, *On the injective chromatic number of graphs*, Discrete Math. **256** (2002), 179–192.

[2] B. Lužar, R. Škrekovski, M. Tancer, *Injective colorings of planar graphs with few colors*, Discrete Math. **309** (2008), 5636–5649 .