Computational and algebraic approaches to open XOR-magic graphs

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A graph $G = (V, E)$ with $|V| = 2^n$ is called *(open) XOR-magic graph*, if it is connected and there exists a bijective labeling $\ell : V \to (\mathbb{Z}_2)^n$ such that for each vertex $v \in V$, sum of labels over (open) closed neighborhood of v is equal to $\mathbf{0}$. This labeling is a special case of group distance magic labeling of graphs.

Batal posed the following open problem: does it exist any even regular XOR-magic or odd regular open XOR-magic graph? In this talk, we will present positive answers to these questions, as well as a generalization about the existence of such graphs of order 2^n for each $n \geq 4$. Furthermore, we will present obtained algebraic approach to non-existence of open XOR-magic labelings and its application to various classes of circulant graphs.

References

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