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Bifurcation of Limit Cycles from a Polynomial Degenerate Center

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Abstract

Using Melnikov functions at any order, we provide upper bounds for the maximum number of limit cycles bifurcating from the period annulus of the degenerate center $\dot{x} = -y((x^2 + y^2)/2)^m$ and $\dot{y} = x((x^2 + y^2)/2)^m$ with $m \geq 1$, when we perturb it inside the whole class of polynomial vector fields of degree n. The positive integers m and n are arbitrary. As far as we know there is only one paper that provide a similar result working with Melnikov functions at any order and perturbing the linear center $\dot{x} = -y$, $\dot{y} = x$.

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