

TWO HOMOCLINIC ORBITS FOR SOME SECOND-ORDER HAMILTONIAN SYSTEMS

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ABSTRACT. This paper is concerned with the existence of homoclinic orbits for a class of second order Hamiltonian systems considering a non-periodic potential and a weaker Ambrosetti–Rabinowitz condition. By considering an auxiliary problem, we show the existence of two different approximative sequences of periodic solutions, the first one of mountain pass type and the second one of local minima. We obtain two different homoclinic orbits by passing to the limit in such sequences. As a relevant application, we obtain another homoclinic solution for the Hamiltonian system studied in [5].

1. Introduction

The complex dynamical behavior of Hamiltonian systems has attracted mathematicians and physicists ever since Newton wrote the differential equations describing planetary motions and derived Kepler’s ellipses as solutions.

It is well known that the existence of homoclinic solutions for Hamiltonian systems and their importance in the study of the behavior of dynamical systems

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