# Juan Pablo Serrano Pérez

My Personal Website | wamjsblvb@live.com.mx | LinkedIn | GitHub

## About

I am a mathematician whose interests range from doing research in mathematics and teaching, to learning languages. Having done research in algorithms, I'm highly interested in LLMs, AI, their development, and applications. I'm currently doing research in pure mathematics, building websites, learning Mandarin, and swimming competitively.

## Education

M.Sc. Mathematics
Center of Research and Advanced Studies, National Polytechnic Institute, Mexico

Dissertation: Clusters in Optimal Rectilinear Drawings of Complete Graphs: Insights into Potential Recursive Patterns.

Advisor: Ph.D. Ruy Fabila Monroy.

Bachelor of Physics and Mathematics
National Polytechnic Institute, Mexico

## Research

Research interests: *My research interests include commutative algebra, machine learning, optimization, algorithms, and statistics.*

### Published Articles

1. *''Distance ideals of digraphs''*, Applied Mathematics and Computation, https://doi.org/10.1016/j.amc.2025.129430

2. *''Evolutive sandpiles''*, Physica A: Statistical Mechanics and its Applications, doi.org/10.1016/j.physa.2024.130248.

### Preprint Articles

Some of the preprints of the published or non published articles can be found down here.

1. *The characterization of graphs with two trivial distance ideals*, arxiv.org/abs/2504.11706
2. *Distance ideals of digraphs*, arxiv.org/abs/2408.02848
3. *Evolutive sandpiles*, arxiv.org/abs/2404.13137

### Talks

1. *Evolutive sandpiles*, XL Coloquio Víctor Neumann-Lara de Teoría de las Gráficas, Combinatoria y sus Aplicaciones

## Projects

My coding projects are mainly build using Python or Sage. These are available here.

## Professional Experience

Graduate abstract algebra course, 2023
Center of Research and Advanced Studies, National Polytechnic Institute, Mexico.
Microservices Developer, 2021--2023

Enterprise Resource Planning Solutions, Mexico

> Developed various types of applications, particularly focusing on REST and JSON as well as SOAP and XML applications. Worked extensively on client-server integration projects, leveraging technologies such as Java, object-oriented programming, OpenShift, and Apache Camel. Additionally, developed OSB (Oracle Service Bus) and SOA (Service-Oriented Architecture) services using Oracle SOA Suite 12c, employing XML, XSD, XSLT, and XQuery to ensure efficient communication and integration between systems. Utilized essential tools like WebLogic Server, Enterprise Manager, and Oracle Service Bus.

## Skills

Proficient in Python 3.x and LaTeX. Knowledge of MATLAB, Java, C, SageMath, optimization mathematics, linear and nonlinear optimization. Strong background in probability and statistics, and the analysis and design of algorithms:

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

Knowledge of deep learning:

- TensorFlow, Keras, and scikit-learn; convolutional neural networks, recurrent neural networks, natural language processing, and transformers.

## Languages

Spanish: Native speaker

English: C1 proficiency level

Mandarin: Beginner