Publicacions més rellevants de la línia de recerca:

Estudi de les famílies d'òrbites periòdiques i les seves bifurcacions pels sistemes d'equacions diferencials i funcions en dimensió finita

Referència: Cima, A., Gasull, A. and Mañosa, V. Dynamics of some rational discrete dynamical systems via invariants. *International J. Bifurcation and Chaos, Appl. Sci. Engrg*, **16(3)** (2006), pp. 631–645.

Abstract: We consider several discrete dynamical systems for which some invariants can be found. Our study includes complex Mobius transformations as well as the third-order Lyness recurrence.

Referència: Gasull, A. and Torregrosa, J. Exact number of limit cycles for a family of rigid systems. *Proceedings of the American Mathematical Society*, **133(3)** (2005), pp. 751–758.

Abstract: For a given family of planar differential equations it is a very difficult problem to determine an upper bound for the number of its limit cycles. Even when this upper bound is one it is not always an easy problem to distinguish between the case of zero and one limit cycle. This note mainly deals with this second problem for a family of systems with a homogeneous nonlinear part. While the condition that allows us to separate the existence and the nonexistence of limit cycles can be described, it is very intricate.

Referència: Christopher, C., Llibre, J. and Pereira, J.V.. Multiplicity of invariant algebraic curves in polynomial vector fields. *Pacific Journal in Mathematics*, **229(1)** (2007), pp. 63–117.

Abstract: The aim of this paper is to introduce a concrete notion of multiplicity for invariant algebraic curves in polynomial vector fields. In fact, we give several natural definitions and show that they are all equivalent to our main definition, under some generic assumptions.

In particular, we show that there is a natural equivalence between the algebraic viewpoint (multiplicities defined by extactic curves or exponential factors) and the geometric viewpoint (multiplicities defined by the number of algebraic curves which can appear under bifurcation or by the holonomy group of the curve). Furthermore, via the extactic, we can give an effective method for calculating the multiplicity of a given curve.

As applications of our results, we give a solution to the inverse problem of describing the module of vector fields with prescribed algebraic curves with their multiplicities; we also give a completed version of the Darboux theory of integration which takes the multiplicities of the curves into account.

In this paper, we have concentrated mainly on the multiplicity of a single irreducible and reduced curve. We hope, however, that the range of equivalent definitions given here already demonstrates that this notion of multiplicity is both natural and useful for applications.