APPLICATIONS OF INSPECTION GAMES

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An inspection game is a mathematical model of a non-cooperative situation where an inspector verifies that another party, called inspectee, adheres to legal rules. The inspector wishes to deter illegal activity on the part of the inspectee and, should illegal activity nevertheless take place, detect it with the highest possible probability. The inspectee may have some incentive to violate his commitments - otherwise the situation is pointless - and violation, if observed, will incur punishment, therefore if he chooses illegal behavior, the inspectee will wish to avoid detection with the highest possible probability.

Three examples of applications are presented which differ by substance and analytical tools. The first one deals with random controls in public transportation systems, it is described by a two by two-person game. The second one describes the problem of verification of arms control and disarmament in a very general way. The third one deals with inspections over time which are important in the context of non-proliferation verification; it is formulated as a recursive extensive form two-person game.

Nash equilibria, if unique, are considered the solutions of these games. They will be determined in all three cases with the help of different techniques, and their use for the applications mentioned will be discussed.