Dynamics over networks

Prof. Fabio Fagnani¹

¹ Dipartimento di Matematica, Politecnico di Torino
Email: fabio.fagnani@polito.it

Timetable: 20 hours. Every Tuesday and Thursday from 10:30 to 12:30. First lecture on Tuesday, May 10, 2011. Room DEI/G (Dept. of Information Engineering, Via Gradenigo 6/a). The lecture of Thursday, June 2, will be made on Wednesday June 1.

Course requirements: Basic probability and calculus.

Examination and grading: homeworks.

Aim: In a large variety of scientific and technological fields (social and economic sciences, computer science, engineering, biology), mathematical models based on networks are rapidly increasing their importance. The unifying setting is a large number of 'atoms' possessing a relatively simple time dynamics, who are interconnected together. As a consequence of this interaction, complex global properties emerge in the network: asymptotic convergence to an equilibrium typically dependent on the initial condition, correlation phenomena on several possible network length scales, local and global clustering phenomena. The course wants to give an introduction to some of the hottest and most promising research topics on dynamics over networks. The examples we have in mind and which we want to cover in this course include: epidemics diffusions, opinion spreading models in social and economic networks, cooperative algorithms over sensor networks (consensus), Bayesian learning and games over networks.

Course contents:


References: