

Gallai Ramsey numbers of complete graphs and odd cycles

Zhao Wang, Yaping Mao, Colton Magnant, Ingo Schiermeyer *, Jinyu Zou, Technische Universität Bergakademie Freiberg

Given a graph H , the k -coloured Gallai Ramsey number $gr_k(K_3 : H)$ is defined to be the minimum integer n such that every k -colouring (using all k colours) of the complete graph on n vertices contains either a rainbow triangle or a monochromatic copy of H . In 2015, Fox, Grinshpun, and Pach conjectured the value of the Gallai Ramsey numbers for complete graphs. We verify this conjecture for the first open case when $H = K_4$. For the case $H = K_5$ we will show that the validity of the conjecture depends on the exact value of the (unknown) Ramsey number $r(K_5, K_5)$. We also present the Gallai Ramsey numbers $gr_k(K_3 : C_{2p+1})$ for all odd cycles C_{2p+1} .

Keywords: Ramsey number, Gallai Ramsey number, Gallai colouring