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G. Alex McClain* (alex.mcclain423@gmail.com) and **Carl V. Lutzer**. *An Examination of Equilibria in the Multi-Site Iterated Prisoner's Dilemma*. Preliminary report.

Iterated Prisoner's Dilemma is a simple model for the interaction between two self-interested agents who can choose whether or not to cooperate with one another. Many real-world problems can be characterized in terms of the Iterated Prisoner's Dilemma, from the militarization of rival nations to the tradeoff between gas mileage and safety when purchasing a vehicle. The game theoretic properties of Iterated Prisoner's Dilemma are well understood, and previous research by Axelrod into the performance of various strategies in a Darwinian environment is extensive. In this paper we extend Axelrod's work by investigating the dynamics of the Iterated Prisoner's Dilemma when multiple "communities," each playing its own Iterated Prisoner's Dilemma tournament, are allowed to interact and influence each other. Specifically, we examine the case when these communities are populated by players using two specific strategies: TIT-FOR-TAT and ALWAYS-NONCOOPERATIVE. We establish a possible range for an equilibrium in the multi-site scenario through rigorous analysis of the underlying structure of the model, and present substantial numerical data that points to the existence of such an equilibrium. (Received September 25, 2012)