

Martin Ulirsch (Frankfurt)

From algebraic to tropical divisors (and back again)

Abstract

Tropical geometry is a framework to formalize many of the combinatorial gadgets associated to degenerations and compactifications of algebraic varieties. Its main new insight is to think about these as objects of geometric inquiry themselves and to study their properties by what is true in algebraic geometry. This talk will give an introduction to tropical geometry guided by the analogy between Riemann surfaces and tropical curves and, in particular, their respective divisor theories.

Its main topic will be the process of tropicalization, i.e. the process of going from a divisor on a Riemann surface to a divisor on an associated tropical curve, and on the so-called realizability problem, i.e. the problem of deciding which tropical divisors are the tropicalization of algebraic divisors of the same rank and multiplicity profile. In particular, I will outline a complete solution to this problem for effective canonical divisors as well as, given time, a partial solution for principal divisors.

This talk is based on joint work with Madeline Brandt, Bo Lin, Martin Moeller, Annette Werner, and Dmitry Zakharov.