

## Uniqueness of Algebraic Limit Cycles for Quadratic Systems<sup>1</sup>

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We know five different families of algebraic limit cycles in quadratic systems, one of degree 2 and four of degree 4. Moreover, if there are other families of algebraic limit cycles for quadratic systems, then their degrees must be larger than 4. It is known that if a quadratic system has an algebraic limit cycle of degree 2, then this is the unique limit cycle of the system. The first main goal of this paper is to prove that if a quadratic system has an algebraic limit cycle of degree  $\leq 4$ , then this is the unique limit cycle of the system. For the Yablonskii and Filippov algebraic limit cycles the problem of proving their uniqueness has been open since 1966 and 1973, respectively. The second main goal is to provide sufficient conditions in order that all the limit cycles of a quadratic system to be algebraic.

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