

Anti-Ramsey number of edge-disjoint rainbow spanning trees in all graphs

Linyuan Lu ^{*} Andrew Meier [†] Zhiyu Wang [‡]

August 19, 2021

Abstract

An edge-colored graph H is called *rainbow* if every edge of H receives a different color. Given any host multigraph G , the *anti-Ramsey* number of t edge-disjoint rainbow spanning trees in G , denoted by $r(G, t)$, is defined as the maximum number of colors in an edge-coloring of G containing no t edge-disjoint rainbow spanning trees. For any vertex partition P , let $E(P, G)$ be the set of non-crossing edges in G with respect to P . In this paper, we determine $r(G, t)$ for all host multigraphs G : $r(G, t) = |E(G)|$ if there exists a partition P_0 with $|E(G)| - |E(P_0, G)| < t(|P_0| - 1)$; and $r(G, t) = \max_{P: |P| \geq 3} \{|E(P, G)| + t(|P| - 2)\}$ otherwise. As a corollary, we determine $r(K_{p,q}, t)$ for all values of p, q, t , improving a result of Jia, Lu and Zhang.

Last updated: August 19, 2021

^{*}University of South Carolina, Columbia, SC 29208, (lu@math.sc.edu).

[†]University of South Carolina, Columbia, SC 29208, (am66@mailbox.sc.edu).

[‡]Georgia Institute of Technology, Atlanta, GA 30332, (zwang672@gatech.edu).