

# Antimagic labelings of regular bipartite graphs: An application of the Marriage Theorem

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## Abstract

A labeling of a graph is a bijective function onto its edges from the set  $\{1, 2, \dots, |E(G)|\}$ . A labeling is *antimagic* if for every pair of distinct vertices  $u$  and  $v$ , the sum of the labels on edges incident to  $u$  is different from the sum of the labels on edges incident to  $v$ . We say a graph is antimagic if it has an antimagic labeling. In 1990, Ringel conjectured that every connected graph other than  $K_2$  is antimagic. The most significant progress has been made by Alon et al. (in 2004), who showed there exists a constant  $C$ , such that if an  $n$ -vertex graph  $G$  has  $\delta(G) \geq Cn$ , then  $G$  is antimagic. In this paper, we show that every regular bipartite graph (with degree at least 2) is antimagic. Our technique relies heavily on the Marriage Theorem.