

# SYMMETRIC PERIODIC ORBITS FOR THE COLLINEAR 3-BODY PROBLEM VIA THE CONTINUATION METHOD

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## Abstract

In this paper we give a brief description of the well known continuation method of Poincaré for autonomous differential systems. This method provides sufficient conditions under which a known periodic orbit of a system of differential equations depending on a small parameter can be continued in the parameter. Then we apply the method to study the families of symmetric periodic orbits of the collinear 3-body problem when the two non-central masses are sufficiently small.

**Keywords:** Continuation method, symmetric periodic orbits, collinear 3-body problem.

## 1. Introduction

In the study of any dynamical system and, in particular, in the study of the dynamical systems associated to the  $n$ -body problem, it is very important to know the existence, stability and bifurcation of periodic orbits. Over the years many different methods have been used to establish the existence and the nature of periodic solutions of the  $n$ -body problem (for instance the continuation method of Poincaré, averaging theory, Lagrangian manifold intersection theory, normal forms, numerical anal-