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Qualitative Theory of Dynamical Systems

Centers for Trigonometric Abel Equations

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Abstract In this paper we introduce the notion of strongly persistent centers, together with the condition of the annulation of some generalized moments, for Abel differential equations with trigonometric coefficients as a natural candidate to characterize the centers of composition type for these equations. We also recall several related concepts and discuss the differences between the trigonometric and the polynomial cases.

Keywords Periodic orbits · Centers · Trigonometric Abel equation · Moments · Persistent centers

Mathematics Subject Classification (2000) 39C25 · 37C27

1 Introduction

Consider planar systems of differential equations of the form

$$\begin{aligned} \frac{dx}{dt} &= -y + P(x, y), \\ \frac{dy}{dt} &= x + Q(x, y), \end{aligned} \tag{1}$$

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