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Patrick Speissegger* (speisseg@math.mcmaster.ca), McMaster University, Mathematics and Statistics Department, 1280 Main Street, Hamilton, ON L8S4K1, Canada. *O-minimality and Hilbert's 16th problem.*

Let F be the family of all polynomial vector fields of degree d in the plane. Hilbert's 16th problem conjectures that there is a finite bound on the number of limit cycles of the vector fields belonging to F . This as yet open problem (if d is at least 2) has a tantalizingly model-theoretic flavor, but no model-theoretic framework has been discovered so far to capture it. On the other hand, Roussarie's finite cyclicity conjecture reduces the problem to a localized (in the parameter space) one. In recent joint work with Kaiser and Rolin, we used o-minimality (a branch of model theory) to establish Roussarie's conjecture in a very special case. Our hope is to extend our approach to a generic case of this conjecture. I will give a survey of the result in the special case and of some of the difficulties we encounter in the generic case. (Received September 20, 2010)