Similarity Detection for Rational Curves

Juan G. Alcázar, Carlos Hermoso
Universidad de Alcalá (Spain)

Georg Muntingh
University of Oslo (Norway)

juange.alcazar@uah.es

Abstract

In Pattern Recognition, there is a vast literature concerning the question how to detect whether two curves are *similar*. Essentially, the problem is to recognize a certain curve as the result of applying a movement to another curve in a database. Most of the strategies proposed so far deal with curves in implicit form, and ultimately resort to numerics to decide whether such curves are related by a similarity.

In this talk, we present a new, fast, and deterministic algorithm to address the problem in the case when the curves are defined by a rational parametrization in exact arithmetic. The algorithm does not require to compute or use implicit equations of the curves, and takes advantage of the fact that the curves are similar if and only if their parametrizations are related by means of a Möbius transformation. It has been implemented and tested in the `Sage` computer algebra system, and shows good performance for middle inputs.

Keywords
Pattern Recognition, Planar Rational Curves, Möbius transformation