



The 16th Hilbert Problem for Discontinuous Piecewise Linear Differential Systems Separated by the Algebraic Curve $y = x^n$

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Abstract

We consider planar piecewise discontinuous differential systems formed by either linear centers or linear Hamiltonian saddles and separated by the algebraic curve $y = x^n$ with $n \geq 2$. We provide in a very short way an upper bound of the number of limit cycles that these differential systems can have in terms of n , proving the extended 16th Hilbert problem in this case. In particular, we show that for $n = 2$ this bound can be reached.

Keywords Non-smooth differential system · Limit cycle · Discontinuous piecewise linear differential system · Linear centers · Linear Hamiltonian saddles

Mathematics Subject Classification Primary 34A30 · 34C05 · 34C25 · 34C07 · 37G15

1 Introduction and Statement of the Main Result

The dynamics of piecewise linear differential systems started with Andronov et al [1] in 1930. Since then and taking into account that they are used to model many phenomena in mechanics, electronics, economy, neuroscience,...., see for more details the papers [3, 18, 20, 21, 36, 38, 40, 42, 43] and the references therein.

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