PERGAMON

Nonlinear Analysis 39 (2000) 351–363

Nonlinear Analysis

www.elsevier.nl/locate/na

Phase portraits of planar semi-homogeneous vector fields (II)

Laurent Cairó [a], Jaume Llibre [b,*,1]

[a] *MAPMO-UMR 6628, Département de Mathématiques, Université d'Orleans, BP 6759, 45067 Orléans, Cedex 2, France*

[b] *Departament de Matemàtiques, Universitat Autònoma de Barcelona, 08193 – Bellaterra, Barcelona, Spain*

Received 12 March 1997; accepted 24 October 1997

Keywords: Phase portraits; Semi-homogeneous systems; Cubic systems

1. Introduction

Let P and Q be real homogeneous polynomials in the variables x and y of degrees m and n, respectively. Then we say that $X=(P,Q):\mathbf{R}^2\to\mathbf{R}^2$ is a *semi-homogeneous polynomial vector field*, in particular if $m=n$, X is a *homogeneous polynomial vector field.*

The case $m=n$ has been studied by several authors. The homogeneous quadratic polynomial vector fields ($m=n=2$) by Lyagina [18], Markus [19], Korol [12], Sibirskii and Vulpe [22], Newton [21], Date [10] and Vdovina [23]; the homogeneous cubic polynomial vector fields ($n=m=3$) by Cima and Llibre [6]; the general case $m=n$ by Argemí [3], Cima and Llibre [6], Collins [9], Llibre, Pérez del Río and Rodriguez [15, 16]. In these papers is described an algorithm for studying the phase portraits of homogeneous polynomial vector fields for all degree $m=n$, the classification of all phase portraits of homogeneous polynomial vector fields of degree 2 and 3, the algebraic classifications of homogeneous polynomial vector fields and the characterization of structurally stable homogeneous and semi-homogeneous polynomial vector fields. In a previous paper [5], we study the phase portraits of the semi-homogeneous vector fields with $m=1$ and $n=2$.

* Corresponding author. E-mail: jllibre@mat.uab.es.

[1] The second author is partially supported by a DGICYT grant number PB96-1153.

PII: S0362-546X(98)00177-1