Özenç Güngör, Ph.D.

Profile

Quantitative developer specializing in credit risk and derivatives pricing with expertise in adjoint differentiation, stochastic calculus, and high-performance C++. Track record of delivering production systems. PhD in theoretical physics with a mathematical physics research background.

Contact details

@ ozenc@gungor.cc
+12167857335
+447909874314
ozencgungor
ozencgungor-google scholar

Education

Middle East Technical University
BS Physics
2007 to 2013

Middle East Technical University
MS Physics
2013 to 2015

Case Western Reserve University
PhD Physics
2015 to 2022

Employment

Quantitative Developer — **Nov. 2022 – Current**
Nomura — *New York, NY and London, UK*
Credit Risk Pricing Team

Research and Teaching Assistant — **2015 – 2022**
Case Western Reserve University — *Cleveland, OH*

Research and Teaching Assistant — **2012 – 2015**
Middle East Technical University — *Ankara, TURKEY*

Experience

Quantitative Developer
Credit Risk Pricing Engines — **Nov. 2022 – Current**
Senior Software Developer

- Part of a global team that led the effort to transform the firm's credit risk pricing engine to use adjoint differentiation in C++ for SA-CVA and forward SIMM IM calculations, ultimately resulting in $3B in capital savings.
- Responsible for enhancing and developing pricers for callables/exotics and American options using adjoint differentiation compatible regression methods for calculating PV and future sensitivities.
- Lead developer and quant analyst in building and maintaining an easy to use Python API for risk managers and traders to access the firm's credit risk engine, giving them the ability to inspect, visualize and make informed decisions based on future market scenarios and sensitivities.
- Improved equity model calibration performance by implementing adjoint differentiation for gradient computation, reducing calibration time by half while improving market price fitting accuracy.
- Lead developer and quant analyst in developing dynamic margin period of risk scenarios and improved handling of cross-asset correlations to better capture wrong-way risk.
- Collaborated with front office to develop and implement Contingent CDS pricing model, enabling synthetic risk transfers and increasing deal volume with uncollateralized counterparties.
- Lead quant analyst in developing marginal risk breakdown methodologies for trade level exposure and CVA calculations, allowing CVA traders and risk managers to better optimize their portfolios and improve the accuracy of desk level Tier 1 and ACVA capital allocation.
- Part of the team leading the effort for developing early warning indicators for the firm's counterparties by capturing outlier moves, contagion risk and adverse news sentiment for creditworthiness.

Theoretical Physics Research — **2015 – 2022**
Machine Learning

- Responsible for developing data input pipelines to simulate, analyze and interpret Cosmic Microwave Background (CMB) data to train neural networks.
- Responsible for developing graph neural network based ML pipelines to classify CMB data for different spatial topologies.

Other research

- Responsible for developing novel graph theoretical and Markovian dynamics methods for optimal external control to speed up and steer the evolution of statistical and Markovian systems.
- Theoretical and numerical studies of numerical stability of bouncing cosmologies using PDE methods.

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2015 to 2022

Skills

Hard skills: Quantitative Finance, Mathematical Modeling, Stochastic Calculus, Physics, Statistical Methods, Advanced Calculus, Numerical Analysis
Programming: C++: Numerical Methods, Algorithmic Differentiation, Monte-Carlo; Python: Data Science stack; Bash
Technologies/Frameworks: Shell, Shell script, AWS, Linux, GitLab, Grafana, Agile
Data: Data collection, Data cleaning, Data analysis and visualization, Data simulation, Signal detection
Machine Learning: Graph Neural Networks, random-forests, classification, clustering
Workflow: Docker, AWS, Jenkins, Ansible, Excel, High Performance Computing Clusters
Soft skills: Analytical Thinking, Research, Project Management, Collaboration, Leadership and Mentoring, Strong oral and written communication

Selected Publications

[1] Shamreen Iram, Emily Dolson, Joshua Chiel, Julia Pelesko, Nikhil Krishnan, Özenç Güngör, Benjamin Kuznets-Speck, Sebastian Deffner, Efe Ilker, Jacob G Scott, Michael Hinczewski *"Controlling the speed and trajectory of evolution with counterdiabatic driving"*, Nat. Phys. 17, 135–142 (2021)

[2] Efe Ilker, Özenç Güngör, Benjamin Kuznets-Speck, Joshua Chiel, Sebastian Deffner, Michael Hinczewski, *"Shortcuts in Stochastic Systems and Control of Biophysical Processes"*, Phys. Rev. X 12, 021048 (2022)

[3] Yashar Akrami, Stefano Anselmi, Craig J Copi, Johannes R Eskilt, Andrew H Jaffe, Arthur Kosowsky, Pip Petersen, Glenn D Starkman, Kevin González-Quesada, Özenç Güngör, Deyan P Mihaylov, Samanta Saha, Andrius Tamosiunas, Quinn Taylor, Valeri Vardanyan, Compact Collaboration, *" Promise of Future Searches for Cosmic Topology "*, Phys. Rev. Lett. 132, 171501 (2024)

[4] Andrius Tamosiunas, Fernando Cornet-Gomez, Yashar Akrami, Stefano Anselmi, Javier Carrón Duque, Craig J Copi, Johannes R Eskilt, Özenç Güngör, Andrew H Jaffe, Arthur Kosowsky, Mikel Martin Barandiaran, James B Mertens, Deyan P Mihaylov, Thiago S Pereira, Samanta Saha, Amirhossein Samandar, Glenn D Starkman, Quinn Taylor, Valeri Vardanyan, COMPACT collaboration, *"Cosmic topology. Part IVa. Classification of manifolds using machine learning: a case study with small toroidal universes"*, JCAP09(2024)057

[5] Johannes R Eskilt, Yashar Akrami, Stefano Anselmi, Craig J Copi, Andrew H Jaffe, Arthur Kosowsky, Deyan P Mihaylov, Glenn D Starkman, Andrius Tamosiunas, James B Mertens, Pip Petersen, Samanta Saha, Quinn Taylor, Özenç Güngör, COMPACT collaboration, *"Cosmic topology. Part IIa. Eigenmodes, correlation matrices, and detectability of orientable Euclidean manifolds"*, JCAP03(2024)036