Self-reverse distance magic labeling

P. Kovář[1], K. Rozman[2,3], P. Šparl[2,4,5]

[1] Department of Applied Mathematics, VSB, Ostrava, Czech Republic
[2] IMFM, Ljubljana, Slovenia
[3] UP FAMNIT, Koper, Slovenija
[4] UL PEF, Ljubljana, Slovenia
[5] UP IAM, Koper, Slovenija

According to a nonstandard definition introduced in 2021, a distance magic labeling ℓ of a regular graph of order n is a bijection from its vertex set to the set of integers of the arithmetic progression from $1 - n$ to $n - 1$ with common difference 2, such that the sum of the labels of the neighbors of each vertex is zero. Such a labeling is called *self-reverse* if, for any pair of vertices u and v, u is adjacent to v if and only if the vertices with labels $-\ell(u)$ and $-\ell(v)$ are adjacent.

In this talk, we present the motivation for studying self-reverse distance magic labelings. We focus on self-reverse distance magic labelings in the case of tetravalent graphs providing several examples and a complete classification of all orders for which a tetravalent graph admitting such a labeling exists. The classification is obtained via a novel construction that produces a (tetravalent) distance magic graph from two given (tetravalent) distance magic graphs. We also discuss the existence of graphs admitting a self-reverse distance magic labeling among some well-known families of tetravalent graphs.