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# Implementation of a new algorithm of computation of the Poincaré–Liapunov constants

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## Abstract

In the last years many papers giving different methods to compute the Poincaré–Liapunov constants have been published. In (Appl. Math. Warsaw 28 (2002) 17) a new method to compute recursively all the Poincaré–Liapunov constants as a function of the coefficients of the system for an arbitrary analytic system which has a perturbed linear center at the origin was given, and thus a theoretical answer to the classical center problem was given. The method also computes the coefficients of the Poincaré series as a function of the same coefficients. We describe its implementation in two different ways, by means of a computer algebra system and an algorithm in any computer language. If this second alternative is used, later it is necessary to translate the results so that they can be manipulated with a computer algebra system. We describe also how the availability of symbolic manipulation procedures has recently led to a significant progress in the resolution of the different problems related with the Poincaré–Liapunov constants as they are the central problems like the small-amplitude limit cycles.

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## 1. Introduction

Many models of nature use differential equation systems in the plane and with the qualitative theory of differential equations introduced by Poincaré, the behavior of these systems in the majority

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