Coloring and list coloring digraphs

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Abstract

The dichromatic number $\vec{\chi}(D)$ of a digraph D is the least number k such that the vertex set of D can be partitioned into k parts each of which induces an acyclic subdigraph. Introduced by Neumann-Lara in 1982 [7], this digraph invariant shares many properties with the usual chromatic number of graphs and can be seen as its natural analog. There has been a renewed interest in this parameter during the last few years. We give a survey of some of the recently obtained results, including results on the list version of the problem. We also discuss some ongoing work and open conjectures.

References

[1] J. Bensmail, A. Harutyunyan, N.-K. Le. List coloring digraphs. Journal of Graph Theory 87(4): 492-508 (2018)

[2] P. Erdős. Problems and results in number theory and graph theory, Proc. Ninth Manitoba Conf. on Numerical Math. and Computing 1979, pp. 3–21. `https://www.renyi.hu/~p_erdos/1980-30.pdf`

[3] L. Esperet, L. Lemoine, F. Maffray Small Feedback Vertex Sets in Planar Digraphs. Electr. J. Comb. 24(2): P2.6 (2017)

[4] A. Harutyunyan, T.-N. Le, A. Newman, S. Thomassé, Coloring dense digraphs, submitted.

[5] A. Harutyunyan, T.-N. Le, S. Thomassé, H. Wu, Coloring tournaments: from local to global, submitted.

[6] Z. Li, B. Mohar. Planar Digraphs of Digirth Four are 2-Colorable. SIAM J. Discrete Math. 31(3): 2201-2205 (2017)

[7] V. Neumann-Lara. The dichromatic number of a digraph. Journal of Combinatorial Theory, Series B, 33:265-270, 1982.