Complex Network: Theory and Applications
Professor: Laura Hernandez

Summary

Networks Theory is a powerful mathematical tool devoted to the study of systems of interacting agents. These systems are ubiquitous, with applications in the study of natural, technological and social problems.

This course is addressed to young researchers, PhD or last year Master students interested in this rich and rapid developing field. It is thought to be interdisciplinary and it aims to introduce students to the foundations of Networks Theory.

Its goal is to provide students both with the necessary elements to understand the vast literature referring to Network Theory, as well as a toolbox of concepts and methods allowing them to easily model problems that can be put in terms of a set of interacting agents. It also provides the necessary knowledge to access to a more advanced course on recent advancements and ongoing research hot topics that cannot be addressed at this very short course, like Spatial Networks, Networks of Networks (Multiplexes and Multilayers), etc.

Bried Index
1. Introduction
2. The mathematics of networks
3. Network models I
4. Network models II
5. Recent interdisciplinary applications (Social Systems, Ecology, Economy)

Required Background

Linear algebra, elementary notions of differential equations, and probability theory