

Center Conditions and Cyclicity for Generic Planar Polynomial Vector Fields

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Abstract

We study the center-focus problem for planar polynomial vector fields, which can be viewed as a local version of Hilbert's 16th problem. Based on a Lyapunov function approach, we establish novel results regarding the center-focus conditions. More precisely, under generic conditions, and for any degree of a polynomial vector field, we find an upper bound on the size of the Bautin ideal generated by the Lyapunov constants. This also provides an upper bound on the cyclicity of the systems we consider. This is joint work with Yovani Villanueva, Universidade Federal de Goiás, Goiás, Brasil.