



New family of cubic Hamiltonian centers

Martín-Eduardo Frías-Armenta¹ ·
Jaume Llibre²

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Abstract We characterize the 11 non-topological equivalent classes of phase portraits in the Poincaré disc of the new family of cubic polynomial Hamiltonian differential systems with a center at the origin and Hamiltonian

$$H = \frac{1}{2}((x + ax^2 + bxy + cy^2)^2 + y^2),$$

with $a^2 + b^2 + c^2 \neq 0$.

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1 Introduction

For a given family of real planar polynomial differential systems depending on parameters one of the main problems is the characterization of their centers and their phase portraits. The notion of *center* goes back to Poincaré in [16]. He defined it for differ-

✉ Martín-Eduardo Frías-Armenta
martineduardofrias@gmail.com; eduardo@gauss.mat.uson.mx
Jaume Llibre
jllibre@mat.uab.cat

¹ Departamento de Matemáticas, Universidad de Sonora, Hermosillo, Mexico

² Departament de Matemàtiques, Universitat Autònoma de Barcelona, Bellaterra, 08193 Barcelona, Catalonia, Spain