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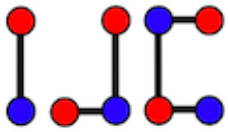

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A strict upper bound for size multipartite Ramsey numbers of paths versus stars

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Abstract

Let P_n represent the path of size n. Let $K_{1,m-1}$ represent a star of size m and be denoted by S_m. Given a two coloring of the edges of a complete graph $K_{j\times s}$ we say that $K_{j\times s} \to (P_n, S_{m+1})$ if there is a copy of P_n in the first color or a copy of S_{m+1} in the second color. The size Ramsey multipartite number $m_j(P_n, S_{m+1})$ is the smallest natural number s such that $K_{j\times s} \to (P_n, S_{m+1})$. Given j, n, m if $s = \left\lceil \dfrac{n+m-1-k}{j-1} \right\rceil$, in this paper, we show that the size Ramsey numbers $m_j(P_n, S_{m+1})$ is bounded above by s for $k = \left\lceil \dfrac{n-1}{j} \right\rceil$. Given $j \geq 3$ and s, we will obtain an infinite class (n, m) that achieves this upper bound s. In the later part of the paper, will also investigate necessary and sufficient conditions needed for the upper bound to hold.

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