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Extremal Cop-Win Graphs

For a cop-win graph, the capture time is the number of moves required by one cop to catch the robber. We consider graphs that are extremal (or almost extremal) with respect to capture time, i.e. their capture time is as large as possible relative to their order, characterizing such graphs (thus reproving an old result and proving a new result). Our new approach involves associating graphs to vectors (i.e. finite lists of integers) and then partially determining which vectors can be realized by some graph. We leave fully characterizing these vectors as an open question.