

Domingo López-Rodríguez

PROFESSOR OF APPLIED MATHEMATICS

Málaga, Spain

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Profile

Applied Mathematics Professor specialized in **Neural Networks**, **Formal Concept Analysis (FCA)**, and **Medical Imaging**. Passionate about open-source research software development, algebraic methods for data analysis, and teaching logic and computation.

Experience

University of Málaga

Professor, Dept. of Applied Mathematics

Málaga, Spain

2007 – Present

- Lecturer for engineering and computer science programs, specialized in discrete mathematics and algebra.
- Active researcher in the *FCA Group*, developing algebraic logic applications and machine learning integrations.

Research Projects (Last 5 Years)

VALID: Verifiable Algebraic and Logic tools for Imperfect Data

PIs: Manuel Ojeda-Aciego, Domingo López-Rodríguez

Research Project

2023 – 2026

Research Software

fcaR: Formal Concept Analysis with R

Lead Developer & Maintainer

CRAN / GitHub

2019 – Present

- Core R package providing mathematical tools for Formal Concept Analysis (FCA) and Boolean Matrix Factorization (BMF).
- Features tools for fuzzy context handling, implication extraction, logical rule simplification, and lattice visualization.
- **Links:** CRAN Package · Docs Website

fcaRviz: Interactive Visualizer for fcaR

Lead Developer

GitHub

2026 – Present

- Interactive Shiny dashboard and RStudio Addin to visually explore formal concepts, lattices, and implication sets.
- Built-in live visualization of implication networks and matrix factorization outputs.

Selected Publications (Last 5 Years)

Journal Articles

Lubomir Antoni, Dominika Kotlářová, Ondrej Krídlo, Domingo **López-Rodríguez**, Manuel Ojeda-Aciego. **Effective greedy Boolean matrix factorization via the Rice-Siff algorithm**. *International Journal of Approximate Reasoning* vol. 197, pages 109747. 2026

Manuel Ojeda Hernández, Domingo **López-Rodríguez**. **Direct-optimal systems of attribute implications in fuzzy formal concept analysis**. *Computational and Applied Mathematics* vol. 45 (10), pages 433. 2026

Domingo **López-Rodríguez**, Manuel Ojeda Hernández, Ángel Mora, Carlos Bejines. **Close-by-One-like algorithms in the fuzzy setting: Theory and experimentation**. *Fuzzy Sets and Systems* vol. 520, pages 109574. 2025

Domingo **López-Rodríguez**, Manuel Ojeda Hernández, Tim Pattison. **Systems of implications obtained using the Carve decomposition of a formal context.** *Knowledge-Based Systems*, pages 113475. 2025

Francisco Rodríguez-Gómez, José del Campo-Ávila, Domingo **López-Rodríguez**, Luis Pérez-Urrestarazu. **URSUS_UHI: URban SUStainability software for detection of unfavourable areas due to the Urban Heat Island effect.** *SoftwareX* vol. 29, pages 101997. 2025

Hugo J. Bello, Manuel Ojeda Hernández, Domingo **López-Rodríguez**, Carlos Bejines. **Fuzzy time series analysis: Expanding the scope with fuzzy numbers.** *International Journal of Approximate Reasoning* vol. 180, pages 109387. 2025

Domingo **López-Rodríguez**, Manuel Ojeda Hernández, Carlos Bejines. **New Simplification Rules for Databases with Positive and Negative Attributes.** *Mathematics* vol. 13 (2), article number 309. 2025

Francisco Rodríguez-Gómez, José del Campo-Ávila, Luis Pérez-Urrestarazu, Domingo **López-Rodríguez**. **URSUS_LST: URban SUStainability intelligent system for predicting the impact of urban green infrastructure on land surface temperatures.** *Environmental Modelling & Software* vol. 186, pages 106364. 2025

Manuel Ojeda Hernández, Domingo **López-Rodríguez**, Ángel Mora. **A Formal Concept Analysis approach to hierarchical description of malware threats.** *Forensic Science International: Digital Investigation* vol. 50, pages 301797. 2024

Carlos Bejines, Manuel Ojeda Hernández, Domingo **López-Rodríguez**. **Analysis of Fuzzy Vector Spaces as an Algebraic Framework for Flag Codes.** *Mathematics* vol. 12 (3), article number 498. 2024

Conference Proceedings

Francisco Pérez Gámez, Carlos Bejines, Pablo Cordero, Domingo **López-Rodríguez**, Manuel Ojeda Hernández. **Inheritance of completeness between systems of strong and weak implications.** *European Symposium on Computational Intelligence and Mathematics, ESCIM*, 2024 2024

Domingo **López-Rodríguez**, Manuel Ojeda Hernández, Ángel Mora. **Close-by-One strategy for computing the fuzzy concept lattice.** *Fuzzy Sets Theory and Applications, FSTA*, 2024 2024

Ondrej Krídlo, Domingo **López-Rodríguez**, Manuel Ojeda-Aciego, Marek Reformat. **An FCA-based approach to RDF graphs.** *Fuzzy Sets Theory and Applications, FSTA*, 2024 2024

Rosa Maza-Quiroga, Karl Thurnhofer-Hemsi, Domingo **López-Rodríguez**, Ezequiel López-Rubio. **Rician noise estimation for 3D Magnetic Resonance Images based on Benford's Law.** *24th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)* 2021 2021

Books

Dominik Dürschnabel, Domingo **López-Rodríguez**. **Formal Concept Analysis.** *17th International Conference, ICFCA 2023, Kassel, Germany, July 17-21, 2023, Proceedings* 2023

Enrique Domínguez Merino, Domingo **López-Rodríguez**, Ezequiel López-Rubio, Rosa Maza-Quiroga, Miguel A. Molina-Cabello, Karl Thurnhofer-Hemsi. **Super-Resolution of 3D Magnetic Resonance Images of the Brain.** *Artificial Intelligence in Healthcare and Medicine*, pp. 157-176 2022

Domingo **López-Rodríguez**, Emilio Muñoz Velasco, Manuel Ojeda-Aciego. **Formal methods in FCA and Big Data.** *Complex Data Analytics with Formal Concept Analysis*, pp. 201 – 224 2021

Teaching& Service

Estructuras Algebraicas para la Computación

Course Coordinator / Lecturer

ETSI Informática, UMA

2023 – Present

- Lead lecturer and coordinator for discrete mathematics and algebraic structures for computer science undergraduate students.

Estadística y Métodos Numéricos

Course Coordinator / Lecturer

- Coordinated the statistics and numerical methods curriculum for telecommunication engineering students.