Jean René Zuluaga Duque
Phd on Electric Power Systems
Cinvestav Guadalajara
Electrical Engineering
National University of Colombia

Personal Information

Date of birth:	September 24, 1988
City of origin:	Medellín (Antioquia - Colombia)
Marital Status:	Single
Language:	Spanish (native), English-Advanced level
Mobile Phone:	(+52) 5517579983 (Guadalajara - Jalisco)
Currently city:	Zapopan - Jalisco
E-mail:	jrzuluagad@gmail.com

Resume

Doctor of Science in the specialty of Electric Power Systems. Capabilities to programming in: C, C++, Pyhton, Verilog, VHDL, Visual Basic, CUDA, Matlab, simulink and R. Phd Thesis focuses on parallel computing of electromagnetics and travelling wave models with GPUs and FPGAs. Experience in research, projects related to circuit analysis and transient analysis, time series analysis, signal processing, filtering, hydroelectric, renewable energy, sea energy, overhead and underground cables, parallel computing and power electronics. High ability to learn new things and research in different areas. Experience in university education. Skilled for teamwork and work under pressure.

Job Experience

- **Professional services** in energy projects related to renewable energy and their connection to the grid. March 2020 - Currently.
- **Lecturer:** Universidad Jesuita de Guadalajara ITESO From August 2019 – Currently. Experience in teaching topics related to: Integral Calculus, Basic Mathematics and differential Calculus.
- **Lecturer**: Universidad Autónoma de Guadalajara Sep, 2018 - Currently. Experience in teaching topics related to: Differential Equations, mathematics methods (in master degree) Basic algebra, Integral, differential and vectorial calculus, numerical methods with Python, Magnetism and Electricity and Time Series analysis with Python and R.
- **Lecturer:** Universidad Autónoma de San Luis Potosí From February 2021 – june 2021. Experience in teaching topics related to: Electromagnetic Transient Analysis (in master degree).
- **Electrical Data Analyst**. XM S.A. E.S.P. Feb 2012 - Jun 2012.
- **Internship** XM S.A. E.S.P, Electrical Systems, assurance operation Area. July - 2011 Jan 2012.
- **Auxiliar Student**: "Potential energy identification for sea technology in Colombia**".** Feb - Aug 2011.
- **Auxiliar Student**: "Experience documentation and current status of hydric technology developed by IPSE in no interconnected zones". Jun - Dec 2010.

Education

- **Electrical Engineering** - National University of Colombia, Medellín 2006-2012. Professional card: 11043325
- **Electrical Engineering Master on Power Systems** - Advanced Research Center of the National Polytechnic Institute (Cinvestav). 2012 – 2014 (Graduation 20-Oct-2014). Working on thesis: “Filter Banks, Wavelets and multiresolution analysis for Electromagnetic Transient simulation”
  Professional card: 11124128
- **Electrical Engineering Phd on Power Systems** - Advanced Research Center of the National Polytechnic Institute (Cinvestav). 2015 – 2019 (Graduation 28-June-2019). Working on thesis: “Parallel computing for Electromagnetic Transients With Filter Banks and their implementations on FPGA and GPU”
  Professional card: 12249739

Computing tools

- Knowledge in programs as: Matlab & Simulink, ATP, PSCAD, EMTP-RV, Pspice Student, Circuitmaker, Autocad 2D, Microsoft Visual studio, Microsoft Office.
- FPGA programing with VHDL and Verilog. ISE, Vivado and Quartus.
- GPU programming with CUDA.
- Knowledge in C, C++, Visual Basic, R and Python.
- Knowledge in Real Time Power system simulations with RT-LAB, RSCAD, OPAL-RT technologies, RTDS Technologies and real time analysis in power systems.
- Basic knowledge on Cadence.

Participation in Research Groups and Academic Internships

- Tuition refund during 9 semesters in the bachelor degree in Electrical Engineer.
- Complete scholarship for Master studies.
- Complete scholarship for Doctoral studies.
- Research stay in Western Michigan University (Michigan United States) Working with Inverse Numerical Laplace Transform.
- Research stay in Universidad Michoacana (Michoacán México) Working with OPAL-RT technologies.
- Research stay in Universidad Autónoma de San Luis Potosí (San Luis Potosí México) Working with RTDS technologies.

Publications

"*Polyphase Filter-Bank Realization for the Simulation of Power System Transients*", published in: 2014 11th International Conference on Electrical Engineering, Computing Science and Automatic Control. Ciudad del Carmen - Campeche 29 Sep - 2 Oct 2014

"*Multi-Objective Optimization for Reconfiguration and Capacitor Allocation in Distribution Systems*" published in: 2014 North American Power Symposium Proceedings. Washington State University, Pullman - Washington 7-9 September 2014

"*Wavelet and Multi-rate Analysis for the Simulation of Electromagnetic Transients in Power Systems*", published in: 2014 North American Power Symposium Proceedings. Washington State University, Pullman - Washington 7-9 Sep 2014

"Numerical Laplace inversion methods for electromagnetic transient simulations," published in: 2016 North American Power Symposium (NAPS), Denver, CO oct 2016

“Sampling Approaches for the Numerical Laplace Transform and its FPGA Implementation” published in: 2014 11th International Conference on Electrical Engineering, Computing Science and Automatic Control. Ciudad de México – 26 Octubre - 28 Octubre 2017

‘’Electromagnetic-Transient analysis in the Laplace-domain through the QD algorithm’’ IPST 2019 - France.

“FPGA Implementation of a Numerical Laplace Transform Algorithm for Power System Electromagnetic-Transient Studies” ALTAE 2019.

‘’Evaluación de Transitorios Electromagnéticos en Tiempo Acelerado mediante la Transformada Numérica de Laplace en un FPGA’’ e-Gnosis [online] Vol. 18, 2020

‘’Parallel Computation of Electromagnetic Transients in Power Systems through Polyphase-QMF FIR-Filter Banks’’ at Electric Power system Research Journal ELSEVIER

‘Laplace Transform Inversion through the Theta Algorithm for Power-System EMT Analysis’’ at Electric Power system Research Journal ELSEVIER.

Areas of interest

- Hardware implementations of Power systems models FPGA and GPU and Real time and faster than real time simulations of power systems.
- Electromagnetic Transient Simulations, travelling waves modelling, overhead lines and underground cables modeling
- Time Series analysis.
- Renewable energies and Matlab with Simulink applications.
- Parallel computing tools.
- Electric and Electronic design.
- Numerical Laplace Transform Algorithms, Numerical methods and mathematic modeling.

Personal References

José Luis Naredo Villagrán, Ph.D. Researcher at Cinvestav Guadalajara phone: +52 (33) 13997163 Email: jlnaredo@gdl.cinvestav.mx

Mario Roberto Arrieta Paternina, Ph.D. Researcher at UNAM Ciudad de México Phone: +52 (33) 35597150, Email: mra.paternina@gmail.com

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