

The Birank Number of Operationally Constructed Graphs

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A k -biranking on a graph G is a function $g : V(G) \rightarrow \{1, 2, 3, \dots, k\}$ such that if $g(a) = g(b)$, then on any path from a to b there exist vertices s and ℓ such that $g(s) < g(a) < g(\ell)$. The smallest k for which a biranking exists is the birank number of G . First, we establish bounds for the birank number of the graph product of two graphs based on the birank number of the individual graphs. Next we define the single edge addition of two vertex transitive graphs G and H to be the graph $G \oplus H$ obtained by connecting one vertex of G to a vertex of H with a single edge. We provide bounds for the birank number of $G \oplus H$ as a function the birank numbers of G and H .

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