Publicacions més rellevants de la línia de recerca:

Problema de la integrabilitat i problema del centre en sistemes diferencials en el pla.

Referència: García, I.A., Giné, J. Non-algebraic invariant curves for polynomial planar vector fields. *Discrete Contin. Dyn. Syst.* **10** (2004), no. 3, pp. 755–768.

Abstract: In this paper we give, as far as we know, the first method to detect non-algebraic invariant curves for polynomial planar vector fields. This approach is based on the existence of a generalized cofactor for such curves. As an application of this algorithmic method we give some Lotka-Volterra systems with non-algebraic invariant curves.

Referència: Giacomini, H. Giné, J. Llibre, J. The problem of distinguishing between a center and a focus for nilpotent and degenerate analytic systems. *J. Differential Equations* **227** (2006), no. 2, pp. 406–426.

Abstract: In this work we study the centers of planar analytic vector fields which are limit of linear type centers. It is proved that all the nilpotent centers are limit of linear type centers and consequently the Poincaré-Liapunov method to find linear type centers can be also used to find the nilpotent centers. Moreover, we show that the degenerate centers which are limit of linear type centers are also detectable with the Poincaré-Liapunov method.

Referència: Giacomini, H. Giné, J. Grau, M. Linearizable planar differential systems via the inverse integrating factor. *J. Phys. A* **41** (2008), no. 13, pp. 135205-135224.

Abstract: Our purpose in this paper is to study when a planar differential system polynomial in one variable linearizes in the sense that it has an inverse integrating factor which can be constructed by means of the solutions of linear differential equations. We give several families of differential systems which illustrate how the integrability of the system passes through the solutions of a linear differential equation. At the end of the work, we describe some families of differential systems which are Darboux integrable and whose inverse integrating factor is constructed using the solutions of a second-order linear differential equation defining a family of orthogonal polynomials.