On Star-critical Ramsey numbers for Stars versus Stripes

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August 10, 2019

Abstract

Let K_n denote the complete graph on n vertices, $K_{1,n}$ denote the Star on n vertices and G, H be finite graphs without loops or multiple edges. If for every red/blue coloring of edges of the complete graph K_n, there exists a red copy of G, or a blue copy of H, we will say that $K_n \to (G, H)$. The Ramsey number $r(G, H)$ is the smallest positive integer n such that $K_n \to (G, H)$. Let $r(n, m) = r(K_n, K_m)$. Due to growing difficulties in calculating the Ramsey numbers $r(n, m)$, for $n, m \geq 5$, the exact values of these numbers are known, only for a selected few cases. In the recent past, research on calculation of Ramsey numbers has taken a different outlook encompassing interesting variations that are closely related to diagonal Ramsey numbers. One such variation is the study of Star-critical Ramsey numbers, introduced by Hook and Isaak in 2010. Current literature reveals many studies on the Star-critical Ramsey numbers related to different classes of graphs. Star-critical Ramsey number $r^*(G, H)$ is defined as the largest value of k such that $K_{r(G,H)-1} \sqcup K_{1,k} \to (G, H)$. Some studies on Star-critical Ramsey numbers related to different classes of graphs are trees vs complete graphs, paths vs. paths, cycles vs. cycles and complete graphs vs stripes are some such examples. In this paper, we find Star critical Ramsey numbers for Stars versus Stripes and derive a general formulae for $r^*(K_{1,n}, mK_2)$ when $n, m \geq 3$.

Keywords: Ramsey theory, Star-critical Ramsey numbers
Mathematics Subject Classification: 05C55, 05C38, 05D10