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Colouring and recolouring digraphs with bounded maximum degree

Abstract:

A dicolouring of a digraph is a partition of its vertex-set into acyclic subsets. This notion extends the notion of proper colouring of an undirected graph. In the context of digraph recolouring, given a digraph and two of its dicolourings, we wonder if we can transform one into the other by recolouring one vertex at each step while maintaining a dicolouring at any step. Moreover, when such a recolouring sequence exists, we look for the shortest one.

In this talk, we will consider these questions when dealing with digraphs of bounded maximum degree. In particular, we will see an extension of a result due to Feghali et al. and improve this result when restricted to oriented graphs. In order to achieve this, we show a strengthening of the Directed Brooks' Theorem when restricted to this particular class of digraphs.