Domingo **López-Rodríguez**

PROFESSOR OF APPLIED MATHEMATICS

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Profile

Applied Mathematics Professor specialized in **Neural Networks**, **Formal Concept Analysis**, and **Medical Imaging**. Passionate about open-source software and reproducible research.

Experience

University of Málaga Málaga, Spain
Professor, Dept. of Applied Mathematics 2007 – Present

Research Projects

VALID: Verifiable Algebraic and Logic tools for Imperfect Data ** *2023*

Análisis e implementación de estrategias de enseñanza-aprendizaje en asignaturas de Matemáticas mediante detección de dependencias entre contenidos ** *2019*

FLAIR: Fuzzy, Logic and Algebraic tools for Information Resources ** *2019*

URSUS-DM: Nuevos desarrollos en minería de datos para su utilización en la sostenibilidad urbana ** *2019*

Selected Publications

Journal Articles

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

Pablo Cordero, Manuel Enciso, Domingo **López-Rodríguez**, Ángel Mora. **A conversational recommender system for diagnosis using fuzzy rules**. *Expert Systems with Applications, volume 154, 2020* 2020

Juan Pérez, Andrés Rodríguez, Juan Francisco Chico, Domingo **López-Rodríguez**, Manuel Ujaldón. **Energy-aware acceleration on GPUs: Findings on a bioinformatics benchmark**. *Sustainable Computing: Informatics and Systems vol. 20, pp. 88 – 101* 2018

Ezequiel López-Rubio, Juan Miguel Ortiz-de-Lazcano-Lobato, Domingo **López-Rodríguez**. **Probabilistic PCA self-organizing maps**. *IEEE Transactions on Neural Networks vol 20 (9), 1474-1489* 2009

Gloria Gálan-Marín, Enrique Mérida-Casermeiro, Domingo **López-Rodríguez**. **Improving neural networks for mechanism kinematic chain isomorphism identification**. *Neural Processing Letters vol 26 (2), 133-143* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortiz-de-Lazcano-Lobato. **Stochastic multivalued network for optimization. Application to the graph MaxCut problem**. *WSEAS Transactions on Mathematics, (6), 3, pp. 500-505* 2007

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

Pablo Cordero, Manuel Enciso, Domingo **López-Rodríguez**, Ángel Mora. **Topic Modelling in Social Networks with Formal Concept Analysis**. *International Conference on Computational and Mathematical Methods in Science and Engineering (CMMSE) 2021* 2021

Manuel Ojeda Hernández, Francisco Pérez Gámez, Ángel Mora Bonilla, Domingo **López-Rodríguez**. **Using Logic to Determine Key Items in Math Education**. *IADIS International Conference e-Learning 2021 (part of MCCSIS 2021)* 2021

Domingo **López-Rodríguez**, Pablo Cordero, Manuel Enciso, Ángel Mora. **Clustering and identification of core implications**. *International Conference on Formal Concept Analysis (ICFCA) 2021* 2021

Domingo **López-Rodríguez**, Pablo Cordero, Manuel Enciso, Ángel Mora. **How to provide light to COVID data by means of FCA**. *RealDataFCA Workshop, jointly with International Conference on Formal Concept Analysis (ICFCA) 2021* 2021

Francisco Pérez Gámez, Manuel Ojeda Hernández, Ángel Mora Bonilla, Domingo **López-Rodríguez**, Nicolas Madrid. **Using Formal Concept Analysis to Explore Hidden Knowledge in the Assessment of a Math Course**. *IADIS International Conference e-Learning 2020 (part of MCCSIS 2020)* 2020

Pablo Cordero, Manuel Enciso, Domingo **López-Rodríguez**, Ángel Mora. **Recommendations in CDSS using Fuzzy Formal Concept Analysis**. *International Conference on Computational and Mathematical Methods in Science and Engineering (CMMSE) 2019* 2019

Domingo **López-Rodríguez**, Antonio García-Linares. **Predictive and Populational Model for Alzheimer's Disease Using Structural Neuroimaging**. *XIII Mediterranean Conference on Medical and Biological Engineering and Computing 2013* 2013

Ángel Mora Bonilla, Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Improving Moodle with WIRIS and M-QIT**. *Proceedings of the 12th International Conference on Enterprise Information Systems, Volume 4* 2010

Esteban J. Palomo, Juan Miguel Ortiz-de-Lazcano-Lobato, Domingo **López-Rodríguez**, Rafael Marcos Luque Baena. **Hierarchical Graphs for Data Clustering**. *International Work-conference on Artificial Neural Networks (IWANN) pp 432-439* 2009

Juan Miguel Ortiz-de-Lazcano-Lobato, Rafael Marcos Luque Baena, Domingo **López-Rodríguez**, Esteban J. Palomo. **Growing Competitive Network for Tracking Objects in Video Sequences**. *International Conference on Adaptive and Natural Computing Algorithms 2009, pp 109 – 118* 2009

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro. **Shortest Common Superstring Problem with Discrete Neural Networks**. *International Conference on Adaptive and Natural Computing Algorithms 2009, pp 62 – 71* 2009

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Drawing Graphs in Parallel Lines with Artificial Neural Networks**. *Eighth International Conference on Hybrid Intelligent Systems (HIS) 2008: 667-671* 2008

Rafael Marcos Luque Baena, Domingo **López-Rodríguez**, Enrique Mérida Casermeiro, Esteban J. Palomo. **Video Object Segmentation with Multivalued Neural Networks**. *Eighth International Conference on Hybrid Intelligent Systems (HIS) 2008: 613-618* 2008

Gloria Galán Marín, Domingo **López-Rodríguez**, Enrique Mérida Casermeiro. **A generalization of the Hopfield model for the graph isomorphism problem**. *Computing and Computational Techniques in Sciences 2008* 2008

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Adjust of Contradictory Information by a Fuzzy Method**. *Proceedings of the 2008 International Conference on Computational and Mathematical Methods in Science and Engineering* 2008

Rafael Marcos Luque Baena, Domingo **López-Rodríguez**, Enrique Domínguez Merino, Esteban J. Palomo. **A Dipolar Competitive Neural Network for Video Segmentation**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (5290 LNAI), pp. 103-112* 2008

Salvador Merino Córdoba, Javier Martínez del Castillo, Gloria Gutiérrez Barranco, Ángel Mora-Bonilla, Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro. **Fnova: Fermat and joomla fusion**. *Proceedings of the IASTED International Conference on Internet and Multimedia Systems and Applications and Visual Communications, pp. 15-20* 2008

Ángel Mora Bonilla, Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Luis Fernando López Anguita. **Integration Of Moodle Quizzes**. *{IADIS} International Conference e-Learning 2008, Amsterdam, The Netherlands, July 22-25, 2008. Proceedings, pp. 45–52* 2008

Rafael Marcos Luque Baena, Enrique Dominguez Merino, Domingo **López-Rodríguez**, Esteban J. Palomo. **A Neighborhood-Based Competitive Network for Video Segmentation and Object Detection**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (5163), PART 1, pp. 877–886* 2008

Juan Miguel Ortiz-de-Lazcano-Lobato, Rafael M. Luque Baena, Domingo **López-Rodríguez**, Esteban J. Palomo. **A Novel Competitive Network Approach to Object Tracking**. *Proceedings of the 2008 UK Workshop on Computational Intelligence* 2008

Ezequiel López-Rubio, Juan Miguel Ortiz-De-Lazcano-Lobato, Domingo **López-Rodríguez**, M. del Carmen Vargas-Gonzalez. **Robust nonparametric probability density estimation by soft clustering**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (5163 LNCS), PART 1, pp. 155-164* 2008

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortiz-de-Lazcano-Lobato. **A Multivalued Neural Network for the Degree-Constrained Minimum Spanning Tree Problem**. *Congreso de la Asociación Española para la Inteligencia Artificial 2007* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortiz de Lazcano Lobato. **Red Multivaluada Estocástica para Optimización. Aplicación al Problema del MaxCut**. *Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados 2007* 2007

Ezequiel López-Rubio, Juan Miguel Ortiz-De-Lazcano-Lobato, Domingo **López-Rodríguez**, María del Carmen Vargas-González. **Automatic Model Selection for Probabilistic {PCA}**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4507 LNCS), pp. 127-134* 2007

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Juan Miguel Ortiz-de-Lazcano-Lobato. **Image Compression with Competitive Networks and Pre-fixed Prototypes**. *IFIP International Federation for Information Processing, (247), pp. 339–346* 2007

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Gloria Galán Marín, Juan Miguel Ortiz-de-Lazcano-Lobato. **Improved Production of Competitive Learning Rules with an Additional Term for Vector Quantization**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4431), PART 1, pp. 461–469* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortíz-de-Lazcano-Lobato, Gloria Galán-Marín. **K-pages graph drawing with multivalued neural networks**. *Artificial Neural Networks - {ICANN} 2007, 17th International Conference, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4669 LNCS), PART 2, pp. 816-825* 2007

Ezequiel López-Rubio, Juan Migueñ Ortíz-De-Lazcano-Lobato, Domingo **López-Rodríguez**, María del Carmen Vargas-González. **Self-organization of probabilistic PCA models**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4507 LNCS), pp. 211-218* 2007

Ezequiel López-Rubio, Juan Miguel Ortiz-de-Lazcano-Lobato, Domingo **López-Rodríguez**, María del Carmen Vargas-González. **Soft Clustering for Nonparametric Probability Density Function Estimation**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4668 LNCS), PART 1, pp. 707-716* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Gloria Galán-Marín, Juan Miguel Ortiz-de-Lazcano-Lobato. **Stochastic functional annealing as optimization technique: Application to the traveling salesman problem with recurrent networks**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4667 LNAI), pp. 397-411* 2007

Gloria Galán-Marín, Enrique Mérida-Casermeiro, Domingo **López-Rodríguez**, Juan Miguel Ortiz-De-Lazcano-Lobato. **A Study into the Improvement of Binary Hopfield Networks for Map Coloring**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4432 LNCS), PART 2, pp. 98-106* 2007

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Gloria Galán Marín, Juan Miguel Ortiz-de-Lazcano-Lobato. **Theoretical Study on the Capacity of Associative Memory with Multiple Reference Points**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4527), PART 1, pp. 292–302* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortíz-De-Lazcano-Lobato, Gloria Galán-Marín. **Two pages graph layout via recurrent multivalued neural networks**. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4507 LNCS), pp. 194-202* 2007

Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, Juan Miguel Ortiz-De-Lazcano-Lobato. **Stochastic multivalued network for optimization. Application to the graph MaxCut problem**. *International Conference on Computational Intelligence, Man-Machine Systems and Cybernetics - Proceedings, (1), pp. 111-116* 2006

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro, Juan Miguel Ortiz-de-Lazcano-Lobato, Ezequiel López-Rubio. **Image Compression by Vector Quantization with Recurrent Discrete Networks**. *Artificial Neural Networks - (ICANN) 2006, 16th International Conference, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4132), pp. 595–605* 2006

Ezequiel López-Rubio, Juan Miguel Ortiz-De-Lazcano-Lobato, Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, María Del Carmen Vargas-González. **Local selection of model parameters in probability density function estimation**. *Artificial Neural Networks - (ICANN) 2006, 16th International Conference, Lecture Notes in*

Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4132 LNCS - II), pp. 292-301 2006

Ángel Mora, Enrique Mérida-Casermeiro, Domingo **López-Rodríguez**. **Development of a virtual learning community for the subject Numerical Methods under Moodle**. *Current Developments in Technology-Assisted Education 2006* 2006

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Juan Miguel Ortiz-de-Lazcano-Lobato. **Enhanced maxcut clustering with multivalued neural networks and functional annealing**. *ESANN 2006 Proceedings - 14th European Symposium on Artificial Neural Networks, pp. 25–30* 2006

Ezequiel López-Rubio, Juan Miguel Ortiz-de-Lazcano-Lobato, Domingo **López-Rodríguez**, Enrique Mérida-Casermeiro, María del Carmen Vargas-González. **Global-local learning strategies in probabilistic principal components analysis**. *Proceedings of the 10th IASTED International Conference on Artificial Intelligence and Soft Computing, ASC 2006, pp. 46-51* 2006

Enrique Mérida-Casermeiro, Domingo **López-Rodríguez**. **Hebbian Iterative Method for Unsupervised Clustering with Automatic Detection of the Number of Clusters with Discrete Recurrent Networks**. *11th Conference of the Spanish Association for Artificial Intelligence (CAEPIA) 2005, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), (4177), pp. 241– 250* 2005

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Iterative Learning Reinforcement for Unsupervised Clustering with Discrete Recurrent Networks**. *XI Conferencia de la Asociación Española para la Inteligencia Artificial 2005* 2005

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro. **Neural Formulation of Functional Annealing and Application to Traveling Salesman Problem**. *XI Conferencia de la Asociación Española para la Inteligencia Artificial 2005* 2005

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro, Juan Miguel Ortiz-de-Lazcano-Lobato. **Hopfield Network as Associative Memory with Multiple Reference Points**. *International Enformatika Conference, IEC'05, August 26-28, 2005, Prague, Czech Republic, , pp. 62–67* 2005

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Memoria auto-asociativa y clasificación con redes neuronales recurrentes**. *Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados 2005* 2005

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro. **Aplicación neuronal del enfriamiento funcional discreto al problema del viajante**. *Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados 2005* 2005

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Graph Partitioning via Recurrent Multivalued Neural Networks**. *International Work-Conference on Artificial Neural Networks (IWANN) 2005, Lecture Notes in Computer Science, (3512), pp. 1149–1156* 2005

Domingo **López-Rodríguez**, Enrique Mérida Casermeiro. **Matrix Bandwith Minimization: A Neural Approach**. *International Congress of Computational Methods in Science and Engineering 2004* 2004

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**. **Multivalued Neural Network for Graph Maxcut Problem**. *International Congress of Computational Methods in Science and Engineering 2004* 2004

Books

Dominik Dürrschnabel, 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

Enrique Mérida Casermeiro, Domingo **López-Rodríguez**, Juan Miguel Ortiz-de-Lazcano-Lobato. **MREM, Discrete Recurrent Network for Optimization**. *Encyclopedia of Artificial Intelligence 2009: 1112-1120* 2009

Enrique Mérida-Casermeiro, Domingo **López-Rodríguez**, Juan Miguel Ortiz-de-Lazcano-Lobato. **An approach to artificial concept learning based on human concept learning by using artificial neural networks**. *Advancing Artificial Intelligence Through Biological Process Applications, pp. 130-145* 2008