A second order analysis of the periodic solutions for nonlinear periodic differential systems with a small parameter

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We deal with nonlinear T–periodic differential systems depending on a small parameter. The unperturbed system has an invariant manifold of periodic solutions. We provide the expressions of the bifurcation functions up to second order in the small parameter in order that their simple zeros are initial values of the periodic solutions that persist after the perturbation. In the end two applications are done. The key tool for proving the main result is the Lyapunov–Schmidt reduction method applied to the T–Poincaré–Andronov mapping. The results presented here are extensions to more general cases of the results from [1].

References

[1] A. Buică, J. Giné and J. Llibre,*A second order analysis of the periodic solutions for nonlinear periodic differential systems with a small parameter*, Physica D **241** (2012), 528–533.