Bern-Fribourg Graduate Seminar

a seminar for Master and PhD students

Thursday 26th February, 2026: 16:15 - 17:00

Room 2.52, Pérolles 08, Fribourg

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On the geometric degree of the tangent bundle

Abstract

An essential invariant related to the geometric complexity of an algebraic variety $V \subseteq \mathbb{A}^n$ is its geometric degree, $\deg(V)$, which roughly measures how twisted the variety is. This invariant plays a key role in the complexity analysis of algorithmic procedures for solving polynomial systems.

In the context of differential elimination, the prolongation–projection method introduced by Cartan and Kuranishi naturally involves tangent spaces. In algebraic geometry, the tangent bundle of a variety encodes first–order information about its geometry and provides a bridge between algebraic and differential viewpoints. It is therefore natural, in order to understand the complexity of such procedures, to estimate the geometric degree of the tangent bundle of a smooth algebraic variety.

In this talk, we introduce the notion of geometric degree and survey existing results, bounds, and techniques for estimating the degree of the tangent bundle of a smooth algebraic variety.