

Rainbow Connection in Oriented Graphs

Paul Dorbec^{a,b,*}, Ingo Schiermeyer^c,
Elżbieta Sidorowicz^d and Éric Sopena^{a,b}

^a Univ. Bordeaux, LaBRI, UMR5800, F-33400 Talence

^b CNRS, LaBRI, UMR5800, F-33400 Talence

^c TU Bergakademie Freiberg, Institut für Diskrete Mathematik and Algebra, Freiberg, Germany

^d Faculty of Mathematics, Computer Science and Econometrics, University of Zielona Góra, Zielona Góra, Poland

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Abstract

An edge-coloured graph G is said to be *rainbow-connected* if any two vertices are connected by a path whose edges have different colours. The rainbow connection number of a graph is the minimum number of colours needed to make the graph rainbow-connected. This graph parameter was introduced by G. Chartrand, G.L. Johns, K.A. McKeon and P. Zhang in 2008. Since, the topic drew much attention, and various similar parameters were introduced, all dealing with undirected graphs.

Here, we initiate the study of rainbow connection in oriented graphs. An early statement is that the rainbow connection number of an oriented graph is lower bounded by its diameter and upper bounded by its order. We first characterize oriented graphs having rainbow connection number equal to their order. We then consider tournaments and prove that (i) the rainbow connection number of a tournament can take any value from 2 to its order minus one, and (ii) the rainbow connection number of every tournament with diameter d is at most $d + 2$.

1 Introduction

We consider finite and simple graphs only, and refer to [1] for terminology and notations not defined here.

*E-mail: paul.dorbec@labri.fr