Abstract

The Zagreb indices have been introduced more than thirty years ago by Gutman and Trinajstić. Throughout this thesis we consider only simple connected graphs, i.e., connected graphs without loops and multiple edges. For a graph G, $V(G)$ and $E(G)$ denote the set of vertices and edges, respectively and the degree of a vertex v is the number of edges incident to v and is denoted by $d_G(x)$.

The first and the second Zagreb index, denoted by $M_1(G)$ and $M_2(G)$, respectively, are defined as:

$$M_1(G) = \sum_{x \in V(G)} d_G(x)^2$$

$$M_2(G) = \sum_{xy \in E(G)} d_G(x)d_G(y).$$

Considering the family of graphs of order n, in this M. Phil. thesis we surveyed in characterizing the trees, unicyclic and bicyclic graphs with largest first Zagreb index M_1 and the largest second Zagreb index M_2, as well as corresponding graphs with smallest indices M_1 and M_2, by using some graph transformations.