Abstract

The labeling of a graph is defined to be a mapping which associates non negative integers to elements of graph (vertices or edges or both) according to particular condition. When vertex set is domain of mapping, it is vertex labeling, the set of all edges (edge labeling) and labeling is said to be total labeling if domain is both vertex and edge set. Weight of any graph element (vertex or edge or face) is sum of all related labels to that element of graph. In 1988, for graph G which does not have any isolated vertex, irregular labeling was delineated by chartrand et al.[16] as the sum of weights of edges are different at each vertex. For t-ary tree ($t = 2, 3$), irregularity strength is equal to its number of vertices with degree 1(pendent vertices) was found by Cammarch et al. [36] in 1991 and they also proved that for tree having no vertex of degree 2, irregularity strength is same as t-ary tree. Tongi and Amar [11] also verified this result in 1998

In this thesis we consider edge irregularity m-valuation as a labeling of graph elements (vertices) to labels from the set $\{1,\ 2,\ 3,\ \ldots, m\}$. We take sum of associated labels of end vertices to get weight of any edge. Weight of different edges are different, then we call such labeling as edge irregular m-labeling. The least value of m, according to which graph G has an irregular m-labeling is named as edge irregularity strength of graph G represented by $es(G)$. In this dissertation we drive new results of this type of strength of some new families of graphs namely multi middle graphs, extended prism and rooted product graphs, we also present characterization of f-graphs and determine graph parameters for f-graphs.