

# Shifted-antimagic Labelings for Graphs

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## Abstract

The concept of antimagic labelings of a graph is to produce distinct vertex sums by labeling edges through consecutive integers starting from one. A long-standing conjecture proposed by Hartsfield and Ringel is that every connected graph, except a single edge, is antimagic. Many graphs are known to be antimagic, but little is known about sparse graphs as well as trees.

In this talk, we will study the  $k$ -shifted-antimagic labeling which uses the consecutive integers starting from  $k + 1$ , instead of starting from one, where  $k$  is a given integer. We establish connections among various concepts proposed in the literature of antimagic labelings and extends previous results in the following aspects:

- Some classes of graphs, including trees and graphs whose vertices are of odd degrees, which have not been verified to be antimagic are shown to be  $k$ -shifted-antimagic for sufficiently large  $k$ .
- Some graphs are proved to be  $k$ -shifted-antimagic for all  $k$ , while some are proved not for some particular  $k$ . In particular, we determine the values of  $k$  for which trees of diameter at most 5 are  $k$ -shifted antimagic.
- Disconnected graphs are also considered. We characterize the linear forests and star forests that are  $k$ -shifted antimagic for every integer  $k$ .
- Labeling the graphs with  $|E(G)|$  distinct real numbers.

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**Keywords:** antimagic labelings, tree, forest