

Security games on graphs and matroids

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Measuring the reliability of a network is one of the rich and complex areas of combinatorial optimization. Since the precise meaning of reliability highly depends on the application, there is an abundance of reliability metrics that have been proposed.

Applying game-theoretical tools for measuring security has become very common. The basic idea is very natural: define a game between two virtual players, the Attacker and the Defender, such that the rules of the game capture the circumstances under which reliability is to be measured. Then analyzing the game might give rise to an appropriate security metric: the better the Attacker can do in the game, the lower the level of security is. This kind of analysis can give rise to new graph reliability metrics and in many cases it can shed a new light on some well-known ones.

In this talk we will survey a few recent results of this type. From game theory nothing beyond the most fundamental results on two-player, zero-sum games will be relied on. As for matroid theory, the depth of penetration will highly depend on the appetite of the audience.