

Neson Garcia Roman, Eng.

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▶ Mieles Matemáticas

in Nelson G. Roman

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Mechanical Engineering graduate from the University of Pinar del Río (2016), Cuba. Currently pursuing a Master's degree in Applied Mathematics at the Graduate Program in Applied Mathematics at the Universidade Federal do Rio Grande do Sul (UFRGS, 2023 - Present), Brazil. Possesses experience in the field of Applied Mathematics, with a focus on inverse problems, numerical methods, computational modeling, machine learning and deep learning.

Employment History

2018 – 2022

📌 **Public Servant.** Functional Position: Mathematics Professor. Regime: Exclusive Dedication. Technological University José Antonio Echeverría, CUJAE.



- Teaching of Calculus I, II, Numerical Series, Differential Equations, and Complex Variables Calculus and Operational.
- Development of the Pre-Calculus Book as the second edition of the Complementary Manual enriched with new elements in collaboration with other authors.
- Development of Mathematical Models applied to Sciences at the Mathematical Studies Center for Sciences and Techniques (CEMAT).
- Collaboration on the project: Inspection Frequency in Electric Generators of Generator Groups based on Mechanical Vibration Analysis.
- Shear and bending diagram in beams through Fourier Analysis. Scientific Forum.
- Collaboration on the research project: Wavelet Signals for Vibrational Analysis in Generator Groups, specifically obtaining information for subsequent predictive maintenance.
- Mathematical model for the electrical pulse signals emitted by the frontal lobe of the brain at the moment of decision making.

2016 – 2018

📌 **Public Servant.** Functional Position: Mathematics Professor. Regime: Exclusive Dedication. University of Pinar del Río, UPR.


- Teaching of Calculus I, II, III subjects in Mechanical and Computer Engineering careers.
- Application of Linear Ordinary Differential Equations to Physical Problems.
- Creation of a manual of Complementary Basic Mathematics, aimed at Careers in the hybrid modality.

Education

- 2023 – 2024  **M.Sc., Universidade Federal do Rio Grande do Sul, UFRGS** in Applied math.
Dissertation title: *Application of Deep Learning to Solve Inverse Radiative Transport Problem*
Advisor: Pedro Henrique de Almeida Konzen.
Scholarship recipient from the Coordination for the Improvement of Higher Education Personnel (CAPES), Brazil.
Area: Applied Mathematics / Specialty: Numerical Analysis, Computational Modeling.
- 2011 – 2016  **Eng., University of Pinar del Río, UPR** in Mechanical Engineering.
Coursework: *Software design for the calculation of industrial conveyors for general application..*

Research Publications

Journal Articles

- 1 N. G. Roman, P. C. Santos, and P. H. A. Kozen, “ANN-MoC method for inverse transient transport problems in one-dimensional geometry,” *LATIN-AMERICAN JOURNAL OF COMPUTING*, 2024, ISSN: 1390-9266.  URL: <https://doi.org/10.5281/zenodo.12191947>.
- 2 N. G. Roman, P. C. Santos, and P. H. A. Kozen, “Método ANN-MoC para problema inverso de caracterização da fonte,” *Approved to: CIÊNCIA E NATURA*, 2024.

Conference Work

- 1 P. H. A. Konzen, N. G. Roman, and A. Tchantchalam, “The data-driven ann-moc method to neutral particle transport problems in 1d,” in *Proceedings of the 16th IMSE*, To appear, Macaé, RJ, Brazil, 2024.
- 2 N. G. ROMAN and P. H. A. KONZEN, “ANN-MoC estimations of the absorption coefficient in multi-region media,” in *Submitted to: XLIII CNMAC*, Porto de Galinhas, PE, Brazil, 2024.
- 3 N. G. Roman, P. C. Santos, and P. H. A. Kozen, “ANN-MoC method for inverse transient transport problems in one-dimensional geometry,” in *Anais do XXVI ENMC/XIV ECTM*, Nova Friburgo, RJ, Brazil., 2023, ISBN: 9786527201540.
- 4 N. G. Roman, P. C. Santos, and P. H. A. Kozen, “Método ANN-MoC para problema inverso de caracterização da fonte,” in *To appear in IV JMMA*, Santa Maria, RS, Brasil., 2023.
- 5 P. C. SANTOS and P. H. A. Roman N. G. and Kozen, “Método ANN-MoC com pré-processamento de dados para resolução de problema inverso de transporte,” in *To appear in IV JMMA*, Santa Maria, RS, Brasil., 2023.

Extension Courses

- **Python for Mathematics**

Universidade Federal do Rio Grande do Sul (UFRGS)

October 29, 2024 - November 7, 2024

Delivered four sessions, each lasting 2 hours, covering topics including elements of structured programming, matrix computation, and graphics. The course included hands-on exercises and group projects, benefiting 40 students.

Article Reviewing

- **2024:** Reviewer for the article titled "Improving Sentiment Classification using Ensemble Learning" in *LATIN-AMERICAN JOURNAL OF COMPUTING*.

Research Groups

2023 – 2024 **N³: Neural Network for Numerical**
Inverse problems, deep learning, python programming for training artificial neural networks in Pytorch and numerical methods, currently with an open problem in Deep Learning Application for Inverse Problem in Optical Tomography by non-collimated Laser in one-dimensional domain, with the objective of extend for multidimensional domain.
Main area: Exact and Earth Sciences / **Area:** Mathematics / **Subarea:** Applied Mathematics.

Complementary training

2023 – 2024 **Universidade Federal do Rio Grande do Sul, UFRGS**
Matrix Theory
Mathematical Analysis
Numerical Methods for Differential Equations
Introduction to Parallel Computing
Systems of Ordinary Differential Equations and Applications
Applied Numerical Methods

2018 – 2021 **Technological University José Antonio Echeverría, CUJAE**
Introduction to Matlab
Non-linear analysis with Finite Elements
Solutions to computational problems
Mathematical Modeling and Optimization
Finite Element Modeling
Advanced Mathematics

Skills

Languages Spanish: Native Level
English: Intermediate Level
Portuguese: Advanced Level

Coding C/C++, Python, \LaTeX , Object-oriented programming (C++/Python)