

Sina Rezazadeh Baghal

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ABOUT ME

I am a quantitative finance self-learner. My PhD was in numerical analysis, optimization, and machine learning methods. Later, during my internship at CMRM, CIBC, I had an invaluable exposure to quantitative finance which sparked my interest in the field. I started by reading Shreve's "Stochastic Calculus for Finance II" and have kept studying from other sources since. Also, I have 7 years of coding experience in Python and MATLAB (also familiar with C++), enjoy implementing algorithms and have work experience in neural network implementation (Pytorch).

WORK EXPERIENCE

- TD (Full Time Permanent)** Toronto, CA
Data Scientist II July 2023 - Present
 - Delivery:** Data extract pulls in SAS and SQL (Oracle). Data analytics (e.g., ML algorithms) on transaction data. Data cleaning. Time sensitive ad-hoc projects.
 - Technical Skills:** Database programming in SQL and SAS, Oracle, Python
- CIBC (Full Time Internship, 1 Year)** Toronto, CA
Quantitative Analyst Aug 2022 - July 2023
 - Delivery (FRTB IMA):** Non-Modellable Risk Factor Time Series Construction: Developed tools and methodology for time series construction of credit derivative risk factors such as single-name CDS spreads, Sector CDS spreads, CDS Index Spreads and CDS Index Volatilities. Developed methodology to identify proxy/reduced-set time series. Developed OOP style Python package using bash scripting and parallel processing to handle large data and ensure maintainability
 - Technical Skills:** Mathematical finance, FRTB, Python, Performance optimization, Parallel processing, OOP
 - Weakly Presentation:** Applications of Graph Neural Networks in finance, Chapters 1&2 of Bergomi's SV book
 - Self-Study**¹: Studied topics include: stochastic calculus, risk-neutral pricing, BSM, pricing using PDEs, exotic options, American derivatives, term structure models (Vasicek, CIR, Hull-White, Forward LIBOR), volatility smile, volatility surface (Heston, SABR) calibration and credit risk. Last but not least, I authored solutions to exercises from Shreve's "Stochastic Calculus for Finance II". See my Learning Quantitative Finance page for details.
- Huawei Noah's Ark Lab (Full Time Internship, 6 Months)** Montreal, CA
Research in neural network quantization based on product team's requirements Feb 2022 - Aug 2022
 - Delivery:** Acceleration of neural networks' SoftMax layer for both training and inference in Pytorch. Achieved baseline accuracy using only the optimal number of bits required for classification i.e., $\lceil \log_2 c \rceil$ where c is the number of classes
 - Technical Skills:** Pytorch, Python, Customized training of neural networks
 - Research and Collaboration:** Ideal bit-allocation for training different layers of nns, batch-norm quantization, impact of weights distributional assumptions on quantization, exploding/vanishing gradients, binarization of transformers
- University of Waterloo** Waterloo, CA
Postdoctoral (at CS dept.) and Graduate Researcher (at C&O dept.) May 2016 - Feb 2022
 - Research:** Conducted research in stochastic optimization and graph neural networks
 - Technical Skills:** Numerical Analysis, Optimization, Statistics, Machine learning, Python, CPU/GPU, C++, MATLAB, Parallel processing, Dask, Spark, Code performance optimization, Object oriented programming
 - Tutorial Sessions:** Numerical Computation, Linear Algebra, Introduction to Optimization, Fundamental of Optimization, Semi-definite Programming, Portfolio Optimization, Deterministic OR Models
- Young Scholars Club (Seasonal - Part Time)** Tehran, IR
Mathematical Olympiad Coach Sep 2006 - May 2016
 - Teaching:** Algebraic Combinatorics, Analytic Number Theory, Probability Theory, and Algebra
 - Problem Solving:** Held challenging problem solving (e.g., Putnam) sessions so students develop their math. skills
 - Problem Design:** Part of problem designing committee for Iranian mathematical Olympiad exams²

EDUCATION

- University of Waterloo** Waterloo, CA
PhD in Mathematical Optimization at the department of Combinatorics & Optimization May 2016 - Apr 2021
Thesis: Simple Termination Criteria for Stochastic Gradient Descent Algorithm
- Sharif University of Technology** Tehran, IR
Bachelor's and Master's degree in Fundamental Mathematics Sept 2006 - July 2012
I studied Algebraic Geometry and Number Theory during this time.

SELECTED HONORS AND AWARDS

Iranian Mathematical Olympiad (Silver Medal, 2005)³

¹I started learning quantitative finance at CIBC and have continued my studies independently since starting a non-quant position

²e.g., I created the following : Does there exists two functions $f, g : \mathbb{R} \rightarrow \mathbb{R}$ s.t. $|f(x) - f(y)| + |g(x) - g(y)| > 1, \forall x \neq y$?

³Olympiad medals are awarded annually to 40 out of 320,000 competing students