

## Modeling Intelligent Threats: Case of Continuous Attacks on a Specific Target

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**Abstract :** In this paper, we treat a model that falls in the area of protecting targeted systems from intelligent threats including terrorism. We introduce the concept of system survivability, in the context of continuous attacks, as the probability that a system under attack will continue operation up to some fixed time  $t$ . We define a constant attack rate (CAR) process as an attack on a targeted system that follows an exponential distribution. We consider the superposition of several CAR processes. From the attacker side, we determine the optimal attack strategy that minimizes the system survivability. We also determine the optimal strengthening strategy that maximizes the system survivability under limited defensive resources. We use operations research techniques to identify optimal strategies of each antagonist. Our results may be used as interesting starting points to develop realistic protection strategies against intentional attacks.

**Keywords :** CAR processes, defense/attack strategies, exponential failure, survivability

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