

Anatomy of matrix games

GYÖRGY SZABÓ

Institute of Technical Physics and Materials Science, Centre
for Energy Research, Hungarian Academy of Sciences

Similarly to vector calculus, matrices can also be composed of an orthogonal set of basis matrices (elementary games). For the symmetric n -strategy games the dyadic products of a set of n -dimensional basis vectors serve as suitable orthogonal basis games. According to this analysis these games can be classified into four types characterizing coordination, cyclic dominance and games with self- and cross-dependent payoffs. We will discuss the microscopic features of these basis games as well as their consequences in macroscopic systems. For example, in the absence of cyclic components the games are potential games and the multiagent system exhibits thermodynamic behavior for the application of a logit dynamical rule. The antisymmetric part of the self- and cross-dependent components are responsible for the social dilemmas.