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ORIGINAL PAPER

Limit cycles for two classes of control piecewise linear differential systems

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Abstract
We study the bifurcation of limit cycles from the periodic orbits of $2n$–dimensional linear centers $\dot{x} = A_0 x$ when they are perturbed inside classes of continuous and discontinuous piecewise linear differential systems of control theory of the form $\dot{x} = A_0 x + \varepsilon(Ax + \phi(x_1)b)$, where ϕ is a continuous or discontinuous piecewise linear function, A_0 is a $2n \times 2n$ matrix with only purely imaginary eigenvalues, ε is a small parameter, A is an arbitrary $2n \times 2n$ matrix, and b is an arbitrary vector of $\mathbb{R}^n$.

Keywords Limit cycles · Discontinuous piecewise linear differential system · Bifurcation

Mathematics Subject Classification Primary 58F15 · 58F17; Secondary 53C35

1 Introduction and statement of the main results

In control theory it is relevant to study the *continuous piecewise linear differential systems* of the form

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