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Associate Professor of Mathematics

Stochastic Analysis · Mathematical Finance · Actuarial Mathematics

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ACADEMIC PROFILE

Associate Professor of Mathematics at Shahrood University of Technology whose research focuses on Applied Probability, Stochastic Analysis, Mathematical Finance, and Actuarial Mathematics. My research develops fractional and stochastic frameworks for option pricing, insurance risk models and ruin theory with recent work on ψ -Caputo stochastic models and stochastic volatility. I am the author or coauthor of **34 peer-reviewed journal articles** and have supervised or co-supervised **34 graduate theses**. My research has included international collaborations with researchers in France and Poland, and I welcome opportunities for international collaboration in stochastic processes, actuarial science and mathematical finance.



RESEARCH INTERESTS

Applied Probability, Stochastic Analysis, Mathematical Finance, Insurance Risk, Ruin Theory, Actuarial Mathematics and, Lévy Processes



RESEARCH EXPERTISE

Stochastic Differential Equations · Backward SDEs · G-Expectation · Mathematical Finance · Option Pricing · Insurance Risk · Ruin Theory · Fractional Calculus · Lévy Processes · Stochastic Volatility Models · Point Processes · Poisson Point Process · Computational Mathematics.



RESEARCH HIGHLIGHTS

- Developed Lie-symmetry, conservation-law, and invariant-subspace methods for time-fractional Fokker–Planck–Kolmogorov and related equations arising in option pricing.
- Introduced fractional and ψ -Caputo stochastic models for option pricing under stochastic-volatility frameworks (Heston, double-Heston, Hull–White) and in fractional / foreign-exchange markets.
- Applied neural-network and machine-learning techniques (probabilistic neural networks, multilayer perceptrons, finite-difference schemes) to option pricing and pricing-error analysis in nonlinear markets.



RESEARCH IMPACT

- **Google Scholar:** 229 citations, h-index 8, i10-index 7.
- 34 peer-reviewed journal articles.
- 22 conference presentations.
- Supervised or co-supervised 34 graduate theses (1 Ph.D., 33 M.Sc.) — as principal supervisor (24 M.Sc.) and as advisor (1 Ph.D., 2 M.Sc.) — reflecting a sustained, self-built graduate research program.

- Invited research visitor at the Centre de Physique Théorique (CPT), Marseille, France, and the Banach Center (IMPAN), Warsaw, Poland.
- Reviewer for 15 international journals, including *Financial Innovation* and the *Journal of Applied Mathematics* (Wiley).



EDUCATION

- **Ph.D., Mathematics — Probability Theory**, University of Guilan, Iran, 2007–2011.
Thesis: “On Symmetric Random Measures and Convergence of Random Riemann and Riemann–Stieltjes Sums.” **Supervisor: Dr Asghar Varsei (PhD, MSc, BSc, honors, Manchester).**
- **M.Sc., Mathematics — Analysis & Probability Theory**, University of Guilan, Iran, 2005–2007.
Supervisor: Dr Asghar Varsei (PhD, MSc, BSc, honors, Manchester).



HONORS & AWARDS

- **Ph.D. Scholarship** — awarded a doctoral fellowship during Ph.D. studies (2007–2011).



ACADEMIC APPOINTMENTS

- **Assistant Professor**, Department of Mathematics and Statistics, Faculty of Mathematical Sciences, Shahrood University of Technology, Iran (2012–2020).
- **Associate Professor**, Department of Mathematics and Statistics, Faculty of Mathematical Sciences, Shahrood University of Technology, Iran (2020–present).



RESEARCH EXPERIENCE & INTERNATIONAL COLLABORATION

- Invited Research Visitor, Centre de Physique Théorique (CPT), Marseille, France (French government).
- Research Visitor, Banach Center (IMPAN), Warsaw, Poland (Shahrood University funded).



PUBLICATIONS *34 articles · h-index 8 · 229 citations*

The list below reproduces the 20 highest-cited entries currently shown on the author's public Google Scholar profile (out of the 34 total journal articles reported), each cross-checked against Journal Citation Reports (JCR) 2024 for Impact Factor and Quartile. Ordered by year, most recent first.

- Sahebi Fard, H., Dastranj, E., Jajarmi, A. (2025). “A novel fractional stochastic model equipped with Ψ -Caputo fractional derivative in a financial market.” *Mathematical Methods in the Applied Sciences*, 48(9), 9653–9661. **(Q1 · 2024 JIF 1.8)**
- Sahebi Fard, H., Dastranj, E., Hejazi, R., Jajarmi, A. (2024). “Analytical and numerical solutions for a special nonlinear equation.” *International Journal of Financial Engineering*, 11(01), 2350057. **(Q4 · 2024 JIF 0.6)**
- Araghi, M., Dastranj, E., Abdolbaghi Ataabadi, A., Sahebi Fard, H. (2024). “Option pricing with artificial neural network in a time-dependent market.” *Advances in Mathematical Finance and Applications*, 2(2), 723.
- Dastranj, E., Sahebi Fard, F.H. (2022). “Exact solutions and numerical simulation for Bakstein–Howison model.” *Computational Methods for Differential Equations*, 10(2), 461–474. **(Q2 · 2024 JIF 1.3)**
- Sahebi, F.H., Dastranj, E., Abdolbaghi, A.A. (2022). “Analytical and numerical solutions for the pricing of a combination of two financial derivatives in a market under Hull–White model.” *Advances in Mathematical Finance and Applications*, 7(4), 1013–1023.

- Dastranj, E., Sahebi Fard, H., Abdolbaghi, A., Hejazi, S.R. (2020). "Power option pricing under the unstable conditions (evidence of power option pricing under fractional Heston model in the Iran gold market)." *Physica A: Statistical Mechanics and its Applications*, 537, 122690. (Q2 · 2024 JIF 3.1)
- Hejazi, S.R., Habibi, N., Dastranj, E., Lashkarian, E. (2020). "Numerical approximations for time-fractional Fokker–Planck–Kolmogorov equation of geometric Brownian motion." *Journal of Interdisciplinary Mathematics*, 23(7), 1387–1403. (Q2 · 2024 JIF 0.8)
- Dastranj, E., Sahebi Fard, H., Abdolbaghi, A., Latifi, R. (2020). "A comparison between the pricing of capped and power options on the basis of arbitrage prevention: evidence from a stochastic market with double stochastic volatility." *Journal of Asset Management and Financing*, 8(2), 89–103.
- Sahebi, F.H., Dastranj, E., Abdolbaghi, A.A., Hejazi, S.R., Motamednezhad, A. (2020). "Power option pricing under Heston model (evidences of Tehran stock exchange)." *Investment Knowledge*, 9(33), 241–257.
- Naderifard, A., Hejazi, S.R., Dastranj, E. (2020). "Conservation laws of the time-fractional Zakharov–Kuznetsov–Burgers equation." *Kragujevac Journal of Mathematics*, 44(1), 75–88. (Q2 · 2024 JIF 0.6)
- Naderifard, A., Hejazi, S.R., Dastranj, E. (2019). "Symmetry properties, conservation laws and exact solutions of time-fractional irrigation equation." *Waves in Random and Complex Media*, 29(1), 178–194.
- Habibi, N., Lashkarian, E., Dastranj, E., Hejazi, S.R. (2019). "Lie symmetry analysis, conservation laws and numerical approximations of time-fractional Fokker–Planck equations for special stochastic process in foreign exchange markets." *Physica A: Statistical Mechanics and its Applications*, 513, 750–766. (Q2 · 2024 JIF 3.1)
- Naderifard, A., Hejazi, S.R., Dastranj, E., Motamednezhad, A. (2019). "Symmetry operators and exact solutions of a type of time-fractional Burgers–KdV equation." *International Journal of Geometric Methods in Modern Physics*, 16(02), 1950032. (Q1 · 2024 JIF 2.2)
- Lashkarian, E., Hejazi, S.R., Dastranj, E. (2018). "Conservation laws of $(3+\alpha)$ -dimensional time-fractional diffusion equation." *Computers & Mathematics with Applications*, 75(3), 740–754. (Q1 · 2024 JIF 2.5)
- Rashidi, S., Hejazi, S.R., Dastranj, E. (2018). "Approximate symmetry analysis of nonlinear Rayleigh-wave equation." *International Journal of Geometric Methods in Modern Physics*, 15(04), 1850055. (Q1 · 2024 JIF 2.2)
- Saberi, E., Hejazi, S.R., Dastranj, E. (2018). "A new method for option pricing via time-fractional PDE." *Asian-European Journal of Mathematics*, 11(05), 1850074. (Q3 · 2024 JIF 0.5)
- Dastranj, E., Hejazi, S.R. (2018). "Exact solutions for Fokker–Planck equation of geometric Brownian motion with Lie point symmetries." *Computational Methods for Differential Equations*, 6(3), 372–379. (Q2 · 2024 JIF 1.3)
- Naderifard, A., Dastranj, E., Hejazi, S.R. (2018). "Exact solutions for time-fractional Fokker–Planck–Kolmogorov equation of geometric Brownian motion via Lie point symmetries." *International Journal of Financial Engineering*, 5(02), 1850009. (Q4 · 2024 JIF 0.6)
- Dastranj, E., Hejazi, S.R. (2017). "New solutions for Fokker–Planck equation of special stochastic process via Lie point symmetries." *Computational Methods for Differential Equations*, 5(1), 30–42. (Q2 · 2024 JIF 1.3)
- Dastranj, E., Latifi, R. (2017). "A comparison of option pricing models." *International Journal of Financial Engineering*, 4(02n03), 1750024. (Q4 · 2024 JIF 0.6)



MANUSCRIPTS IN PREPARATION

- Seifi, M., Dastranj, E., *A manuscript on insurance risk and applied probability* (in preparation).



INVITED & CONFERENCE PRESENTATIONS

- *European option pricing under Bates model*. The 4th Conference on Financial Mathematics and Applications, Yazd University, Iran, 2019.

- *Power option pricing under fractional double Heston model*. 49th Annual Iranian Mathematics Conference, Iran University of Science and Technology, Iran, 2019.
- *Zero coupon bonds pricing under the Hull–White model via fast Fourier transform method*. The 2nd National Congress on Mathematics and Statistics, Gonbad Kavous University, Iran, 2020.
- *Invariant analysis of a special case of Fokker–Planck equation of the Heston model*. The 15th Seminar on Differential Equations and Dynamical Systems, University of Guilan, Iran, 2021.
- *European option pricing using neural network*. The 16th Seminar on Differential Equations and Dynamical Systems, University of Tabriz, Iran, 2022.
- *Exact solution for non-linear Black–Scholes using Lie group algebra*. 54th Annual Iranian Mathematics Conference, University of Zanjan, Iran, 2023.

Complete list of conference presentations available upon request (total: 22).



FUNDED RESEARCH PROJECTS

Principal Investigator

- **Option pricing of power options under a combined Markov jump-diffusion model with stochastic volatility**. Shahrood University of Technology (Internal Grant), 2016 (6 months). Status: Completed.
- **Mathematical modeling of a risk measure in a financial market**. Shahrood University of Technology (Internal Grant), 2015 (11 months). Status: Completed.



GRADUATE SUPERVISION

Ph.D. Supervision

- As principal supervisor: 1
- As advisor only: 1

M.Sc. Supervision

- As principal supervisor: 24
- As co-supervisor: 9
- As advisor only: 2

Representative Thesis Topics

Stochastic Differential Equations · Option Pricing · Insurance Risk Models · Ruin Probability · Lévy Processes · Financial Mathematics · Fractional Differential Equations · G-Brownian Motion.

Representative Theses (Selected)

- **Hossein Sahebi Fard (2025)**, “Results of stochastic and generalized fractional differential equations and some of their applications,” Ph.D. Thesis, Shahrood University of Technology.
- **Azadeh Naderifard (2019, as advisor; principal supervisor: S.R. Hejazi)**, “Analyzing of fractional differential equations and their applications in solving some equations in financial mathematics,” Ph.D. Thesis, Shahrood University of Technology.
- **Mohammad Hossein Seifi (2024)**, “Conservation laws and new solutions for option pricing in some nonlinear markets,” M.Sc. Thesis, Shahrood University of Technology.
- **Niloufar Pourkhosravi (2024)**, “Bond pricing in markets with a stochastic interest rate,” M.Sc. Thesis, Shahrood University of Technology.
- **Mehran Araghi (2023)**, “Option pricing based on neural networks in the Heston and time-dependent market,” M.Sc. Thesis, Shahrood University of Technology.
- **Ali Arabi (2022)**, “Pricing of barrier options under several stochastic models in the Tehran Stock Exchange,” M.Sc. Thesis, Shahrood University of Technology.

- **Hadis Eesapour (2016)**, "The ruin probability of the insurance company in a market with compound Poisson model," M.Sc. Thesis, Shahrood University of Technology.
- **Seyed Hassan Eshaghi (2016)**, "Stochastic modeling for risk investments in the insurance industry," M.Sc. Thesis, Shahrood University of Technology.
- **Hossein Mohammad Khani (2016)**, "A martingale representation for the maximum of a Lévy process," M.Sc. Thesis, Shahrood University of Technology.
- **Atena Ebrahimbeygi (2015)**, "G-Brownian motion and its applications," M.Sc. Thesis, Shahrood University of Technology.



TEACHING EXPERIENCE

- **Financial Mathematics** — M.Sc., Shahrood University of Technology, 2014–present.
- **Stochastic Analysis** — Ph.D., Shahrood University of Technology, 2018–present.
- **Real Analysis** — M.Sc., Shahrood University of Technology, 2012–present.
- **Probability Theory** — M.Sc., Shahrood University of Technology, 2012–present.
- **Mathematical Analysis** — B.Sc., Shahrood University of Technology, 2012–present.
- **Differential Equations** — B.Sc., Shahrood University of Technology, 2012–present.
- **Probability and Statistics** — B.Sc., University of Guilan, 2008 and 2009.
- **Calculus** — B.Sc., Shahrood University of Technology, 2012–present.
- **Foundations of Mathematics** — B.Sc., Shahrood University of Technology, 2012–present.

Teaching Interests

Probability Theory · Stochastic Analysis · Mathematical Finance · Real Analysis...Real Analysis...Insurance Risk · Applied Probability · Differential Equations · Computational Mathematics.



PROFESSIONAL SERVICE & REVIEWING

Journal Reviewer (ordered by prominence)

Financial Innovation · Journal of Applied Mathematics (Wiley) · Fractional Calculus and Applied Analysis · Waves in Random and Complex Media · Complex and Nonlinear Systems · Caspian Journal of Mathematical Sciences · Sigma Journal of Engineering and Natural Sciences · Journal of Mahani Mathematical Research Center · Journal of Advanced Mathematical Modeling · Journal of Asset Management and Financing · The Journal of Finance and Corporate Sustainability · The Journal of Economic Policy · International Journal of Modeling, Simulation & Scientific Computing · Journal of Heat and Mass Transfer Research · Applied Computational Intelligence and Soft Computing.

Conference Reviewer

54th Annual Iranian Mathematics Conference.