

第33回 MEE seminar

Mathematical Ecology & Evolution

2012年5月31日(木) 16:30~17:30
明治大学生田キャンパス第二校舎A館: A304
May 31, 2012. 16:30~17:30 Meiji Univ. Ikuta campus A304

小田急小田原線 「生田駅」から徒歩10分
又は「向ヶ丘遊園」駅北口から「明治大学正門前」行きバスで15分終点下車
詳しくは、http://www.meiji.ac.jp/koho/campus_guide/ をご覧下さい

Evolution of learning strategies in temporally and spatially variable environments

Kenichi Aoki (Tokyo University)

Abstract: Individual learning (IL; learning by oneself, e.g., by trial-and-error) and social learning (SL; learning from others, e.g., by imitation) are alternative ways of acquiring and expressing the appropriate behavior (phenotype) in a given environment. The way in which an organism combines IL and SL and its relative dependence on each constitute a learning strategy. A learning strategy is a genetic adaptation to a variable environment and moreover constrains the possible pathways that culture can take. The simplest evolutionary situation involves competition between organisms that use IL or SL but not both. I review the various mathematical models of competition between obligate IL and SL in temporally variable environments with a digression on the so-called Rogers' paradox. An analogous model with spatial heterogeneity of the environment is also considered. Next, I introduce a more realistic mixed strategy model which assumes that each organism is capable of both IL and SL, but with the probability of using each fixed throughout its lifetime. The evolutionarily stable strategy (ESS) in this model incorporates SL with positive probability when the periodicity of environmental change is sufficiently long. Finally, I consider the evolution of learning schedules, which are defined as the life-stage dependent application of IL and SL. Of special interest is the social-learner-explorer strategy in which an organism first uses SL and then IL. I argue that environmental change experienced in mid-life, either as a result of temporal change or of long-distance migration, favors the evolution of this strategy. Social-learner-explorer is one of the few plausible learning strategies supportive of cumulative culture as seen in modern humans.

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>
岡嶋亮子 <ryokookajima6@gmail.com>

