Davood Ahmadian

Curriculum Vitae

*Associate Professor of Financial Mathematics
and Stochastic Analysis, University of Tabriz, Tabriz, Iran*

Personal Details

Gender	Male
Date of birth	31th March, 1985
Place of birth	Tabriz, Iran
Present Citizenship	Iranian

Education

2009–2013 **PhD in Applied Mathematics**, *Iran University of Science and Technology (IUST)*, Tabriz, *GPA − 18.85*.

2006–2008 **Masters of Applied Mathematics**, *Iran University of Science and Technology (IUST)*, Tehran, *GPA − 17.36*.

2003–2006 **Bachelor of Mathematics Education**, *University of Tabriz*, Tabriz, *GPA − 15.54*.

Masters Thesis

Title *Homotopy Analysis Method for Solving System of Nonlinear Equation.*

Supervisor Prof. Ahmad Golbabai

PhD Thesis

Title *Numerical Methods in Solving Models of American Option Pricing.*

Supervisor Prof. Ahmad Golbabai

Teaching Experience

2013–Present Calculus, Numerical Analysis and Computations and Engineering Mathematics at the University of Tabriz

Faculty of Mathematics, Statistics and Computer Sciences, University of Tabriz, 29 Bahman St., Tabriz,
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2014–Present	Stochastic Differential Equation, Mathematical Finance and Financial Engineering at the University of Tabriz
2016–Present	Numerical Methods for Stochastic Differential Equations at Azarbaijan Shahid Madani University
2017–2018	Financial Engineering at the University of Bonab
2021–2022	Application of Statistics in Quantitative and Qualitative Research at the University of Tabriz
2021–2022	Advanced Financial Engineering at UCNA

Awards

2011	Winner of "Tabriz University scholarship", University of Tabriz, Tabriz, Iran.
2021	*External assessor of the Ph.D. thesis titled "Derivatives in the Post Financial Crisis Era: Pricing Under Models with Stochastic Volatility"*, Amount 100 €, May 2021, from the Faculty of Science, University of Mauritius.
2022	The University of Tabriz's top technology in attracting non-resident Iranians in 1402.
2023	Outstanding Young Researcher at the Provincial Level in 2023.

Responsibility

2019	Head of Technology Cooperation Group, University of Tabriz, Tabriz, Iran

Present Research/Professional Speciality

- Financial Markets Including Credit Risk and the Copula Functions
- Numerical Methods for PDE's Arisen in Financial Derivatives
- Numerical Analysis and Methods of Stochastic Differential Equations
- Neural Network and Deep Learning with Application in Analysing Financial, Energy and Biology Data

Visiting Positions

2017	Sabbatical research under the supervision of professor Wolgfgang Breymann and Dr. Erich Walter Farkas in the Zurich University of Applied Sciences, April-2017 ZHAW School of Engineering, Switzerland.
2018	Sabbatical research under the supervision of Professor Luca Vincenzo Ballestra Department of Statistical Sciences, Amount 800 €, September 2018, Alma Mater Studiorum University of Bologna, Via delle Belle Arti 41, 40126 Bologna, Italy.
2019	Sabbatical research under the supervision of Professor Luca Vincenzo Ballestra Department of Statistical Sciences, Amount 900 €, September 2019, Alma Mater Studiorum University of Bologna, Via delle Belle Arti 41, 40126 Bologna, Italy.

2019 *Workshop on "Introduction to Computational Finance: Applications in Option Pricing"*, Amount 1000 €, May 2019, Department of Statistical Sciences, Alma Mater Studiorum University of Bologna, Via delle Belle Arti 41, 40126 Bologna, Italy.

2022 Sabbatical research under the supervision of Professor Luca Vincenzo Ballestra Department of Statistical Sciences, Amount 1560 €, September 2022, Alma Mater Studiorum University of Bologna, Via delle Belle Arti 41, 40126 Bologna, Italy.

Grants

2021 Research Grant Cooporartion with Dr. Mohamadreza Chalak Ghazani, The Vice-Presidency for Science and Technology, Application of Neural Network and Deep Learning on Financial Data, October 2021, Amount 1700 €.

2021 Research Grant Cooporartion with Dr. Rohollah Alizadeh Sani, The Vice-Presidency for Science and Technology, Application of Neural Network and Deep Learning on Biology Data, September 2021, Amount 1700 €.

2022 Research Grant Cooporartion with Dr. Amir Jalili, Random Matrix Theory in Financial Anlysis, The Vice-Presidency for Science and Technology, March 2022, Amount 1700 €.

Workshops & Conferences

2024 **D. Ahmadian**, A. Fazlzadeh, S. Naghdi, V. Ahmadian, Forecasting crude oil price based on heston-nandi-garch-ann Hybrid model, 2 International Symposium on Insurance, Banking and Finance, 21-23 December 2023, Erzurum / TURKİYE.

2024 S. Naghdi, M. R. F. Sorkhabi, A. Fazlzadeh, V. ahmadian, **D. Ahmadian**, Investigating the effectiveness of regulatory technology mechanisms (regtech) in preventing money laundering in the banking system, 2 International Symposium on Insurance, Banking and Finance, 21-23 December 2023, Erzurum / TURKİYE.

2023 M. Biglari, **D. Ahmadian**, An efficient Monte Carlo variance reduction method for valuation of geometric Asian option under the variance gamma process, 8th FINACT-IRAN International on Financial and Actuarial Mathematics, 18-20 July 2023, Kharazmi University, Tehran-Iran.

2020 V. Rahimi, **D. Ahmadian**, Diagonally Drift Balanced Stochastic Runge–Kutta Methods of Second-Order for Stochastic Differential System of Equations, 7th Seminar of Mathematics and Humanities (Financial Mathematic), 11-12 May 2022, Allameh Tabataba'i University, Tehran, Iran.

2020 **D. Ahmadian**, L. V. Ballestra, Pricing Arithmatic Asian option using the control variate thechnique, The 6th FINACT-IRAN National Conference and 4th Workshop on Financial and Actuarial Mathematics, February 1-4, 2020, School of Mathematics, IPM, Tehran, Iran

2019 **D. Ahmadian**, L. V. Ballestra, A Very Efficient Approach for Pricing Geometric Asian Rainbow Options described by the mixed fractional Brownian motion, 8th International Eurasian Conference on Mathematical Sciences and Applications (IECMSA-2019), August 27-30, 2019, Baku, Azerbaijan.

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2018   O. Farkhondeh Rouz, **D. Ahmadian**, A closed form series solution for nonlinear Black- Scholes equation, 14th seminar on Differential Equations, Dynamical Systems and Applications (DEDSA), 17-19 July 2018, Institute for Advanced Studies in Basic Sciences, Zanjan-Iran.

2018   O. Farkhondeh Rouz, **D. Ahmadian**, mean square convergence of split step θ Milstein method for stochastic delay differential equations, 5th Seminar of Mathematics and Humanities Mathematical Finance (Femath5), 9-10 May 2018, Department of Mathematics and Computer Sciences at Allameh Tabataba'i University (ATU), Tehran- Iran.

2018   **D. Ahmadian**, Skew Laplace normal Copula Functions with application in Insurance, The 5th FINACT-IRAN National Conference on Financial and Actuarial Mathematics, 22-25 December 2018, Khatam University, Tehran-Iran.

2017   **D. Ahmadian**, L. V. Ballestra, A Highly Accurate Numerical Method with Application to Finance: Survival Probability Model, The 9th edition of International Finance Conference, IFC9, 11-12 March 2017, Paris-France.

2017   O. Farkhondeh Rouz, **D. Ahmadian**, M Milev, Exponential mean-square stability of two classes of theta Milstein methods for stochastic delay differential equations, AIP Conference Proceedings 1910 (1), 060015, 7 December 2017

2017   **D. Ahmadian**, High Order Finite Element Method In Insurance Mathematics, International Conference on Applied Analysis and Mathematical Modelling, 3-7 July 2017, Gelisim University, (ICAAMM2017), Istanbul-Turkey

2016   O. Farkhonde Rouz, **D. Ahmadian**, Stability analysis of two-classes od theta Milstein schemes for stochastic differential delay equations, The 6th seminar on numerical analysis and its application, 20-21 July 2016, Maragheh-Iran.

2016   **D. Ahmadian**, Superconvergence of Finite Element Method in Computing Survival Probability Based on Stochastic Differential Equation, The 6th seminar on numerical analysis and its application, 20-21 July 2016, Maragheh-Iran.

2015   **D. Ahmadian**, Superconvergence of the finite element method and Richardson extrapolation scheme with application to finance, 12th Seminar on Differential Equations and Dynamical Systems, 27–29 May 2015, University of Tabriz, Tabriz, Iran.

2013   **D. Ahmadian**, Evaluation of Finite Element Method to price discrete double barrier option in a CEV model with Jump, 3th Conference Mathematics and Humanities Sciences, April 24-25, Allameh University, Tehran-Iran.

2012   **D. Ahmadian**, A. Golbabai, H. Rezazadeh, Pricing American Options by the Finite Element Method, 3th Conference on Financial Mathematics & Applications, January 30-31 2013, Semnan University, Semnan, Iran.

2012   A. Golbabai, **D. Ahmadian**, Superconvergence of a finite element approximation to the solution of double discrete barrier option, 43th Annual Iranian Mathematics Conference, August 27-30, University of Tabriz, Tabriz-Iran.

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✉ *d.ahmadian@tabrizu.ac.ir; d.ahmadian1985@gmail.com*   *4/8*

2011   A. Golbabai,   **D. Ahmadian**, Radial Base Function Method with application to Finance: American Put Option under Jump Diffusion, 2th Seminar of Financial Mathematics and Social Network, February 16-18, Institute for Advanced Studies in Basic Sciences, Zanjan-Iran

2010   A. Golbabai, **D. Ahmadian**, Homotopy Analysis Method for S olving the Eigenvalues of Shrodinger Equation, 41th Annual Iranian Mathematics Conference, September 12-15, Urmia University, Urmia-Iran

Publications

1. V. Rahimi, **D. Ahmadian**, Stability analysis of stochastic Lyapunov functions: Applications to memristor neural networks, *Mathematical Methods in the Applied Sciences*, January 2025, https://doi.org/10.1002/mma.10574.

2. O. Farkhonde Rooz, S. Shahmorad, **D. Ahmadian**, Double weakly singular kernels in stochastic Volterra integral equations with application to the rough Heston model, *Applied Mathematics and Computation* , September 2023, https://doi.org/10.1016/j.amc.2024.128720.

3. A. S. Hashim, E. Najafi, **D. Ahmadian**, and O. Farkhondeh Rouz. Investigation of convergence analysis of stochastic Heston model with one singular point, *Computational Methods for Differential Equations*, January 2025 2025, Accepted.

4. A. Jalili, H. Sabri, **D. Ahmadian**, Z. Saleki, Y. A. Luo and C. A. Xi, Spectral fluctuations in financial systems: an integrated random matrix theory and machine learning perspective, *European Physical Journal Plus* , October 2024, https://doi.org/10.1140/epjp/s13360-024-05760-5.

5. A. Hosseinnezhad, A. jalili majarshin, Y. A. Luo, **D. Ahmadian**, H. Sabri, Deformation in $92{-}128$Pd isotopes, *NUCLEAR PHYSICS A*, June 2022, https://doi.org/10.1016/j.nuclphysa.2022.122523

6. V. Rahimi, **D. Ahmadian**, A. Rathinasamy , Stability and convergence analysis of stochastic Runge–Kutta and balanced stochastic Runge–Kutta methods for solving stochastic differential equations, *Journal of Applied Mathematics and Computing*, February 2024, https://doi.org/10.1007/s12190-024-02269-z.

7. **D. Ahmadian**, N. Parvini and L.V. Ballestra, Forecasting Cryptocurrency Prices Using Support Vector Regression Enhanced by Particle Swarm Optimizatio, *Computational Economics*, November 2024, https://doi.org/10.1007/s10614-024-10809-9.

8. F. Shokrollahi, **D. Ahmadian**, L.V. Ballestra, Pricing Asian options under the mixed fractional Brownian motion with jumps, *Mathematics and Computers in Simulation*, June. 2024, Accepted.

9. V. Rahimi, **D. Ahmadian**, L.V. Ballestra, Construction and Mean-Square Stability Analysis of a New Family of Stochastic Runge-Kutta Methods, *Applied Mathematics and Computation*, Jan. 2024, Accepted.

10. **D. Ahmadian**, L.V. Ballestra, F. Shokrollahi, A Monte-Carlo Approach for Pricing Arithmetic Asian Rainbow Options under the Mixed Fractional Brownian Motion, Chaos, Solitons & Fractals, March 2022, Accepted.

11. N. Parvini, **D. Ahmadian**, A. Fazlzadeh, Forecasting Bitcoin returns with long short-term memory networks and wavelet decomposition: A comparison of several market determinants, Applied Soft Computing, March 2022, Accepted.

12. **D. Ahmadian**, A. Ebrahimi, K. Ivaz, M. Milev, An investigation on the existence and uniqueness analysis of the optimal exercise boundary of American put option, Filomat, Vol 35, No 4 (2021).

13. O. Farkhondeh Rouz, **D. Ahmadian**, Mean-square stability of a constructed Third-order stochas-

tic Runge–Kutta schemes for general stochastic differential equations, Computational Methods for Differential Equations, May. 2021, In Press.

14. **D. Ahmadian**, L. V. Ballestra, The Finite Element Method: A High-Performing Approach for Computing the Probability of Ruin and Solving Other Ruin-Related Problems, Mathematical Methods in the Applied Sciences, Vol. 44, Nov. 2021.

15. M. Shahmoradi, **D. Ahmadian**, M. Ranjbar, Mean-square stability of 1.5 strong convergence orders of diagonally drift Runge-Kutta methods for a class of stochastic differential equations, Computational and Applied Mathematics, Vol. 40, April 2021.

16. **D. Ahmadian**, L. V. Ballestra, N. Karimi, An Extremely Efficient Numerical Method for Pricing Options in the Black-Scholes Model with Jumpss, Mathematical Methods in the Applied Sciences, Vol. 44, Sep. 2020.

17. A. Safdari, **D. Ahmadian**, R. J. Jahromi, An approximation scheme for option pricing under two-state continuous CAPM, Computational Economics, Vol. 57, April 2021.

18. O. Farkhondeh Rouz, **D. Ahmadian**, Exponential mean-square stability of numerical solutions for stochastic delay integrodifferential equations with Poisson jump, Journal of Inequalities and Applications, Vol. 186, Jul. 2020.

19. A. Rathinasamy, **D. Ahmadian**, P. Naira, Second-order balanced stochastic Runge-Kutta methods with multi-dimensional studies, Journal of Computational and Applied Mathematics, Vol. 377, Oct. 2020.

20. **D. Ahmadian**, L. V. Ballestra, Pricing geometric Asian rainbow options under the mixed fractional Brownian motion, *Physica A: Statistical Mechanics and its Applications*, Vol. 555, Oct. 2020.

21. N. Karimi S. Kazem, **D. Ahmadian**, H. Adibi, L. V. Ballestra, On a generalized Gaussian radial basis function: Analysis and applications, *Engineering Analysis with Boundary Elements*, Vol. 112, Mar. 2020.

22. **D. Ahmadian**, O. Farkhondeh Rouz, K. Ivaz, A. Safdari, Robust numerical algorithm to the European option with illiquid markets, *Applied Mathematics and Computation*, Vol. 366, Feb. 2020.

23. **D. Ahmadian**, O. Farkhondeh Rouz, Boundedness and Convergence Analysis of Stochastic Differential Equations with Hurst Brownian Motion, *Bulletin of Paranas Mathematical Society* Vol. 38, Feb. 2020.

24. **D. Ahmadian**, O. Farkhondeh Rouz, L.V. Ballestra, Stability analysis of split-step -Milstein method for a class of n-dimensional stochastic differential equations, *Applied Mathematics and Computation*, Vol. 348, May 2019.

25. O. Farkhondeh Rouz, **D. Ahmadian**, Stability of two classes of improved backward Euler methods for stochastic delay differential equations of neutral type, *Computational Methods for Differential Equations* Vol. 5, Aug. 2017.

26. O. Farkhondeh Rouz, **D. Ahmadian**, A. Jodaree Akbarfam, And M. Milev, A Note on the Almost Sure Exponential Stability of the Milstein Method for Stochastic Delay Differential Equations with Jumps, *International Journal of Pure and Applied Mathematics*, Vol. 116, Jan. 2017.

27. O. Farkhondeh Rouz, **D. Ahmadian**, Analysis on Mean-Square and Almost Sure Exponential Stability of Numerical Method for Stochastic Differential Equations with Constant Delay, *Journal of Applied Mathematics and Statistics*, Vol. 56, Oct. 2017.

28. R. Kalantari, S. Shahmorad, **D. Ahmadian**, The Stability Analysis of Predictor-Corrector Method

in Solving American Option Pricing Model, *Computational Economics* Vol. 47, Jan. 2015.

29. **D. Ahmadian**, L.V. Ballestra, A Numerical Method to Price Discrete Double Barrier Options under a CEV Model with Jump Diffusion, *International Journal of Computer Mathematics* Vol. 92, Nov. 2014.

30. A. Golbabai, L.V. Ballestra, **D. Ahmadian**, Superconvergence of the finite element solutions of the Black–Scholes equation, *Finance Research Letters,* Vol. 10, Mar. 2013.

31. A. Golbabai, L.V. Ballestra, **D. Ahmadian**, A Highly Accurate Finite Element Method to Price Discrete Double Barrier Options, *Computational Economics*, Vol. 10, Aug. 2013.

32. A. Golbabai, **D. Ahmadian**, M. Milev, Radial basis functions with application to finance: American put option under jump diffusion, *Mathematical and Computer Modelling*, Vol. 93, Feb. 2012.

Submissions

1. M. Biglari, **D. Ahmadian**, F. Shokrollahi, An Efficint Numerical Method for Continuous Arithmatic Asian Options Under Mixed Fractional Brownian Motion, Under Review in Mathematics and Computers in Simulation.
2. Navid Parvini, **D. Ahmadian**, Luca Vincenzo Ballestra, Feature Selection and Hyperparameters Optimization Employing a Hybrid Model Based on Genetic Algorithm and Artificial Neural Network: Forecasting Dividend Payout Ratio, Under Review in Computational Economics.
3. O. Farkhondeh Rouz, **D. Ahmadian**, Convergence analysis of the improved -scheme for two-dimensional double singular stochastic Volterra integral equations, Under Revision in Filomat
4. **D. Ahmadian**, M. R. Chalak Qazani, N. Parvini, S. Pedrammehr, L. V. Ballestra, Forecasting Volatility using Hybrid Machine Learning Method: Sequencing Block, Multi-Layer Perceptron, and Bayesian Optimization, Under Revision in Computational Economics.

Invited Talks

2017   *An Overview of Numerical Solution of Partial Differntial Equations Driven by Financial Derivatives and Stochastic Differntial Equations*, March 2017, ZHAW School of Engineering, Winterthur, Switzerland.

2013   *Option Pricing Problems*, April 2010. Department of Applied Mathematics, University of Tabriz, Tabriz, Iran,

Projects

2015   *Forecasting the Stock Exchange Index of Tehran by Using Neural Network, Markov Chain and Behavior Finance*, Tehran Stock Exchange, Tehran, Iran.

2020   *Investigation Contagion Risk between Banks, Exchange Organization and Insurance*, Tehran Stock Exchange, Tehran, Iran.

2021   *Machine Learning in Analyzing of Financial data, Second Call of MSRT/NIMAD – TÜBİTAK Bilateral Cooperation*.

2022   *Ruin and Default Probability in Insurance Companies and Banks, Call for International Reserach Proposals: TABRIZU-300 Program*.

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✉ *d.ahmadian@tabrizu.ac.ir; d.ahmadian1985@gmail.com*

Computer skills

Intermediate	C programming, Microsoft Office, Microsoft Windows
Advanced	Matlab, Python, LaTeX, FTEX, X∃LaTeX, X∃Persian

Languages

Turkish	**Mothertongue**
Persian	**Official Language**
English	**Advanced**

References

These persons are familiar with my professional qualifications and my character:

Dr. L. V. Ballestra, Associate Professor, Department of Statistical Sciences, Alma Mater Studiorum University of Bologna, Via delle Belle Arti 41, 40126 Bologna, Italy.
Email: luca.ballestra@unibo.it

Dr. F. Shokrollahi, Assistant Professor, University of Vaasa, Finland.
Email: fshokrol@uwasa.fi

Dr. A. Rathinasamy, Assistant Professor, Department of Applied Sciences and Humanities, MIT Campus, Anna University, India.
Email: a_rsamy@yahoo.com.

Dr. Guillaume Leduc, Associate Professor, Department of Mathematics and Statistics, University of Quebec at Montreal, Canada and AUS.
Email: leduc_guillaume@hotmail.com

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