عنوان مقاله:

Dynamics of a harmonic oscillator perturbed by a non-smooth velocity-dependent damping force

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خلاصه مقاله:

This paper studies the dynamics of a non-smooth vibrating system of the Filippov type. The main focus is on investigating the stability and bifurcation of a simple harmonic oscillator subjected to a non-smooth velocity-dependent damping force. In this way, we can analyze the effects of damping on the system's vibrations. For this purpose, we will find a parametric region for the existence of generalized Hopf bifurcation, in order to compute a branch of periodic orbits for the system. The tool for our purpose is the theoretical results about generalized Hopf bifurcation for planar Filippov systems. Some numerical simulations as examples are given to illustrate our theoretical results. Our theoretical and numerical findings indicate that the harmonic oscillator can experience different kinds of vibrations, in the presence of a non-smooth damping.

کلمات کلیدی:

Velocity-dependent damping, Non-smooth dynamical systems, Generalized Hopf bifurcation, Vibrations, Nonlinear oscillator