Juan Pablo Serrano Pérez

My Personal Page — wamjsblvb@live.com.mx — LinkedIn — GitHub

About

Currently I am enrolled at a Ph.D. on mathematics. I studied a master on science on the specialty of Mathematics, driven by a passion for tackling algorithmic and mathematical challenges with creativity and rigor specialized in the analysis and design of algorithms, aiming to contribute to advancements and efficiency in the fields of computer science, optimization, probability, foundations of deep learning and mathematical research.

Note: This CV is meant to be read in digital form. Every magenta text (except from this) is clickable. In case you get this CV in physical form, at the end are placed the explicit URL's to visit the web pages I put as hyperlinks.

Education

Ph.D. Mathematics
Center of Research and Advanced Studies, National Polytechnic Institute, Mexico

Advisor: Ph.D. Carlos E. Valencia and Ph.D. Carlos A. Alfaro

Master of Science in Mathematics 2024
Center of Research and Advanced Studies, National Polytechnic Institute, Mexico

Thesis: `Clusters in Optimal Rectilinear Drawings of the Complete Graph: Insights into Potential Recursive Patterns`.

Advisor: Ph.D. Ruy Fabila Monroy.

Bachelor of Physics and Mathematics 2022
National Polytechnic Institute, Mexico

Research

Research interests: *commutative algebra, machine (deep) learning, optimization, algorithms and statistics.*

Published articles

1. Carlos A. Alfaro, Juan Pablo Serrano and Ralihe R. Villagrán, *"Evolutive sandpiles"*, Physica A: Statistical Mechanics and its Applications, vol. 657, 2025, article 130248, ISSN 0378-4371, https://doi.org/10.1016/j.physa.2024.130248.
   Status: Published
   A preprint for this article is available here arxiv.org/abs/2404.13137

Preprint articles

1. *Distance ideals of digraphs*, Carlos A. Alfaro, Teresa I. Hoekstra-Mendoza, Juan Pablo Serrano, Ralihe R. Villagrán, (2024)
   Status: Sent (arxiv.org/abs/2408.02848)

Projects

The following are personal works of projects I am interested in. Most of them are built in Python and are available at my GitHub.

Machine Learning Models

1. Time series forecasting: Development of several models to forecast financial time series. The list of models include a Recurrent Network of Long short-term memory and hybrids models of Convolutional Network and LSTM networks.

2. Language processing to sentimental analysis with an LSTM network.

Clustering Algorithm
Developed a clustering algorithm as part of my master's thesis, exploring an unsupervised learning algorithm to investigate recursion in optimal graphs drawings related to the crossing number problem in combinatorial geometry. .

Automation and Optimization of Backtesting Strategies
Implemented a Python program that optimizes hyparameters for various technical indicators, evaluating buy and sell strategies for assets.

Arbitrage in Foreign Exchange Markets
Designed an algorithm to find real arbitrage opportunities in the Foreign Exchange/Cryptocurrencie Markets.

Linear programming optimization
Developed Simplex Algorithm in Python to find optimal solutions in a linear programming problem.

Professional Experience

Microservices Developer 2021 - 2023
Enterprise Resource Planning Solutions, Mexico
I developed various types of applications, particularly focusing on REST and JSON as well as SOAP and XML applications. I worked extensively on client-server integration projects, leveraging technologies such as Java, object-oriented programming, OpenShift, and Apache Camel. Moreover, I had the opportunity to develop OSB (Oracle Service Bus) and SOA (Service-Oriented Architecture) services using Oracle SOA Suite 12c, where I used XML, XSD, XSLT, and XQuery to ensure efficient communication and integration between systems. Throughout my career, I also became proficient in utilizing essential tools like WebLogic Server, Enterprise Manager, and Oracle Service Bus.

Preparatory Master's Course 2023
Center of Research and Advanced Studies, National Polytechnic Institute, Mexico

I taught a preparatory master's course in abstract algebra (groups and rings). A proof of this course can be found clicking here.

Skills

Proficient in Python `3.x` and LaTeX, knowledge on Matlap, Java, C, SageMath, optimization mathematics, linear and non linear optimization. Strong background in Probability and Statistics, analysis and design of algorithms:

- Data structures, graph algorithms, randomized algorithms, parallel computing, approximation algorithms, combinatorial optimization, mathematical optimization and linear programming, hash tables.

Knowledge on deep learning:

- Tensorflow, Keras ans Scikit-Learn, convolutional Neural Networks, recurrent Neural Networks, natural language processing, transformers.

Workshops

Collaborated in the 4th Reunion of Optimization, Mathematics, and Algorithms held in Mexico City.

Languages

Spanish: Native speaker

English: C1 Proficiency level.

Mandarin: Beginner

Grants

Granted by El Consejo Nacional de Humanidades Ciencia y Tecnología, México. Postgraduate scholarship, grant number #1174526.

References

Dr. Ruy Fabila-Monroy (rfabila@math.cinvestav.mx)

Dr. Onésimo Hernández-Lerma (ohernand@math.cinvestav.mx)

Dr. Carlos A. Alfaro Montúfar (alfaromontufar@gmail.com)

Note: If you cannot click into the hyperlinks, here are the complete URL's and profile names:

Personal web page: https://jpabloserrano.github.io

LinkedIn: Juan Pablo Serrano Pérez

GitHub: jpabloserrano

Ms.C. thesis: https://jpabloserrano.github.io/msc%20thesis.pdf