

Persistence problems for polynomial foliations, simultaneous uniformization and identical cycles at infinity

The following two problems are amidst the most challenging in the theory of complex foliations. *Do the complex limit cycles of a polynomial foliation in the plane persist under the parameter change? May the Poincare map of a generic polynomial foliation be in a sense globally extended?* These problems are closely related with the following simultaneous uniformization problem: *Do the leaves of the planar polynomial foliation admit a uniformization that depends holomorphically on the initial condition?* Closely related is the following problem going back to Anosov: *Is it correct that the generic polynomial foliation has no identical complex cycles?* The affirmative answer is supported by the following result of Pyartli and the speaker: *Generic polynomial foliation has no identical cycle at infinity (1995)*