



Universiteit
Leiden



UNIVERSITEIT VAN AMSTERDAM

ABSTRACTS

Clara Stegehuis – Social Networks

Social networks are more popular than ever, and big companies like Facebook, Snapchat and Twitter know more and more about us. In this masterclass we investigate what big social networks like Facebook or Instagram look like, and we will find out how popular your friends are compared to yourself. We will also investigate why some posts can go viral on social media, and what this has to do with epidemic spreading.

Janusz Meylahn – Neural Networks

I will introduce the idea of processes on networks, give some illustrations and categorize them. Next I will shortly give an example of a stochastic/random process and ask the students to do a short computation. Synchronization is a phenomenon that is ubiquitous and can be modelled by interacting stochastic processes on networks. One model used in this regard is the Kuramoto model which I will define and give an explanation of. In the limit when the number of particles in this model goes to infinity we can think of the system as the evolution of a density. Lastly I will give an intuitive idea of what this model would do on the Hierarchical lattice.

Birgit Sollie - Networks in biology

During this lecture we will have a look at networks that appear in biology. In special the networks that exist in our cells, so called chemical reaction networks. We will learn how to draw these networks and how to use them to keep track of the chemical reactions that occur. At last, we will also see how we can represent chemical reaction networks using matrices and how we can use those to easily compute updates on the network.

Jan-Pieter Dorsman – Markov Chain

Google PageRank, the weather, the waiting lines in the airport and the shuffling of cards: all examples where the mathematical model of Andrej Markov is used. I will explain what this model entails and how it can be used to understand the situations mentioned above. We will see how networks and graph theory are hidden in these mathematical models!

