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ISOCHRONOUS CENTERS OF A LINEAR CENTER PERTURBED BY FOURTH DEGREE HOMOGENEOUS POLYNOMIAL (*)

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ABSTRACT. – In this work we study isochronous centers of two-dimensional autonomous system in the plane with linear part of center type and non-linear part given by homogeneous polynomials of fourth degree. We first found necessary conditions for such isochronous center in polar coordinates. Finally we give a proof of the isochronicity of these systems using different methods. © Elsevier, Paris

1. Introduction

We consider the system

$$\begin{aligned} \dot{x} &= -y + X_s(x, y), \\ \dot{y} &= x + Y_s(x, y), \end{aligned} \tag{1.1}$$

where $X_s(x, y)$ and $Y_s(x, y)$ are homogeneous polynomials of degrees s, with $s \geq 2$.

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