

Mauricio Junca

Departamento de Matemáticas
Universidad de los Andes
Bogotá, Colombia

Date of Birth: March 16, 1979
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Research Interest

Stochastic Optimal Control, Mathematical Finance, Optimization, Stability of Stochastic Dynamical Systems.

Education

Ph.D. Industrial Engineering and Operations Research, University of California, Berkeley, 2011.

Thesis: Optimal Execution: Price Impact and Transaction Cost.

Advisors: Xin Guo and L. Craig Evans.

M.Sc. Industrial Engineering and Operations Research, University of California, Berkeley, 2007

M.Sc. Mathematics, Universidad de los Andes, 2006.

Thesis: Block Toeplitz Matrix Preconditioning: An Application in Elasticity.

Advisor: Ahmed Ould.

B.S. Electrical Engineering, Universidad de los Andes, 2003.

B.S Mathematics, Universidad de los Andes, 2003

Thesis: Introduction to Linear Matrix Inequalities and Control Theory Applications.

Advisors: René Meziat and Alain Gauthier

Academic Positions

Universidad de los Andes, Departamento de Matemáticas, Bogotá, Colombia

Associate Professor

8/18 -

Universidad de los Andes, Departamento de Matemáticas, Bogotá, Colombia

Assistant Professor

8/13 - 7/18

Universidad de los Andes, Departamento de Matemáticas, Bogotá, Colombia

Visiting Professor/Postdoctoral Fellow

8/11 - 7/13

Universidad Politécnica de Madrid, Madrid, Spain

Research Intern

1/04 - 4/04

Discrete models development in the Applied Mathematics and Statistics Department project entitled "Mathematical models for planning public transportation systems".

Supervisor: Angel Marín.

Publications

Approximate super-resolution of positive measures in all dimensions (with H. García, C. Hernández and M. Velasco). Applied and Computational Harmonic Analysis, Vol. 52, Pag. 251-278, 2021.

Optimality of refraction strategies for a constrained dividend problem (with H. Moreno-Franco, J. L. Pérez and K. Yamazaki). Advances in Applied Probability, Vol 51 No. 3, Pag. 636-666, 2019.

Optimal bail-out dividends problem with transaction cost and capital injection constraint (with H. Moreno-Franco and J. L. Pérez). Risks, Vol. 7(1):13, 2019.

A time of ruin constrained optimal dividend problem for spectrally one-sided Lévy processes (with C. Hernández, H. Moreno-Franco). Insurance: Mathematics and Economics, Vol. 79, Pag. 57-68, 2018.

Compressed sensing of data with a known distribution (with M. Díaz, F. Rincón, M. Velasco). Applied and Computational Harmonic Analysis, Vol. 45 No. 3, Pag. 486-504, 2018.

Optimal dividend payments under a time of ruin constraint: Exponential claims (with C. Hernández). Insurance: Mathematics and Economics, Vol. 65, Pag. 136-142, 2015.

The maximum cut problem on blow-ups of multiprojective spaces (with M. Velasco). Journal of Algebraic Combinatorics, Vol. 38 No. 4, Pag. 797-827, 2013.

Optimal maintenance policy for permanently monitored infrastructure subjected to extreme events (with M. Sanchez-Silva). Probabilistic Engineering Mechanics, Vol. 33. Pag. 1-8, 2013.

Optimal maintenance policy for a compound Poisson shock model (with M. Sanchez-Silva). IEEE Transaction on Reliability, Vol. 62 No. 1, Pag. 66-72, 2013.

Optimal execution strategy in the presence of permanent price impact and fixed transaction cost. Optim. Control Appl. and Meth., Vol. 33 No. 6, Pag. 713-738, 2012.

Introducción a las desigualdades lineales matriciales y su aplicación en control automático (with V. H. Grisales, A. Gauthier). Revista Ingeniería, Vol 10 No.2, Pag. 30-37, 2005. (Spanish)

Reliability based design optimization of asphalt pavements (with M. Sanchez-Silva, O. Arroyo, S. Caro, B. Caicedo). International Journal of Pavement Engineering, Vol. 6 No. 4, Pag. 281-294, 2005.

Teaching Experience

Universidad de los Andes

Lecturer in Linear Optimization, Convex Optimization, Numerical Analysis, Introduction to Mathematical Finance, Stochastic Processes, Stochastic Calculus, Statistics, Probability, Control Theory, Differential Calculus, Integral Calculus and Linear Algebra.

University of California, Berkeley

Graduate Student Instructor in graduate course Applied Stochastic Processes and undergraduate courses Engineering Economics and Operations Research I.

Students

Carlos Cáceres (BSc. 2012) Approximation of the Value of an European Option in a Market with Frictions.

Camilo Hernández (BSc. 2013) Stochastic Control in Insurance: Optimal Dividends Payment.

Pablo García (MSc. 2013) Proyección Markoviana en Procesos de Volatilidad Estocástica con Saltos.

Juliana Arango (BSc. 2013) Modelos de optimización entera y su aplicación al problema de asignación anual de tareas en una compañía.

Mateo Díaz (BSc. 2013) Algunas propiedades de matrices codificadoras en Compressive Sensing.

Hayden Liu Weng (BS. 2014) Sobre las propiedades del método de elementos espectrales aplicado a la dinámica de fluidos.

Camilo Hernández (MSc. 2015) On De Finetti's Problem for spectrally negative Levy processes under a time of ruin constraint.

David Perdomo (joint with A. Angel) (MSc. 2015) Topological Data Analysis with Metric Learning and an Application to High-Dimensional Football Data.

Daniela Bernal (BSc. 2015) Teoría de optimización de portafolios de bonos: Aplicación en el mercado colombiano.

Julián Forero (MSc. 2015) Optimal Stopping For One Dimensional Diffusions With Maturity Type Restriction.

Mateo Díaz (joint with M. Velasco) (MSc. 2016) Compressed Sensing with an a priori Distribution.

Javier García (joint with M. Velasco) (MSc. 2016) Compressed Sensing and Coding Theory.

Jordi Bulbena (BSc. 2016) Probabilidades de ruina de una firma de seguros.

Daniel Gámez (BSc. 2016) Optimización estocástica lineal multiperiodos con políticas de decisión lineales.

Daniel Ávila (MSc. 2016) Controlled Markov Chains: Some stability problems.

Lorenza Velez (BSc. 2016) Sample Average Approximation para resolver problemas de optimización con restricciones probabilísticas.

Luis Felipe Idarraga (BSc. 2016) Un método inexacto para optimización estocástica de dos etapas.

Santiago Franco (BSc. 2016) The Mathematics behind a Continuous Time Principal - Agent Model .

Sebastián Pachón (BSc. 2017) Valoración de opciones usando el método inverso.

Rafael Amaya (BSc. 2017) Impulse control applications of Piecewise Deterministic Markov Processes (PDMP).

Diego Fonseca (MSc. 2018) Optimización Robusta Distribucional con métrica de Wasserstein y algunas aplicaciones.

Industry Experience

Applied Materials, Inc., Santa Clara, CA, USA

Summer Intern

5/07 - 8/07

Data analysis of excess and obsolete inventory in order to establish a set of trend-based alarms for items with inventory issues.

Software: MS Access, R.

SABMiller plc - Bavaria S.A., Bogotá, Colombia

Demand Forecaster

12/05 - 07/06

Time series analysis of brewed and soft drinks sales in order to forecast the demand of one third of entire sales of the company in Colombia.

Software: Stata.

éffikaz S.A., Bogotá, Colombia

Research Analyst

8/04 - 11/05

Design of discrete models and combinatorial optimization algorithms used in the software Freeway to optimize the vehicle scheduling in transit companies.

Software: GAMS/Cplex

Consulting

Melius I+D, Bogotá, Colombia

Co-founder and consultant in various projects.

Grupo Móvil, Bogotá, Colombia - 2010

Integer programming modeling to optimize long term maintenance schedule of a bus fleet.

Flores Aurora, Bogotá, Colombia - 2010

Integer programming modeling to optimize carnation and mini-carnation planting. Detailed scheduling of the planting by variety satisfying special holidays demand and fixed demand.

éffikaz S.A., Bogotá, Colombia - 2009

Improvements on optimization model for the vehicle scheduling module of Freeway and design of optimization model for bus driver scheduling.

Additional Software

Matlab, C++, AMPL/Gurobi-Cplex, R.