14 Vertex Magic Total Labeling of Tensor Product of Cycles

N P Shrimali
Department of Mathematics,
Gujarat University,
Ahmedabad, Gujarat (INDIA)
E-mail: narenp05@gmail.com

S T Trivedi
Department of Mathematics,
Gujarat University,
Ahmedabad, Gujarat (INDIA)
E-mail: siddh.trivedi@gmail.com

A vertex magic total labeling of a graph $G = (V, E)$ assigns to all vertices and edges of G labels from the set $\{1, 2, 3, \ldots, |V| + |E|\}$ so that the sum of the vertex label and labels of all incident edges does not depend on the vertex. In this chapter, we present a construction of vertex magic total labeling of the tensor product of $C_n \otimes C_n$ for odd n. The construction is based on a vertex magic total labeling of Cartesian product $C_n \times C_n$ for odd n.

14.1 INTRODUCTION

In 1990, MacDougall, Miller, Slamin and Wallis[2] introduced the vertex magic total labeling. In this paper, MacDougall *et.al.* defined vertex magic total labeling as follows:
Let $G = (V, E)$ be a graph. A bijective function $f : V(G) \cup E(G) \to \{1, 2, \ldots, |V| + |E|\}$ is called vertex magic total labeling(VMTL) of G if there exists a constant k such that

$$f(v) + \sum_{u \in N(v)} f(uv) = k$$

for every vertex $v \in V(G)$. Further, the graph having such a labeling is known as a vertex magic total graph. They have proved that the graphs $P_n (n > 1), K_n, C_n, K_{n,n} - e (n > 2)$ and $K_{n,n} (n > 1)$ for odd natural number n have vertex magic total labeling. For the detailed list of vertex magic graphs one may see the dynamic survey of graph labeling[5] written by J. A. Gallian. Furthermore, The construction of VMTL of Cartesian product $C_n \times C_n$ was given by Dalibor Fronček et al. in [1].