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The Distinguishing Index of 2-connected Graphs

The *distinguishing index* $D'(G)$ of a graph G is the least number of colours of an edge colouring that is not preserved by any non-trivial automorphism.

The following result was proved by Pil\'sniak in [1].

Theorem. If G is a connected graph, then
(1) $D'(G) = \Delta(G) + 1$ iff G is a cycle of length less than 6,
(2) $D'(G) = \Delta(G)$ iff G is a symmetric or a bisymmetric tree, a cycle of length at least 6, or K_4 or $K_{3,3}$,
(3) $D'(G) \leq \Delta(G) - 1$ otherwise.

In the same paper, Pil\'sniak formulated the following conjecture.

Conjecture. If a graph G is 2-connected, then D'(G)$\leq \left\lceil \sqrt{\Delta(G)} \right\rceil + 1$.

In this talk, we prove this conjecture in a bit stronger form, and show some of its consequences.

Reference:

[1] M. Pil\'sniak, Improving upper bounds for the distinguishing index, Ars Math. Contemp. 13 (2017) 259–274.

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