On the solutions of very general planar algebraic vector fields

Abstract
It is a theorem from Landis and Petrovskii from the fifties that the only algebraic solutions of a very general planar algebraic vector field are the stationary solutions. The non-stationary solutions of a very general vector field are therefore given by transcendental functions but few things are known about the nature of these transcendental functions. For example, can they be expressed using only “classical” transcendental functions such as exponentials, logarithms, Weierstrass's elliptic functions? In my talk, I will describe a stronger non-integrability result (irreducibility in the sense of Painlevé-Umemura) for very general planar algebraic vector fields of degree greater or equal to three, based on a combination of methods from model-theory and from the local theory of vector fields singularities.