Games and contests

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Valorization

In this chapter we discuss how we can create value from the knowledge provided in this thesis.[10] This dissertation consists of three papers. The first two paper are about infinite player games, and the last paper is about infinite action multi battle n-player dynamic contests. These papers fall into the realm of non-cooperative game theory which analyzes individuals and self-enforced group strategies when they face a strategic interaction.

Doing it now, later or never

In this paper, we distinguish decision makers into two types, sophisticated and naive, and corresponding solution concepts sophisticated and naive equilibria. Sophisticated decision makers know how their own preferences will change in the future whereas a naive decision maker has erroneous beliefs about his/her future preferences. We show that a decision maker who faces an ambiguous due date for a task, sophisticated decision makers are more inclined to execute the task earlier than the naive ones. We achieve the ambiguous due date for a task by supposing that the game consists of infinite time periods. For example, consider a

[10] Article 23 of the "Regulation governing the attainment of doctoral degrees" at Maastricht University states: "Knowledge valorization refers to the 'process of creating value from knowledge, by making knowledge suitable and / or available for social (and / or economic) use and by making knowledge suitable for translation into competitive products, services, processes and new commercial activities' (adapted definition based on the National Valorization Committee 2011:8)."

person who tries to quit smoking. Each day he has two choices, quitting today or quitting tomorrow. It is clear that never quitting is the worst scenario for your health so any other choice is better. Here our study suggests that the quiting probability of a sophisticated person is higher than a naive person.

Moreover to show the existence of naive and sophisticated equilibria we suppose that the payoffs are upper semi-continuous but not necessarily continuous. An example of such payoffs are the cases where stopping the game corresponds to making a costly investment, such as in the reduction of carbon dioxide emissions. Since it is too late to make investment to avoid the disastrous outcome, not making the investment at all is preferred in such cases.

Perfect information games where each player acts only once

In this paper, we study perfect information games played by an infinite sequence of players, each acting only once in the course of the game. For example, consider a game where a player can choose either 0 or 1. Choosing 1 (safe move) leads to a payoff of 1 whereas choosing 0 (risky move) leads to a payoff of 2 if minority of the players chose that action, otherwise leads to a payoff of 0. This game does not admit a subgame perfect ϵ-equilibrium for any ϵ sufficiently small. We call this type of games as frequency-based minority game. A minority game is a type of game where players make choices sequentially and those who end up on the minority side win. Sometimes people prefer to be on the minority; such examples can be found in fashion and stock exchange transactions.

Furthermore we show that games with certain conditions admits subgame perfect ϵ-equilibrium which is a stable state where there is no profitable unilateral deviations with $\epsilon > 0$ error in payoffs.

Multi-battle n-player dynamic contests

Primary elections are how political parties in the United States pick their strongest candidate to run for president. The parties do this by holding mini-elections in each of the states and the candidates with the most delegates from these elections become their party's official nominee. These nominees then face each other in the national election for presidency.

Winner-take-all representation rule characterizes a state election by popular vote: winner in each state wins all the electoral votes of that state. Proportional rule characterizes a state election by distributing delegates in proportion to their votes. There are eight states in primary elections that are winner-take-all, and they're all on the Republican party.

The US presidential primaries is an example of sequential multiple-battle n-player dynamic contests whereas presidential elections provide an example of simultaneous but static (i.e., not dynamic) multi-battle contests.

In this context, campaign resource allocation proportional to delegate numbers is desirable. We show that when players (candidates) maximize their expected number of delegates, there is an equilibrium—a stable state— in which players (candidates) allocate their resources proportionally throughout the states. However, when players maximize their probability of winning, proportionality is not satisfied for dynmaic contests with at least 4 number of states and at least 2 delegates.