Efficient Constructions of Matchings for the Crossing Metric

Nabil Mustafa

Given a set system (X, S), constructing a matching of X with low crossing number with respect to S is a key tool in combinatorics and algorithms. In this talk I will present a new sampling-based algorithm which is applicable to finite set systems. As an immediate consequence, we get improved bounds for constructing low-crossing matchings for a slew of both abstract and geometric problems, including many basic geometric set systems. A major advantage of our method is its simplicity. An implementation of a variant of our algorithm in C++ is available on Github, and is the first implementation made possible for dimensions larger than two.

Joint work with Monika Csikos.