Lyapunov coefficients for Hopf bifurcations in systems with piecewise smooth nonlinearity.

Authors’ abstract: In this paper, we provide explicit formulas for the analogues of the first Lyapunov coefficient in systems with regular linear term and Lipschitz continuous but only piecewise smooth nonlinear terms, with jumps in derivatives across switching surfaces. We also discuss codimension-one degeneracies and the second Lyapunov coefficient.

Reviewer: Yun Tian (Shanghai)

MSC:
34C23 Bifurcation theory for ordinary differential equations
34A36 Discontinuous ordinary differential equations
34C05 Topological structure of integral curves, singular points, limit cycles of ordinary differential equations
34C20 Transformation and reduction of ordinary differential equations and systems, normal forms
34C45 Invariant manifolds for ordinary differential equations

Keywords:
degenerate Andronov-Hopf bifurcation; nonsmooth systems; normal form; invariant manifolds

Software:
AUTO

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References: