# Totally antimagic total labelings

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**Dedicated to Mirka Miller**

A total labeling a graph $G$ is a bijective mapping from the vertex set and the edge set of $G$ to the set $\{1, 2, \ldots, |V(G)|+|E(G)|\}$. Under the total labeling the edge-weight of an edge is the sum of the edge label and the labels of its ends. The vertex-weight of a vertex is the sum of the vertex label and the labels of all edges incident with that vertex. A total labeling is called edge-antimagic total (vertex-antimagic total) if all edge-weights (vertex-weights) are pairwise distinct. If the total labeling has both properties at the same time it is called a totally antimagic total labeling.

The definition of totally antimagic total labeling is a natural extension of the concept of totally magic labeling defined by Exoo, Ling, McSorley, Phillips and Wallis in [G. Exoo, A.C.H. Ling, J.P. McSorley, N.C.K. Phillips and W.D. Wallis, Totally magic graphs, *Discrete Math.* **254** (1–3) (2002), 103–113]. They showed that such graphs appear to be rare. They proved that the only connected totally magic graph containing a vertex of degree 1 is $P_3$, the only totally magic trees are $K_1$ and $P_3$, the only totally magic cycle is $C_3$, the only totally magic complete graphs are $K_1$ and $K_3$, and the only totally magic complete bipartite graph is $K_{1,2}$.

In the talk we will deal with the problem of finding totally antimagic total labelings of graphs. We show the existence of totally antimagic total labelings for some classes of graphs, such as paths, cycles, stars, double-stars, wheels, complete graphs, etc. We will also present several related graph labelings.

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