

BIFURCATIONS OF LIMIT CYCLES IN PIECEWISE SMOOTH HAMILTONIAN SYSTEM WITH BOUNDARY PERTURBATION

NANASAHEB PHATANGARE, SUBHASH KENDRE* AND KRISHNAT MASALKAR

Abstract. In this paper, the general planar piecewise smooth Hamiltonian system with period annulus around the center at the origin is considered. We obtain the expressions for the first order and the second-order Melnikov functions of its general second-order perturbation, which can be used to find the number of limit cycles bifurcated from periodic orbits. Further, we have shown that the number of limit cycles of the system $\dot{X} = \begin{cases} (H_y^+, -H_x^+) & \text{if } y > \varepsilon f(x) \\ (H_y^-, -H_x^-) & \text{if } y < \varepsilon f(x) \end{cases}$ equal to the number of positive zeros of f when at $\varepsilon = 0$, the system has a period annulus around the origin.

Mathematics subject classification (2020): 34C07, 34C23, 34C25, 34D10, 34D30, 37D10, 37G15.

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