

Research Paper



Received 31 August, 2009
Accepted 29 December, 2009
SAFA = 0.61

Repeated Prisoners' Dilemma with Local Interaction: A Simulation Model

Farooq Sheikh*

Jones School of Business, SUNY Geneseo, New York, USA

Abstract: We study a simulation model of the prisoner's dilemma game played locally by agents situated on a two dimensional lattice. Agents interact simultaneously with players in its Von Neuman neighborhood ($r = 1$), behaving as one of the four of automata strategy types including simple cooperation, simple defect, TFT (tit for tat) and TF2T (tit for two tats). Our research seeks to study the effect of including reciprocal players like TFT and TF2T on the survival rate of simple cooperation under different scenarios of learning rate and payoff structures. We show that presence of reciprocal-strategy (TFT and TF2T) players and learning delay positively affects the survival of single state cooperators.

Keywords: Game Theory, Prisoner's Dilemma, local action, automata, simulation

INTRODUCTION

There are many instances of economic behavior where the players engage in playing the same game of competition against many other players at the same time and sometimes repeatedly over finite or infinite periods of time. A genre of such games is typified by the ubiquitous Prisoner's Dilemma (PD) game. The emergence and flourishing of human society is set on foundations of cooperation and at the same time guided by economic rationalism, particularly rational selfishness. This simultaneous engagement of two opposing forces is a puzzle that continues to baffle economists even to-day. The PD game captures the quintessential contradiction between the instinct to cooperate and rational economic choice of selfishness. Interestingly the latter follows in the shadow of the former, but the question remains as to how ever did we arrive at the union of these two disparate forces that simultaneously sustain and energize the human civilization?

