

Continuous-Time Games with Imperfect and Abrupt Information

R06323060 Ming-Hsuan Hsu

1. What is the question?

In games with imperfect monitoring, players may gain two kinds of information: continuous information through a noisy signal and infrequent informative event. In previous study, the information structure is considered with only discrete information or continuous information separately. More precisely, the former one is discussed in the setting of repeated game (Abreu, Pearce, and Stacchetti (1986)) and the latter one is discussed in continuous game setting (Sannikov, 2007). It lacks a work to take two kinds of information into player's incentives simultaneously. Therefore, this paper characterizes the equilibrium payoff set in an information structure allowing for both kinds of information.

2. Why should we care about it?

There are three reasons why we should care about it. First, there are several important cases in real world satisfying this information structure. For example, the author use agreement of greenhouse gas emission to point out that such kind of monitoring problem is discussed in this model. Second, it contributes methodologically that it takes discontinuous information in continuous-time game setting. At last, it loosens the assumption on player's patience, which makes it tractable to analyze different kind of initial state and patient attitude.

3. What is the answer to the question?

There are two main results. This paper characterizes shape of the set of extreme payoff pair, $\varepsilon(r)$, by the tradeoff parameter γ among two types of information, which has not been parametrized in previous result. (The curvature of $\varepsilon(r)$ have been shown to be important condition that equilibria occur, Sannikov, 2007) Moreover, it takes the equilibria in both continuous information setting and discrete information setting into same frame, which gives a study tool to discrete-time study about why impatient players' equilibria collapse when abrupt information is relatively uninformative.

4. How did the author get there?

The author sets the continuous-time game monitoring with public signal given by summation of noisy information, which is modeled by Brownian motion, and abrupt information, by Poisson process. He first deals with the continuous information by generalizing signals from the Sannikov's work (2007). He takes the abrupt shocks as an ODE problem from initial states given in Brownian information and solves it by iteration. He also gives an algorithm to implement what he solves numerically.