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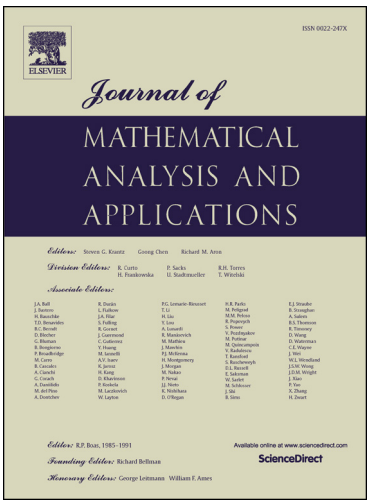

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On the number of limit cycles for a class of discontinuous quadratic differential systems

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Abstract The present paper is devoted to the study of the maximum number of limit cycles bifurcated from the periodic orbits of the quadratic isochronous center $\dot{x} = -y + \frac{16}{3}x^2 - \frac{4}{3}y^2, \dot{y} = x + \frac{8}{3}xy$ by the averaging method of first order, when it is perturbed inside a class of discontinuous quadratic polynomial differential systems. The *Chebyshev criterion* is used to show that this maximum number is 5 and can be realizable. In some sense, the result and that in paper [8] also answer the questions left in the paper [9].

Mathematics Subject Classification: Primary 34A36, 34C07, 37G15.

Keywords: Limit cycle; Discontinuous differential system; Averaging method; Isochronous center; Chebyshev criterion.

1 Introduction and statement of the main result

It is well known that one of the important open problems in the qualitative theory of real planar differential systems is the study of limit cycles. For about one century, scholars focus on the bifurcation of limit cycles in the continuous planar polynomial differential systems, see [1, 2, 3, 4, 5, 6, 7, 12, 13, 15] and the references therein. Nevertheless, it is still open even for the quadratic cases. In recent years, stimulated by the discontinuous phenomena in the real world, a great interest in the limit cycles of discontinuous planar polynomial differential systems has emerged, see for instance [8, 9, 10] etc.

Recall that Loud first classified the quadratic polynomial differential systems

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