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THE DISTINGUISHING COLOURING

Kristína Budajová*, Stanislav Jendroľ

Consider a directed graph $G = (V, E)$. Let $\varphi : V \cup E \to \{1, 2, \ldots, k\}$ be an assignment of colours from the set $\{1, 2, \ldots, k\}$ to the vertices and edges of G. Such a colouring is called *the total k-colouring*. Assign each edge $e = (x, y)$ the ordered triple of integers $(\varphi(x), \varphi(e), \varphi(y))$, where $\varphi(x)$ is colour assigned to the initial vertex x of edge e, $\varphi(e)$ is colour of the edge e and $\varphi(y)$ is colour assigned to the terminal vertex of edge e. The total k-colouring of a directed graph G is called *the edge-irregular k-colouring* if for any two different edges $e = (x, y)$ and $f = (u, v)$ the associated ordered triplets $(\varphi(x), \varphi(e), \varphi(y))$ and $(\varphi(u), \varphi(f), \varphi(v))$ are different. The minimum of k for which the directed graph G has the total edge-irregular k-colouring is called *the total edge-irregular number* of G and is denoted *hit(G)*. In the paper we will present our recent results concerning the total edge-irregular number of few special families of directed graph.