GEOMETRIC METHOD FOR FREE OSCILLATOR UNDER TWO PARAMETRIC PERTURBATION

Z. AFSHARNEZHAD
DEPT.OF APPLIED MATH. FERDOWSI UNIVERSITY OF MASHHAD
MASHHAD, IRAN
E-MAIL: AFSHARNEZHAD@MATH.UM.AC.IR

Abstract. The free oscillation is the harmonic at which any body tends to vibrate most freely . By geometric method of the theory of bifurcation , refined and developed of the Melnikov function; we prove the existence of the periodic orbit for the free oscillator under two parametric perturbation. In fact we use the geometric method of multi-parameter bifurcation theory in order to prove the persistence of the periodic orbit. By this method we consider the effect of forcing and nonlinear damping on the free oscillator simultaneously. Also we consider the effect of detuning on the system. At the end we apply the method on the forced Rayleigh equation.

AMS Classification: 34C15

Keywords: Perturbation and Bifurcation theory, Damping, Free oscillator.