A comprehensive survey on prime cordial and divisor cordial labeling of graphs

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Abstract. This article presents a short and concise survey on prime cordial and divisor cordial labeling of graphs. A prime cordial labeling of a graph $G(V, E)$ is a bijective function $f: V(G) \rightarrow \{1, 2, \ldots, |V|\}$ such that if each edge xy is assigned the label 1 if $gcd(f(x), f(y)) = 1$ and 0 if $gcd(f(x), f(y)) > 1$, then the number of edges labeled with 0 and the number of edges labeled with 1 differ by at most 1. Further, a divisor cordial labeling of G is a bijection $g: V(G) \rightarrow \{1, 2, \ldots, |V|\}$ such that an edge st is assigned the label 1 if one $g(s)$ or $g(t)$ divides the other and 0 otherwise, then the number of edges labeled with 0 and the number of edges labelled with 1 differ by at most 1. We call G a divisor cordial graph if it admits a divisor cordial labeling. This article stands divided into five sections. The first and fifth sections are reserved respectively for introduction and some important references. The second section deals with the prime cordial labeling of certain classes of graphs wherein some important known results have been recalled. The third section deals with the divisor cordial labeling of graphs in which a few known results of high interest have been outlined. In the fourth section we highlight certain conjectures and open problems in respect of the above mentioned labelling that still remain unsolved.

Keywords: Prime Cordial Labeling, Prime Cordial Graphs, Divisor Cordial Labeling, Divisor Cordial Graphs

1. Introduction

Only simple, finite, non-trivial, connected, and undirected graphs are considered in this article. Graph labeling is an "assignment of labels" (mostly integers) to the vertices or/and edges of a graph $G(V, E)$, or simply G, under some restrictions/rules. Graph labeling is the fastest growing area in the present world especially in the field of network security. Graph labeling is making its use in the area of "coding theory, study of X-ray crystallography, communication networks" and many more. A lot of techniques of graph labeling are available in [8]. In this article, we present a comprehensive survey on "prime cordial labeling and divisor cordial labeling" which are under the category of cordial labeling. Cahit in his paper titled "Cordial Graphs: A Weaker Version of Graceful and Harmonious Graphs" introduced the concept of cordial labeling thereby proving some results on trees, wheel graphs, friendship graphs, fan, and pinwheel graphs [7]. For the terminologies not defined here we refer to

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