



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Bulletin des Sciences Mathématiques

journal homepage: www.elsevier.com/locate/bulsci



Darboux theory of integrability on the Clifford n -dimensional torus



Jaume Llibre^a, Claudia Valls^{b,*}

^a *Departament de Matemàtiques, Universitat Autònoma de Barcelona, 08193 Bellaterra, Barcelona, Catalonia, Spain*

^b *Departamento de Matemática, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais 1049-001, Lisboa, Portugal*

ARTICLE INFO

Article history:

Received 16 February 2023

Available online 28 February 2024

MSC:

34C05

Keywords:

Darboux integrability

Clifford torus

Invariant algebraic variety

Exponential factor

Meridian

ABSTRACT

For the polynomial vector fields on a Clifford n -dimensional torus, we develop a Darboux theory of integrability. Moreover, we study the optimal maximum number of invariant meridians in terms of the degree of the polynomial vector field.

© 2024 Elsevier Masson SAS. All rights reserved.

1. Introduction and statement of the main results

Nonlinear ordinary differential equations are vastly used to model processes in many fields. First integrals are important in particular because they help to obtain the phase portrait of the system and to reduce the dimension of the system by its number of independent first integrals. For all this, the corresponding methods are very important.

* Corresponding author.

E-mail addresses: jaumellibre@uab.cat (J. Llibre), cvals@math.tecnico.ulisboa.pt (C. Valls).