Prof. Pierre-Antoine ABSIL (Catholic University of Louvain, Belgium) will present a seminar entitled:

“Geometric methods for recommender systems”

Abstract:

The central topic of this talk is low-rank optimization, where the archetypal problem consists of minimizing a real-valued function defined on a set of matrices of fixed or bounded rank. The fact that the set of fixed-rank matrices admits Riemannian manifold structures endows the problem with a rich geometry. We will see how geometric concepts can be exploited to design efficient low-rank optimization methods. Upstream, this will lead us into the realm of Riemannian optimization. Downstream, we will glance through various applications of low-rank optimization, such as the maximal cut of a graph, sparse principal component analysis, and recommender systems, with an emphasis on the latter.

In recommender systems, a collection of items are available to users. For example, as popularized by the Netflix prize, the items can be movies and the users can be customers. Each customer has rated some movies, and the task is to predict how much the customers would like the movies they did not rate, so as to make a personalized recommendation. One popular model posits that the matrix of ratings is approximately low-rank. This results in the mathematical problem of finding a matrix of low rank that is optimal, in the sense that it agrees as well as possible (according to some criterion) with measured entries. We will see that, while the best known methods for recommender systems take the form of meta-algorithms that aggregate results provided by various techniques, low-rank optimization for recommender systems has recently made important progress and can provide a useful basis for better predictors.

This talk is based on joint work with Nicolas Boumal.

Lausanne, 24 April 2014/DK/cr