QUADRATIC INTEGRABLE CHORDAL SYSTEMS

J. CHAVARRIGA, I.A. GARCÍA AND J. GINÉ

Departament de Matemàtica. Universitat de Lleida. Pl. Victor Siurana, 1. 25003 Lleida, SPAIN.

Introduction

In this work we study sufficient conditions for the integrability of two-dimensional polynomial differential systems of degree two without finite critical points. First of all we need some definitions.

We consider *polynomial systems*, i.e. two–dimensional autonomous systems of differential equations of the form

$$\begin{aligned} \dot{x} &= P(x,y) = \sum_{i+j=0}^{n} a_{ij}x^i y^j \ , \\ \dot{y} &= Q(x,y) = \sum_{i+j=0}^{n} b_{ij}x^i y^j \ , \end{aligned} \tag{1}$$

being $\dot{} = \frac{\mathrm{d}}{\mathrm{d}t}$, $(x,y) \in \mathbb{R}^2$ and where P and Q are real polynomials such that $\max\{ \deg P, \deg Q\} = n$.

Definition 1 *If a differential system has no finite critical points, then it will be called* chordal system.

The chordal systems were studied by Kaplan [6], [7]. The name of chordal system is due to the fact that a such system has all its solutions starting and endding at the equator of the Poincaré sphere (see [5] or [9]).

A non singular differential equation in two real variables defines a foliation of the plane. It is well known that the topological classification of such foliations depends only of the number of inseparable leaves and the way they are distributed in the plane (see [6]). Two leaves (or trajectories) L_1 and L_2 are said to be *inseparable* if for any arcs T_1 and T_2 respectively transversal to L_1 and L_2 there