



Limit cycles of a continuous piecewise differential system formed by a quadratic center and two linear centers

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Abstract

The study of limit cycles of planar differential systems is one of the main and difficult problems for understanding their dynamics. Thus the objective of this paper is to study the limit cycles of continuous piecewise differential systems in the plane separated by a non-regular line Σ . More precisely, we show that a class of continuous piecewise differential systems formed by an arbitrary quadratic center, an arbitrary linear center and the linear center $\dot{x} = -y$, $\dot{y} = x$ have at most two crossing limit cycles and we find examples of such systems with one crossing limit cycle. So we have solved the extension of the 16th Hilbert problem to this class of piecewise differential systems providing an upper bound for its maximum number of limit cycles.

Keywords Limit cycles · Linear center · Quadratic center · Continuous piecewise differential systems · First integrals

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