PERFECT CODES IN GENERALIZED SIERPIŃSKI GRAPHS

Sylvain Gravier and Aline Parreau[1]

Institut Fourier, University of Grenoble, France
e-mail: sylvain.gravier@ujf-grenoble.fr, aline.parreau@ujf-grenoble.fr

Matjaž Kovše

FNM, University of Maribor and IMFM, Slovenia
e-mail: matjaz.kovse@gmail.com

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.

AMS Subject Classification: 05C38,05C69,05C70.

References

[1] S. Klavžar and U. Milutinović, Graphs $S(n, k)$ and a variant of the Tower of Hanoï problem, *Czechoslovak Math. J.* 47(122) (1997) 95-104.

[2] S. Klavžar, U. Milutinović and C. Petr, 1-Perfect codes in Sierpiński graphs, *Bull. Austral. Math. Soc.*, 66 (2002), 369-384.