The RVCL of Comb Product of a Graph and a Complete Graph

Mahmud Imrona*, A.N.M. Salman, Saladin Uttunggadewa, Institut Teknologi Bandung

Let $G = (V, E)$ be a connected, simple, and finite graph and $k \in \mathbb{N}$. A rainbow vertex k-coloring of G is a function $c : V(G) \to [1, k]$ such that for every two distinct vertices u and v in $V(G)$ there exists a $u-v$ path whose internal vertices have distinct colors. Such path is called a rainbow vertex path. The rainbow vertex connection number of G, denoted by $rvc(G)$, is the smallest positive integer k so that G has a rainbow vertex k-coloring. The distance between two differences vertices u and v in $V(G)$, denoted by $d(u, v)$, is the length of a shortest $u-v$ path in G. The rainbow code of a vertex $v \in V(G)$ with respect to an ordered partition $\Pi = \{R_1, R_2, \ldots, R_k\}$ is defined as the k-tuple $rc_\Pi(v) = (d(v, R_1), d(v, R_2), \ldots, d(v, R_k))$, where R_i is the set of vertices with color i and $d(v, R_i) = \min\{d(v, x)|x \in R_i\}$ for each $i \in [1, k]$. If every vertex of G has a distinct rainbow code, then c is called a locating rainbow k-coloring of G. The smallest positive integer k such that G has a locating rainbow k-coloring is called a locating rainbow connection number of G, denoted by $rvcl(G)$. In this paper we provide the stright upper and lower bounds for the locating rainbow connection number of comb product of any graph and a complete graph.

Keywords: comb product, locating rainbow coloring, locating rainbow connection number, rainbow code, rainbow vertex coloring