TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

PhD Course 2026

Titolo: " **Applications of tropical geometry to classical enumerative questions"**

SPEAKER/LECTURER: Algelica Cueto (Ohio State University)

Organizing Committee: Filippo Viviani

Period and schedule:

First lecture: Friday 6 March, from 11:30-13, Room D'Antoni (Math

Department, Tor Vergata University).

Other lectures: the other three lectures will be decided together with the interested students.

Conference Room: 1101 "C. D'Antoni"

ABSTRACT

Tropical Geometry has been the subject of great amount of activity over the last two decades sparked by its application to enumerative geometry. Loosely speaking, it can be described as a piecewise-linear version of algebraic geometry. It is based on tropical algebra, where the sum of two numbers is their maximum and the product is their sum. This turns polynomials into piecewise-linear functions, and their zero sets into polyhedral complexes. The combinatorial structure of these tropical varieties retains a surprising amount of geometric information about their classical counterparts.

In this course, we will give an introduction to the subject, focusing on how it can be used to recover three classical results from the 19th century: (1) Pluecker's Theorem on the 28 bitangent lines to smooth quartic complex plane curves, (2) Coble's Theorem on the 120 tritangent planes to smooth sextic curves in projective space, and (3) Cayley-Salmon's Theorem on the 27 lines on smooth cubic complex surfaces in projective space.