PERFECT CODES IN GENERALIZED SIERPIŃSKI GRAPHS

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We generalize the notion of Sierpiński graphs, defined originally in 1997 in [1] by Klavžar and Milutinović. Starting from a graph $G$, we construct graph $S(n, G)$ of dimension $n$ with the following process. $S(1, G)$ is the graph $G$. We obtain graph $S(n, G)$ from graph $S(n - 1, G)$ by copying $|V(G)|$ times $S(n - 1, G)$ and adding in a certain way an edge for each edge $xy$ of $G$ between copy $x$ and copy $y$ of $S(n - 1, G)$. When $G$ is the complete graph we obtain the classical Sierpiński graphs. We study the existence of perfect codes in $S(n, G)$, generalizing some results of [2]. If $G$ has no perfect code, it is enough to study existence of perfect codes of $S(2, G)$. We give a complete characterization of the existence of perfect codes in the case when the starting graph is a power of a cycle. We also describe the automorphism group of generalized Sierpiński graphs in terms of the automorphism group of the starting graph and compute their distinguishing number.

Keywords: Sierpiński graphs, perfect codes, automorphism group, cycle.

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References


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