第16回 MEE SEMINAR

MATHEMATICAL ECOLOGY & EVOLUTION

2010年2月16日(火) 14：40～16：10

明治大学生田キャンパス第二校舎A館：A207

小田急小田原線　「生田駅」から徒歩10分
又は「向ケ丘遊園」駅北口から「明治大学正門前」行きバスで10分終点下車
詳しくは、http://www.meiji.ac.jp/koho/campus_guide/ をご覧下さい

February 16, 2010, 14:40～16:10　　Meiji Univ, Ikuta campus A207

Evolution of cooperation by phenotypic similarity

Hisashi Ohtsuki

(Tokyo Institute of Technology)

Abstract:

The emergence of cooperation in populations of selfish individuals is a fascinating topic that has inspired much work in theoretical biology. Here, we study the evolution of cooperation in a model where individuals are characterized by phenotypic properties that are visible to others. The population is well mixed in the sense that everyone is equally likely to interact with everyone else, but the behavioral strategies can depend on distance in phenotype space. We study the interaction of cooperators and defectors. In our model, cooperators cooperate with those who are similar and defect otherwise. Defectors always defect. Individuals mutate to nearby phenotypes, which generates a random walk of the population in phenotype space. Our analysis brings together ideas from coalescence theory and evolutionary game dynamics. We obtain a precise condition for natural selection to favor cooperators over defectors. Cooperation is favored when the phenotypic mutation rate is large and the strategy mutation rate is small. In the optimal case for cooperators, in a one-dimensional phenotype space and for large population size, the critical benefit-to-cost ratio is given by b/c = 1 + 2/sqrt(3).

参加自由です。皆様のお越しをお待ちしております。

MEEセミナー世話人：若野友一郎 <joe@math.meiji.ac.jp>
中橋渉 <n_wataru@isc.meiji.ac.jp>