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On a Ramsey Problem Involving the 3-Pan Graph

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Abstract. Let K_s and $K_{j\times s}$ denote the complete graph on s vertices and the complete multipartite balanced graph having j partite sets (where $j \geq 3$) of size s respectively. For any two graphs say G, H, we say that $K_s \rightarrow (H,G)$, if for any red/blue coloring of K_s, given by $K_s = H_R \oplus H_B$, there exists a red copy of a H in H_R or a blue copy G in H_B. In accordance with the same notation, we also say that $K_{j\times s} \rightarrow (H,G)$, if for any red/blue coloring of $K_{j\times s}$, given by $K_{j\times s} = H_R \oplus H_B$, there exists a red copy of a H in H_R or a blue copy G in H_B. The balanced multipartite Ramsey number $m_j(G,H)$ is defined as the smallest positive number s such that that $K_{j\times s} \rightarrow (H,G)$. There are 11 non-isomorphic graphs G on 4 vertices, out of which 5 graphs G are connected and the others are disconnected. In this paper we exhaustively find $m_j(P,G)$ for all of the 11 non-isomorphic graphs G on 4 vertices where P denotes the 3-pan graph (paw graph) given by $K_{1,3}+e$.

Keywords: Graph theory, Ramsey theory

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