

Limit Cycles for a Mechanical System Coming from the Perturbation of a Four-Dimensional Linear Center

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We study the bifurcation of limit cycles from the periodic orbits of a four-dimensional center in a class of differential systems coming from the Mechanics. The tool for proving these results is the averaging theory.

KEY WORDS: Limit cycle; periodic orbit; center; averaging method.

1991 MATHEMATICS SUBJECT CLASSIFICATION: 34C29; 34C25; 47H11.

1. INTRODUCTION

The goal of this paper is to study the existence of limit cycles of the mechanical system of the form

$$\ddot{x} + x = \varepsilon f(x, y), \quad \ddot{y} + y = \varepsilon g(x, y),$$

for small values of the parameter ε . Of course, this system is equivalent to the Four-dimensional system

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