Speaker: Benjamin Matschke

Title: Proofs by example

Abstract: We study the proof scheme "proof by example" in which a general statement can be proved by verifying it for a single example. This strategy can indeed work if the statement in question is an algebraic identity and the example is "generic". This talk addresses the problem of constructing a *practical* example, which is sufficiently generic, for which the statement can be verified efficiently, and which even allows for a numerical margin of error. Our method is based on diophantine geometry, in particular an arithmetic Bézout theorem, an arithmetic Nullstellensatz, and a new effective Liouville-Łojasiewicz type inequality for algebraic varieties. As an application we discuss theorems from plane geometry and how to prove them by example.