Limit Cycles Bifurcating from a *k*-dimensional Isochronous Center Contained in \mathbb{R}^n with $k \leq n$

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Abstract The goal of this paper is double. First, we illustrate a method for studying the bifurcation of limit cycles from the continuum periodic orbits of a *k*-dimensional isochronous center contained in \mathbb{R}^n with $n \ge k$, when we perturb it in a class of C^2 differential systems. The method is based in the averaging theory. Second, we consider a particular polynomial differential system in the plane having a center and a non-rational first integral. Then we study the bifurcation of limit cycles from the periodic orbits of this center when we perturb it in the class of all polynomial differential systems of a given degree. As far as we know this is one of the first examples that this study can be made for a polynomial differential system having a center and a non-rational first integral.

Keywords Limit cycle · Periodic orbit · Center · Isochronous center · Averaging method · Generalized Abelian integral

Mathematics Subject Classifications (2000) 34C29 · 34C25 · 47H11

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