Gao, Jing; Zhao, Yulin
Revisiting limit cycles for 3-monomial differential equations. (English) [Zbl 1453.34038]

In the paper [A. Gasull et al., J. Math. Anal. Appl. 428, 735–749 (2015; Zbl 1323.34037) it was shown that there exists a system of type

\[ \dot{z} = (a + i)z + (b + i)z|z|^{2(p-2)} - 5i/2z^{p-1}, \]

with \( a, b \in \mathbb{R}, 3 \leq p \leq N \) having at least \( p \) limits cycles. By introducing the bifurcation parameter \( \varepsilon \) in the following way \( a = \varepsilon \alpha \) and \( b = \varepsilon \beta \) the bifurcation of these limits cycles from \( p \) annuli of the unperturbed system was proved.

In this paper, the authors continue such investigation and prove that for each \( 3 \leq p \leq N \), there is above mentioned class of systems having at least \( p + 1 \) limit cycles. The method involved is to perturb the symmetric Hamiltonian systems having maximal number of centers. In this paper they also study the bifurcations of limit cycles from the symmetric planar Hamiltonian systems by studying an abelian integral.

Reviewer: Alexander Grin (Grodno)

MSC:
34C05 Topological structure of integral curves, singular points, limit cycles of ordinary differential equations
34C14 Symmetries, invariants of ordinary differential equations
34C08 Ordinary differential equations and connections with real algebraic geometry (fewnomials, desingularization, zeros of abelian integrals, etc.)

Keywords:
limit cycles; abelian integrals; coexistence of limit cycles; \( \mathbb{Z}_q \)-equivariant symmetry

Full Text: DOI

References:


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