Turkish Journal of Physics

phys@tubitak.gov.tr

Scientific Journals Home Page

Multiple Scale and Hamilton-Jacobi Analysis of Extended Mathieu Equation

Özlem YEŞİLTAŞ, Mehmet ŞİMŞEK
Gazi University, Faculty of Arts and Science, Department of Physics
06500, Teknikokullar, Ankara-TURKEY
e-mail: yesiltas@gazi.edu.tr
e-mail: msimsek@gazi.edu.tr

Abstract: In this study, we use perturbation approximations and semiclassical methods to investigate the boundary solutions of non-linear vibrating systems. The extended Mathieu Equation, related to the perturbed Van der Pol oscillator with periodic coefficients, is solved using multiple time scales. Then, using the Von Zeipel Method, which is based on the Hamilton-Jacobi theory, stability conditions are presented. It is shown that the stability boundaries are the same with those obtained by both methods.

Key Words: Van der Pol, multiple scale, Von Zeipel, hamiltonian.