

# **Dynamics of the Evolution of Cooperation: The Prisoners' Dilemma Approach**

**Perera, S.S.N. and Kumari, K.D.N.**

All around us we see people contributing to the welfare of others, even when it is not convenient and may be costly in terms of time or money or may affect their personal and professional relationship. In fact, we see a lot of this corporative behaviour in human societies as well as in many biological system. If natural selection favors selfish individuals, how does evolution favor cooperation and altruistic behaviour in this competitive world? To investigate this, one approach is to study the effect of a network structure. Sociologists believe that the network structure plays an important role in the evolution of cooperation. In a network, a cooperator can evolve by forming links or network branches. We use the idea of the iterated prisoners' dilemma on graphs to model the evolution of cooperation. It can be shown that the average number of neighbors plays an important role in determining whether cooperation is evolutionary game theory. A strategy is called an evolutionary stable strategy if its monomorphic population rejects the invasion of any other mutant strategy. It has been found that during evolution, the benefit of cost ratio being greater than average degree implies cooperative behavior in a social network. The fitness function depends on the payoff of the game and the population size of the social network will affects this rule.

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