Cops and robber games in graphs

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Main objectives of the PFE:

- The first goal of this project is to provide a state of the art of the cops and robber games. This study will focus on the classes of graphs in which the cop-number has been proved to be less than square-root(n) and on the techniques used for this purpose. This requires some mathematical skills and basic knowledges in probability and graph theory.

- Then, the different variants may be investigated in random graphs, or in some particular (deterministic) graph classes (e.g., grid, bounded genus graphs). Classical questions are of interest: upper and lower bounds on the cop number, characterization of graphs with a given cop number, deterministic or random algorithms allowing to compute efficient strategies for the cops/ the robber.

Required background: good knowledge in probability theory, graph theory, algorithmic, optimization, computational complexity

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References:


[CCNV] J. Chalopin, V. Chepoi, N. Nisse and Y. Vaxés, Cop and Robber games when the robber can hide and ride


[LP] T. Luczak and P. Pralat, Chasing robbers on random graphs: zigzag theorem (see www.math.wvu.edu/~pralat/)