Dense Distance Magic Graphs

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Abstract: Let $G = (V, E)$ be a graph with n vertices. A bijection f from V to the set of integers $\{1, 2, \ldots, n\}$ is called a *distance magic labeling* of G if for every vertex in G the sum of labels of all adjacent vertices gives the same value k. A graph that allows such a labeling is a *distance magic graph*. For graphs with an even number of vertices there is an elegant construction of r-regular distance magic graphs for all feasible values of r. For graphs with an odd number of vertices some necessary and several sufficient conditions are known for a graph to have a distance magic labeling. In this paper we focus on distance magic graphs of high regularity: we provide constructions of $(n-5)$-, $(n-7)$-, and $(n-9)$-regular distance magic graphs with n vertices. Magic labelings are used in tournament scheduling.

Keywords: labeling, distance magic, regular graph.