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The damage number of the product of graphs

In adversarial situations on networks, we often concern ourselves with minimizing resources required for neutralizing a threat. Here we consider a different parameter which addresses the situation where an adversary is damaging each unique location they visit. Framed within the context of the game of Cops and Robbers on graphs, the robber tries to maximize the number of unique vertices they visit to maximize the damage to the graph, while the cops aim to minimize the damage by limiting the robber territory. This model was first introduced in 2019 by Cox and Sanaei. We build on their results. We provide a general upper bound for the damage number of the Cartesian product of graphs and consider the damage number of the product of two trees or cycles. We also consider graphs with small damage number along with their products.

This is joint work with Margaret-Ellen Messinger and Amanda Porter.