THREE NESTED LIMIT CYCLES IN DISCONTINUOUS PIECEWISE LINEAR DIFFERENTIAL SYSTEMS WITH TWO ZONES

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Abstract. In this paper we study a planar piecewise linear differential system formed by two regions separated by a straight line so that one system has a real unstable focus and the other a virtual stable focus which coincides with the real one. This system was introduced in a very recent paper (On the number of limit cycles in general planar piecewise linear systems, *Discrete and Continuous Dynamical Systems-A* **32**, 2012, pp. 2147–2164) by S.-M. Huan and X.-S. Yang, who numerically showed that it can exhibit 3 limit cycles surrounding the real focus. This is the first example that a non-smooth piecewise linear differential system with two zones can have 3 nested limit cycles of crossing type surrounding a unique equilibrium. We provide a rigorous computer assisted proof of the quoted numerical result.

Keywords. non–smooth differential system, limit cycle, piecewise linear differential system.

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References


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