ON REGULAR RAMSEY MINIMAL GRAPHS

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Regularity in graphs has many advantages (theoretical as well as practical advantages). For graphs $F$, $G$ and $H$, we write $F \rightarrow (G, H)$ to mean that if the edges of $F$ are arbitrarily bi-coloured, say red or blue, then either the red subgraph of $F$ contains a copy of $G$ or the blue subgraph of $F$ contains a copy of $H$. A graph $F$ (without isolated vertices) is called a Ramsey $(G, H)$-minimal graph if $F \rightarrow (G, H)$ but for each $e \in E(F)$, $F - e \not\rightarrow (G, H)$. The set of all Ramsey $(G, H)$--minimal graphs is denoted by $\mathcal{R}(G, H)$.

The problems of characterising and/or constructing Ramsey $(G, H)$-minimal graphs for certain graphs $G$ and $H$ are very challenging. Some of the papers have devoted to this problem in particular for $G = mK_2$, see [1], [2] and [3]. In this paper, we construct a class of Ramsey $(mK_2, H)$-minimal graphs of regular degree if $H$ is either a triangle or a path $P_n$. Furthermore, we introduce a procedure to obtain new regular Ramsey $(mK_2, H^*)$-minimal graphs from known regular Ramsey $(mK_2, H)$-minimal graphs, if $H^* \supseteq H$.

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References

