Gasull, A.; Geyer, A.; Mañosas, F.
A Chebyshev criterion with applications. (English) [Zbl 1446.34049]
J. Differ. Equations 269, No. 9, 6641-6655 (2020).

The authors prove that a family of certain definite integrals forms a Chebyshev system if two families of associated functions appearing in their integrands are Chebyshev systems as well. Then, they apply this criterion to determine bounds on the number of isolated periodic solutions of several perturbed differential equations. To sum up, the analysis in this paper is skillful and interesting and the results are useful in studying the second part of Hilbert’s 16th problem.

Reviewer: Jihua Yang (Guyuan)

MSC:
34C05 Topological structure of integral curves, singular points, limit cycles of ordinary differential equations
41A50 Best approximation, Chebyshev systems
34C07 Theory of limit cycles of polynomial and analytic vector fields (existence, uniqueness, bounds, Hilbert’s 16th problem and ramifications) for ordinary differential equations
34C23 Bifurcation theory for ordinary differential equations
34C08 Ordinary differential equations and connections with real algebraic geometry (fewnomials, desingularization, zeros of abelian integrals, etc.)

Keywords:
Chebyshev system; bifurcation of limit cycles; abelian integral; Melnikov function

Full Text: DOI

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