

## COLORING OF $G^2 \setminus G$ , FOR EUCLIDEAN GRAPH $G$

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The problem appeared in telecommunication.

Graph  $G = (V(G), E(G))$  is called *Euclidean* if and only if  $V(G)$  is a finite subset of  $R^2$  and  $\{x, y\} \in E(G)$  if and only if  $dist(x, y) \leq d$ , where  $d \in R$  is fixed. Let  $S(G) = G^2 \setminus G$  e.g. The vertex set of  $S(G)$  is  $V(G)$  and there is an edge  $\{x, y\}$  in  $E(S(G))$  if and only if  $\{x, y\} \notin E(G)$  and  $x, y$  have a common neighbor in  $G$ . We consider vertex coloring of the graphs  $S(G)$ , where  $G$  are Euclidean.

**Problem 1.** *Is there a polynomial algorithm, which gives the chromatic number of  $S(G)$  for Euclidean graph  $G$ .*

The problem appeared in telecommunication. In practical applications standard approximate algorithms are used, but they do not use the geometric properties of  $S(G)$  and they seem not to be the most effective.

For geometric reasons  $\chi(S(G)) \leq 12$ , where  $G$  is Euclidean, but on other hand it is difficulty to find Euclidean graph  $G$  such that  $\chi(S(G)) > 6$ .

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