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Bifurcation of nonlinear equations. I: Steady state bifurcation. (English) Zbl 1095.47027
Methods Appl. Anal. 11, No. 2, 155-178 (2004).

[Part 2 appeared *ibid.*, 179–210 (1994; [Zbl 1095.47028](#)), see the following review.]

The main goal of the present article is to give bifurcation existence criteria when the eigenvalue of the completely continuous field in linearizations has even algebraic multiplicity. The results are based on the observation that for a class of nonlinearities, called k -th ($k > 2$) order nondegenerate singularities, the degree at the critical parameter is even, creating the discrepancy of the degree, and leading to bifurcation.

Reviewer's remark: The most general existence theorem for bifurcation near an eigenvalue of odd algebraic multiplicity was proved by *V. A. Trenogin* and *N. A. Sidorov* ["An investigation of the bifurcation point and nontrivial branches of solutions for nonlinear equations", *Diff. Integral Equations*, Irkutsk Gos. Univ., Irkutsk, No. 1, 216–248 (1972; [MR 52 #1446](#))]; *N. A. Sidorov* ["General regularization questions in problems of branching theory" (Russian) (*Irkutsk Gos. Univ., Irkutsk*) (1982; [Zbl 0703.58002](#))]; *N. A. Sidorov, B. V. Loginov, A. V. Sinitsyn* and *M. V. Falaleev* ["Lyapunov–Schmidt methods in nonlinear analysis and applications" (*Math. Appl.* 550, *Kluwer Acad. Publ., Dordrecht*) (2002; [Zbl 1027.47001](#))].

Reviewer: [Irina V. Konopleva \(Ul'yanovsk\)](#)

MSC:

[47J15](#) Abstract bifurcation theory involving nonlinear operators

[58E07](#) Variational problems in abstract bifurcation theory in infinite-dimensional spaces

[34C23](#) Bifurcation theory for ordinary differential equations

[35J25](#) Boundary value problems for second-order elliptic equations

Cited in **2** Reviews
Cited in **4** Documents

Keywords:

steady-state bifurcation; eigenvalues with even multiplicity; transcritical bifurcation; saddle-node bifurcation; spectral theorem

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