

An Algorithm for Graceful Labelings of Paths

Jay Bagga

Ball State University

Adrian Heinz

Ball State University

Suppose that G is a connected graph with n vertices and m edges. A vertex labeling $f : V(G) \rightarrow \{0, 1, 2, \dots, m\}$ such that distinct vertices have distinct labels induces an edge labeling where an edge xy gets the label $|f(x) - f(y)|$. The famous Kotzig-Ringel conjecture states that all trees are graceful. Various classes of trees including paths and caterpillars are known to be graceful. We present an algorithm for finding all graceful labelings of paths. The output generated by running this algorithm has led us to the discovery of some new properties of such graceful labelings.