

Computations in tropical algebraic geometry

Anders Nedergaard Jensen^a

^aInstitut für Mathematik, MA 4-5, Technische Universität Berlin, 10623 Berlin, Germany

The image of an algebraic variety under the coordinatewise valuation map from the field of Puiseux series to the rational numbers is a polyhedral complex called a tropical variety. While most information is lost when going from an algebraic variety to this tropical shadow some information such as the dimension is preserved. A first step in finding a Puiseux series point on a variety is to compute its tropical variety and thus tropical geometry tells us which Puiseux series solutions may exist. Tropical geometry is interesting in its own right and in some cases leads to faster algorithms than traditional methods. In tropical algebraic geometry two kinds of computations appear. One is purely polyhedral concerned with Minkowski sums of Newton polytopes while the other is in commutative algebra taking cancellation of terms into account. In this talk we give an overview of tropical geometry algorithms while also mentioning how tropical geometry has been applied outside its field.