MONICA COJOCARU, University of Guelph
Linking generalized Nash games and replicator dynamics

In this talk I plan to introduce an evolutionary steady state concept related to a generalized Nash game (GN) and a replicator dynamics. Generalized Nash games were introduced in the 50's, and represent models of noncooperative behaviour among players whose both strategy sets and payoff functions depend on strategy choices of other players. ¡p¿¡/p¿ Evolutionary games consist of populations where individuals play many times, against many different opponents, with each contributing a relatively small contribution to the total reward. Given strategies $\{1, ..., n\}$, an individual of $type\ i$ is one using strategy i, and x_i is the frequency of $type\, i$ individuals in the population. Thus the vector $x = (x_1, ..., x_n)$ in the unit simplex is the state of the population. Interaction between players of different types can be describes by linear or nonlinear payoffs; assume that a player of $type\, i$ has a payoff $a_i(x)$, and they want to maximize it subject to a choice of strategies. The dynamic evolution of such game is described by the replicator dynamics $\dot{x}_i(t) = x_i(a_i(x) - \sum_i x_i a_i(x)), \forall i$. Assuming shared constraints imposed on the game (i.e. $g(x) \leq B$ where B would be the upper limit of resource for instance) a replicator dynamics has to satisfy the new constraints, becoming a constraint dynamics of the type known in literature as a projected dynamical system. The new dynamics and its relation to the GN needs to be investigated: the main questions we present here refers to highlighting under what conditions Folk's Theorem type results would hold in this new setting.