

Periodic Solutions in the Hénon-Heiles Rotating System

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SUMMARY

Hénon–Heiles system is probably one of the most studied dynamical systems, because it can be used to model different physical problems and also to highlight different properties inherent to most of two degrees of freedom nonlinear Hamiltonian systems. It arose as a simple model to find additional conservation laws in galactic potentials with axial symmetry [1]. In the context of galactic dynamics, to study stellar orbits, the rotation of the galaxy must be taken into account [2] so that it makes sense to consider a generalized Hénon-Heiles system in a rotating frame. Our aim is to prove the existence of periodic orbits in a neighborhood of the origin for appropriate values of the rotating frequency. To this end, we use normal form theory to demonstrate that the number of periodic orbits is in correspondence with the equilibrium solutions of the original system, with the same type of stability.

Keywords: Generalized Hénon-Heiles system, periodic orbits, normal forms

AMS Classification: 70H08, 70H09, 70H12, 70H15, 34C25, 37C27

References

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