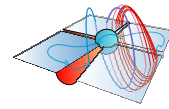# X WORKSHOP
on Dynamical Systems
# 2019

PhD Session

Critical periods of reversible Darboux linearizable isochronous centers

Iván Sánchez

Universitat Autònoma de Barcelona

isanchez@mat.uab.cat

Abstract: A well-known problem in dynamical systems is the study of ciclicity, which aims to find the maximum number of limit cycles bifurcating from a center or a focus. An analogous problem to study the criticality of an isochronous center, this is the maximum number of oscillations of its period function when a perturbation is added to the system. These oscillations are the so-called critical periods. In this talk I will introduce some reversible Darboux linearizable systems of differential equations in the plane, which have allowed us to provide the maximum number of critical periods in a system of fixed degree n so far according to our knowledge.
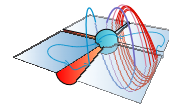
Bifurcações de ciclos limites em uma família de campos de vetores suaves por partes

Luiz Fernando Gonçalves

Instituto de Biociências, Letras e Ciências Exatas - Universidade Estadual Paulista

luizfernando-nandoo@hotmail.com

Resumo: Faremos o estudo de uma família de campos de vetores suaves por partes no plano com duas zonas apresentando o desdobramento de uma dobra-dobra invisível de costura na origem. Mostramos que dado um inteiro k tal família possui k ciclos limites hiperbólicos de costura numa vizinhança desta singularidade. Além disso, estudamos a relação entre os coeficientes de Lyapunov da família descontínua e de sua regularização.
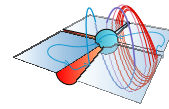
T-chains: a chaotic 3D foliation

Otávio M. L. Gomide

Instituto de Matemática, Estatística e Computação Científica
Universidade Estadual de Campinas

otaviomleandro@hotmail.com

Abstract: In this work, we consider a class of $3D$ Filippov systems presenting robust connections between certain typical singularities, known as T-singularities. Such systems are locally structurally stable at these singularities and are mainly characterized by the existence of $2D$ invariant cones (named diabolos) with vertices on such points. Our main goal is to discuss the existence of chaotic dynamics when self connections between the cones occur. We highlight that the counterpart of these connections in the smooth case can happen only for highly degenerate systems. Joint work with M. A. Teixeira.
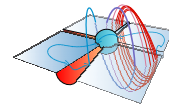
Normal forms of constrained differential systems

Yovani Adolfo Villanueva Herrera

Instituto de Matemática e Estatística - Universidade Federal de Goiás

yovaniing@gmail.com

Abstract: The subject of this work is the theory of normal forms of smooth vector fields of constrained systems (systems of non-linear differential-algebraic equations). In this study we introduce the qualitative theory of ordinary differential equations, with topics such as stability, structural stability, bifurcations, limit cycles and catastrophes of differential equations, and the functional singularity theory. The goal of this work is classify and normalize constrained systems, first of all from the local point of view, we'll show an idea of the global one and our final objective will be consider this theory to differentiable manifolds of dimension $n \geq 2$.