Adaptivity in Network Interdiction

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© 2017, Springer International Publishing AG.We study a network security game arising in the interdiction of fare evasion or smuggling. A defender places a security checkpoint in the network according to a chosen probability distribution over the links of the network. An intruder, knowing this distribution, wants to travel from her initial location to a target node. For every traversed link she incurs a cost equal to the transit time of that link. Furthermore, if she encounters the checkpoint, she has to pay a fine. The intruder may adapt her path online, exploiting additional knowledge gained along the way. We investigate the complexity of computing optimal strategies for intruder and defender. We give a concise encoding of the intruders optimal strategy and present an approximation scheme to compute it. For the defender, we consider two different objectives: (i) maximizing the intruder?s cost, for which we give an approximation scheme, and (ii) maximizing the collected fine, which we