

Rodrigo Donizete Euzébio

Curriculum Vitae

Jacarandá street

Goiânia, 74001-970

Goiás - Brazil

☎ +55 (62) 3521 1153

✉ euzebio@ufg.br

🌐 <https://euzebio.ime.ufg.br>

Office 228, IME-UFG

Personal Details

Nationality Brazilian.
Birth October 21, 1985.
Language skills Portuguese (mother tongue).
English (advanced).
Spanish (advanced).

Education

- 2011–2014 **Ph.D. in Mathematics**, *São Paulo State University (UNESP)*, São José do Rio Preto, São Paulo - Brazil.
Thesis title: Study of minimal sets for discontinuous systems in dimensions 2 and 3
Thesis abstract: In this thesis minimal sets of smooth and non-smooth vector fields in dimension 2 and 3 are studied. First the study of minimal sets is restricted to limit cycles. Questions about existence, distribution and quantity of such objects in smooth and non-smooth vector fields in dimension 3 are answered. Later, the existence of non-trivial minimal sets and chaos in dimension 2 is treated for non-smooth vector fields. Some examples of non-trivial minimal sets are presented and the presence of non-deterministic chaos on some of these sets is verified. Finally, a version of the Poincaré-Bendixson Theorem for non-smooth vector fields presenting crossing and tangency points is presented.
Thesis supervisor: Prof. Claudio A. Buzzi
- 2012–2013 **Ph.D. sandwich in Mathematics**, *Autonomous University of Barcelona*, Barcelona - Spain.
Supervisor: Prof. Jaume Llibre
- 2009–2011 **Master of Sciences in Mathematics**, *São Paulo State University*, São José do Rio Preto, São Paulo - Brazil.
- 2005–2008 **Bachelor in Mathematics**, *São Paulo State University*, São José do Rio Preto, São Paulo - Brazil.

Postdoctoral

- 2015 **Autonomous University of Barcelona**, Barcelona - Spain.
Host: Prof. Jaume Llibre
- 2014–2016 **Campinas State University**, Campinas, São Paulo - Brazil.
Host: Prof. Marco A. Teixeira

Employment

- Feb 2019 - current **Assistant Professor**, *Institute of Mathematics and Statistics, Federal University of Goiás, Goiânia GO - Brazil.*
- Feb 2016 - Jan 2019 **Tenure-track Assistant Professor**, *Institute of Mathematics and Statistics, Federal University of Goiás, Goiânia GO - Brazil.*

Visiting positions

- March-August 2019 **Campinas State University**, Campinas, São Paulo - Brazil.
Host: Prof. Marco A. Teixeira
- December 2018 **Autonomous University of Barcelona**, Barcelona, Spain.
Host: Prof. Jaume Llibre
- May 2015 **Seville University - Department of Applied Mathematics II**, Seville, Spain.
Host: Prof. Enrique Ponce
- July 2013 **Seville University - Department of Applied Mathematics II**, Seville, Spain.
Host: Prof. Enrique Ponce

Research interests

Recurrences, transitivity and chaos in non-smooth vector fields
Regularization and hysteresis in non-smooth vector fields
Local and global bifurcations, asymptotic and structural stability
Limit cycles and invariant manifolds
Averaging and Melnikov theory

Publications

- 14 Carvalho, T., **Euzébio, R.D.**, Minimal sets and chaos in planar piecewise smooth vector fields, *Electronic Journal of Qualitative Theory of Differential Equations*, 33, 2020.
- 13 Buzzi, C.A., Carvalho, T., **Euzébio, R.D.**, On Poincaré-Bendixson Theorem and non-trivial minimal sets in planar nonsmooth vector fields, *Publicacions Matematiques*, 62, 2018.
- 12 **Euzébio, R.D.**, Gouveia, M.R.A., Poincaré recurrence theorem for non-smooth vector fields, *Zeitschrift fur Angewandte Mathematik und Physik*, 40, 2017.
- 11 Carvalho, T., **Euzébio, R.D.**, Teixeira, M.A., Tonon, D.J., Birth of limit cycles from a 3D triangular center of a piecewise smooth vector field, *IMA Journal of Applied Mathematics*, 82, 2017.
- 10 **Euzébio, R.D.**, Llibre, J., Zero-Hopf bifurcation in a Chua system, *Nonlinear Analysis: Real World Applications*, 37, 2017.
- 9 Buzzi, C.A., Carvalho, T., **Euzébio, R.D.**, Chaotic planar piecewise smooth vector fields with non-trivial minimal sets, *Ergodic Theory & Dynamical Systems*, 36, 2016.

- 8 **Euzébio, R.D.**, Pazim, R.C., Ponce, E., Jump bifurcations in some degenerate planar piecewise linear differential systems with three zones, *Physica. D, Nonlinear Phenomena*, 325, 2016.
- 7 Carvalho, T., **Euzébio, R.D.**, Llibre, J., Tonon, D.J., Detecting periodic orbits in some 3D chaotic quadratic polynomial differential systems, *Discrete and Continuous Dynamical Systems - Series B*, 21, 2016.
- 6 Buzzi, C.A., **Euzébio, R.D.**, Mereu, A.C.O., Bifurcation of limit cycles from a non-smooth perturbation of a two-dimensional isochronous cylinder, *Bulletin des Sciences Mathématiques*, 140, 2015.
- 5 **Euzébio, R.D.**, Llibre, J., Sufficient conditions for the existence of periodic Solutions of the extended Duffing-Van der Pol oscillator, *International Journal of Computer Mathematics*, 8, 2015.
- 4 **Euzébio, R.D.**, Llibre, J., On the number of limit cycles in discontinuous piecewise linear differential systems with two pieces separated by a straight line, *Journal of Mathematical Analysis and Applications*, 424, 2014.
- 3 **Euzébio, R.D.**, Llibre, J., Periodic solutions of El Niño model through the Vallis differential system, *Discrete and Continuous Dynamical Systems - Series A*, 34, 2014.
- 2 **Euzébio, R.D.**, Llibre, J., Vidal, C., Zero-Hopf bifurcation in the FitzHugh-Nagumo system, *Mathematical Methods in the Applied Sciences*, 38, 2014.
- 1 Buzzi, C.A., **Euzébio, R.D.**, Llibre, Melo, L.F., Discussion on the limit cycles of the Lev Ginzburg equation by M. Bellamy and R.E. Mickens, *Journal of Sound and Vibration*, 331, 2012.

Submitted manuscripts

- 7 Alves, A.A., **Euzébio, R.D.**, Periodic trajectories in a nonlinear-like dynamical model presenting discontinuities.
- 6 **Euzébio, R.D.**, Freitas, B.R., Riccati vector fields: an approach using Mobius transformations
- 5 **Euzébio, R.D.**, Jucá, J.S., Varão, R., There exist transitive piecewise smooth vector fields on \mathbb{S}^2 but not robustly transitive.
- 4 Buzzi, C.A., **Euzébio, R.D.**, Mereu, A.C.O., Invariant manifolds for piecewise smooth vector fields in \mathbb{R}^3 .
- 3 **Euzébio, R.D.**, Varão, R., Topological transitivity imply chaos for two-dimensional Filippov systems.
- 2 **Euzébio, R.D.**, Llibre, J., Tonon, D.J., Lower bounds for the number of limit cycles in a generalized Rayleigh-Liénard oscillator.
- 1 **Euzébio, R.D.**, Jucá, J.S., Global asymptotic analysis of planar Filippov vector fields.

Ph.D. and M.S. Students

- **Joaby de Souza Jucá**, *Ph.D.*, completed on December 2020.

- **Ana Maria Alves da Silva**, *Ph.D.*, March 2018, current.
- **Yovani Adolfo Villanueva Herrera**, *Ph.D.*, March 2018, current.
- **Angie Tatiana Suarez Romero**, *Ph.D.*, March 2019, (co-advised) - current.
- **Ana Maria Alves da Silva**, *M.S.*, completed on February 2018.

Dissertations committees

Guilherme Tavares da Silva, *Ph.D.*, University of Campinas - 2021
 Joaby de Souza Jucá, *Ph.D.*, Federal University of Goiás - 2020
 Cícero Rumão Gonçalves de Sousa, *M.S.*, Federal University of Goiás - 2020
 Jarne Donizetti Ribeiro, *Ph.D.*, São Paulo State University - 2019
 Ana Maria Alves da Silva, *M.S.*, Federal University of Goiás - 2019
 João Lopes Cardoso Filho, *Ph.D.*, Federal University of Goiás - 2018
 Jeferson Arley Poveda, *M.S.*, Federal University of Goiás - 2018
 Lenison Alves de Queiroz, *M.S.*, Federal University of Goiás - 2018
 Pablo Vandr  Jacob Furlan, *Ph.D.*, Federal University of Goiás - 2017
 Mayk Joaquim dos Santos, *M.S.*, Federal University of Goiás - 2016

Courses Developed

Limit cycles in Dynamical Systems - new doctorate level course, 2018.

Courses Taught

Mar - July 2016 Calculus I
 Aug - Dec 2016 Mathematics applied to Administration
 Ordinary differential equations - master degree
 Mar - Jul 2017 Analytical geometry
 Linear algebra I
 Mar - Jul 2017 Calculus III
 Dynamical systems - doctorate degree
 Mar - Jul 2018 Analytical geometry
 Aug - Dec 2018 Calculus III
 Limit cycles - doctorate degree
 Aug - Dec 2019 Linear algebra I
 Linear algebra II
 Mar 2020 - Jan 2021 Calculus III
 Dynamical systems - doctorate degree
 Mar - Jun 2021 Calculus III

Selected conferences

X Workshop on Dynamical Systems, *Invariant manifolds for some 3D polynomial differential systems*, 2019 - São Paulo University and Federal University of São Carlos - São Carlos SP - Brazil.

II Encuentro Conjunto España-Brasil de Matemáticas, *Topological transitivity of piecewise smooth vector fields*, 2018 - University of Cadiz - Cadiz - Spain.

Workshop of Topology & Dynamics, *Chaos and minimal sets in discontinuous dynamical systems*, 2016 - Federal Fluminense University - Niterói RJ - Brazil.

Advances in Qualitative Theory of Differential Equations, *Invariant manifolds in some three dimensional piecewise smooth differential systems*, 2015 - Tarragona University - Tarragona - Spain.

VI Workshop on Dynamical Systems - MAT 70, *A version of Poincaré-Bendixson Theorem for discontinuous vector fields*, 2014 - Campinas State University - Campinas SP - Brazil.

New Trends in Dynamical Systems, *Global Dynamics of the Lev Ginzburg Equation*, 2012 - Salou - Spain.

Miscellaneous

- Coordinator of funded Research Project 'UNIVERSAL PROJECT - 420858/2016-4 Topological and ergodic aspects of piecewise smooth dynamical systems' - In collaboration with São Paulo State University and Campinas State University. National Council for Scientific and Technological Development.
- Peer reviewed manuscript for the journals
 - Physica D - Nonlinear Phenomena
 - Differential Equations and Dynamical Systems
 - Bulletin des Sciences Mathématiques
 - Nonlinear Dynamics
 - Chaos: An Interdisciplinary Journal of Nonlinear Science
 - Nonlinear Analysis - Real World Applications
 - Applied Mathematics and Computation
 - International Journal of Computational and Applied Mathematics
 - Dynamics of Continuous, Discrete and Impulsive Systems
 - International Journal of Bifurcation and Chaos
 - Moroccan Journal of Pure and Applied Analysis
- Participation in Judging Commissions' Boards - Government Worker Selection, for admission of three tenure positions at Federal University of Goiás, Aug - Sep 2020
- Participation in Judging Commissions' Boards for admission of postdoctoral position at Federal University of Goiás, Jan - Feb 2019
- Organizer of the "Dynamical Systems' Seminar" of the Dynamical Systems Group at Federal University of Goiás, Mar - Jul 2017
- Organizer of the "Dynamical Systems' Seminar" of the Dynamical Systems Group at Federal University of Goiás, Mar - Jun 2021
- Co-organizer of the congress 'VIII Dynamical Systems' Workshop' at Federal University of Goiás, Jul 2016
- Served on the graduate admissions committee, 2018, 2019, 2020
- Leader of the Dynamical System's Group at UFG, Feb 2021 - current

- Scholarship committee and student monitoring of the Graduate Program in Mathematics at UFG, Feb 2021 - current