

Institut für Optimierung und Diskrete Mathematik

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Cops and robbers on infinite graphs

FLORIAN LEHNER

(TU Graz)

Pursuit-evasion based searching, also known as the game of cops and robbers is a game on a graph between two players, c (the cop) and r (the robber). Originally inspired by the problem of searching for a spelunker lost in a cave, the game has a wide range of potential applications from fire fighting to network security.

The rules are as follows: In the first round both c and r choose a starting vertex, in each consecutive round they are allowed to move to a neighboring vertex. The cop wins the game, if after some finite number of steps c and r occupy the same vertex, otherwise the robber wins.

The most basic question related to this game is to characterize the class of cop-win graphs, that is, graphs for which the cop has a winning strategy. For finite graphs this question has been answered by Nowakowski and Winkler who showed that the cop-win graphs are exactly the dismantlable graphs. We present a minor modification to the game due to Chastand et al. which might give a similar characterization for infinite graphs.

Mihyun Kang