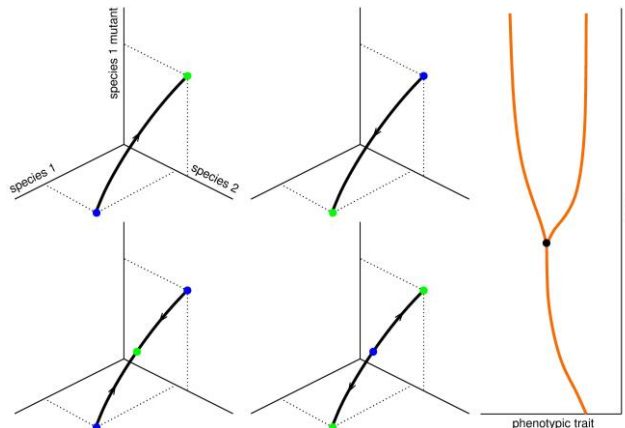




Modelling and Analysis of Innovation and Competition Processes

DEIB, Politecnico di Milano, Course: May 26–28, 2014, Workshop: May 29–30, 2014



Organized by: Fabio Dercole

[DEIB - Department of Electronics, Information, and Bioengineering](#)

The aim of the course is to present *adaptive dynamics* (AD), a mathematical framework to model long-term evolution of coevolving multi-species communities, with special emphasis on the generation of diversity through *evolutionary branching*. Evolutionary branching takes place when a resident and a similar mutant type coexist in the same environment and natural selection favors further differentiation between the two types. The evolutionary dynamics are described as a random walk in the space of the coexisting strategies, a space with variable dimension according to evolutionary branching and extinction. Evolution proceeds in the direction of the local fitness gradient and can be approximated by deterministic continuous dynamics ruled by the AD *canonical equation*. Applications to relevant biological communities, as well as to social and economic sciences, where innovations and competition play the role of mutations and natural selection, will be presented.

The course is part of the teaching activities organized by the [PhD Program in Information Technology](#) at Politecnico di Milano, yet it is not only addressed to PhD students, but to all researchers working in any areas of science and engineering and interested in modelling innovation and competition processes. Advanced theoretical topics and cutting-edge applications of AD will be presented in the workshop by the leading scientists in the field.

Speakers:

[Fabio Della Rossa](#), Department of Electronics, Information, and Bioengineering, Politecnico di Milano
The branching bifurcation

[Fabio Dercole](#), Department of Electronics, Information, and Bioengineering, Politecnico di Milano
Unfolding the resident-invader dynamics of similar strategies

[Ulf Dieckmann](#), Evolution and Ecology Program, International Institute for Applied Systems Analysis (TBC)

[Stefan Geritz](#), Department of Mathematics and Statistics, University of Helsinki

On the coevolution of prey and predator behavior in an adaptive dynamics setting

[Mats Gyllenberg](#), Department of Mathematics and Statistics, University of Helsinki
Evolution of functional responses

[Christopher Klausmeier](#), W. K. Kellogg Biological Station, Michigan State University
Adaptive dynamics in space and time

[Pietro Landi](#), Department of Electronics, Information and Bioengineering, Politecnico di Milano
Fisheries-induced disruptive selection

[Géza Meszéna](#), Department of Biological Physics, Eötvös University, Budapest
Continuity in adaptive dynamics

[Hans Metz](#), Mathematisch Instituut, Universitet Leiden
Effective population sizes and the canonical equation of adaptive dynamics

[Kalle Parvinen](#), Department of Mathematics and Statistics, University of Turku
Evolutionary branching of cooperation

[Tadeas Priklopil](#), Department of Mathematics and Statistics, University of Helsinki
On invasion boundaries and unprotected coexistence

[Sergio Rinaldi](#), Department of Electronics, Information and Bioengineering, Politecnico di Milano
Evolution of biological networks toward synchrony and chaos

For more information visit: <http://maicp2014.deib.polimi.it/>