

An Algorithm on Harmonious Labeling of Fan and Friendship Graphs

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Abstract

In this paper, we present an algorithm for enumerating all possible harmonious labelings of a fan graph f_n for any given number n of vertices and a friendship graph F_n for any given number n of triangle components. Our numerical scheme is based on Dushyant Tanna's construction proof of an injective labeling function $f:V(G) \rightarrow \{0, 1, 2, \dots, q-1\}$ for a graph G with q edges such that its induced function $f^*:E(G) \rightarrow \{0, 1, 2, \dots, q-1\}$ defined by $f^*(uv) = f(u) + f(v) \pmod{q}$ is a bijection. Here, $V(G)$ and $E(G)$, respectively denote the vertex set and edge set of graph G , which may either be a fan or friendship graph. We, then implement our algorithm using the Fortran programming language and plot the results using a command-line Gnuplot program. Finally, we present a pseudocode of our numerical scheme and some computational examples.

Keywords: algorithm, harmonious labeling, fan graphs, friendship graphs, Fortran programing

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