Limit Cycles for Piecewise Linear Differential Systems via Poincaré–Miranda Theorem



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Abstract In Gasull and Mañosa (Periodic orbits of discrete and continuous dynamical systems via Poincaré–Miranda theorem, Preprint 2018 [2]), we develop an effective procedure to prove the existence, determine the number, and locate periodic orbits of dynamical systems of both discrete and continuous nature. It is based on the use of the Poincaré–Miranda theorem. This note presents one of the results obtained in that paper: a new example of piecewise linear differential system with three limit cycles.

1 Introduction and Main Result

The study of the number of limit cycles for planar differential systems is a classical topic in the theory of dynamical systems. In the past years, many attention has been devoted to the study of nested limit cycles of piecewise linear systems, steered by the applicability of these systems in the modelling of biological and mechanical applications. In 2012, S.M. Huan and X.S. Yang gave numerical evidences of a piecewise linear system with two zones and a discontinuity straight line, having three nested limit cycles [3]. A proof based on the Newton–Kantorovich theorem of the existence

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