Title: Descriptive and parameterized complexity

Author: Martin Grohe

Abstract: Descriptive Complexity Theory studies the complexity of problems of the following type:

Given a finite structure $A$ and a sentence $S$ of some logic $L$, decide if $A$ satisfies $S$?

In this survey we discuss the parameterized complexity of such problems. Basically, this means that we ask under which circumstances we have an algorithm solving the problem in time $f(S)||A||^c$, where $f$ is a computable function and $c>0$ a constant. We argue that the parameterized perspective is most appropriate for analyzing typical practical problems of the above form, which appear for example in database theory, automated verification, and artificial intelligence.