



# Shiva Eshaghi

Assistant Professor of Applied Mathematics

## *Curriculum Vitae*

### Personal Details

- Nationality : Iranian
- E-mail Addresses: sh.eshaghi@kut.ac.ir, shiva\_eshaghi69@yahoo.com, 69sh.eshaghi@gmail.com
- ORCID iD: <https://orcid.org/0000-0003-2291-5968>
- ResearchGate Link: <https://www.researchgate.net/profile/Shiva-Eshaghi>
- Google Scholar Link: [https://scholar.google.com/citations?user=\\_og3P4kAAAAJ](https://scholar.google.com/citations?user=_og3P4kAAAAJ)
- Publons Link: <https://publons.com/researcher/4415797/shiva-eshaghi/>

### Education

- **Postdoctoral Researcher of Applied Mathematics, Department of Mathematics, Faculty of Mathematical Sciences, Alzahra University, Tehran, Iran (2021/09/23-2022/9/22).**
- **Research Visit in the Department of Electrical Engineering, Sharif University of Technology, Tehran, Iran, (2019).**
- **Ph. D. in Applied Mathematics, Differential Equations and Dynamical Systems, Shahrekord University, Shahrekord, Iran, (2016/09/22-2020/10/20).**  
Grade: GPA: 19.38/20, 1st Grade- 1st Top Student  
Courses:
  1. Fractional differential equations (19.75/20) (Top score)
  2. Dynamical systems (19.5/20) (Top score)
  3. Numerical solution of ordinary differential equations (19.5/20) (Top score)
  4. Functional analysis (18.75/20) (Top score)Comprehensive exam (19.22/20) (Top score)
- **M. Sc. in Applied Mathematics, Differential Equations, Shahrekord University, Shahrekord, Iran, (2013/09/23-2015/10/04).**  
Grade: GPA: 18.86/20, 1 st Grade- 1st Top Student  
Courses:
  1. Partial differential equations (19.10/20) (Top score)
  2. Numerical methods in linear algebra (19.5/20) (Top score)
  3. Advanced operations research (19.5/20) (Top score)
  4. Seminar (20/20) (Top score)

5. Advanced numerical analysis (18.75/20) (Top score)
6. Approximation theory (17/20) (Top score)
7. Real analysis (17/20) (Top score)

○ **B. Sc. in Applied Mathematics, Shahrekord University, Shahrekord, Iran, (2009/09/23-2013/06/30).**

Grade: GPA: 19.20/20, 1st Top Student

### Postdoctoral project

Title: *Analytical and numerical analysis of fractional chaotic dynamical systems.*

Supervisor: Prof. Yadollah Ordokhani.

### Research visit project

Title: *Finiteness conditions for performance indices in the regularized Prabhakar fractional control systems.*

Supervisor: Prof. Mahmmad Saleh Tavazoi.

### Ph.D. Thesis

Title: *Dynamical Behaviors of Generalized Fractional-Order Systems: Numerical and Analytical Approaches.*

Supervisors: Prof. Reza Khoshsiar Ghaziani and Prof. Alireza Ansari.

Grade: Excellent grade (20/20).

### Masters Thesis

Title: *Fractional calculus with generalized fractional derivatives and Mittag-Leffler functions.*

Supervisor: Prof. Alireza Ansari.

Grade: Excellent grade (20/20).

### Languages

- Persian (Mothertongue).
- English.

### Research Interests

- Fractional calculus
- Partial differential equation (PDE)
- Dynamical systems
- Integral transforms and special functions
- Numerical analysis
- Ordinary differential equation (ODE)
- Fractional differential equation (FDE)
- Chaotic systems
- Integral representations of special functions
- Bifurcation and stability analysis of fractional dynamical systems

- Numerical method for fractional differential equations
- Control systems
- Numerical simulations
- Chaos control and synchronization
- Optimal control
- Integral performance indices

## Teaching

2016–Present Teaching mathematics courses at Shahrekord University for master's and bachelor's degrees

Taught Courses at Shahrekord University:

- Mathematics 1
- General mathematics 1
- Engineering mathematics
- Fractional differential equations
- Mathematics 2
- General mathematics 2
- Differential equations
- Partial differential equations

2013–Present Teaching mathematics in math institutes for all levels (bachelor, masters and Ph.D)

Taught Courses at math institutes:

- Mathematics 1
- Calculus
- Differential equations
- Numerical analysis
- Technical language
- XePersian
- Maple
- Mathematics 2
- Dynamical systems
- Fractional differential equations
- Partial differential equations
- Linear algebra
- LaTeX
- Matlab

## Computer skills

- Maple
- ICDL1
- LaTeX
- WinEdt
- BibTEX
- TeXMaker
- Microsoft Office (Word, Excel, Access, OneNote, PowerPoint)
- Matlab
- ICDL2
- XePersian
- MiKTeX
- FarsiTEX
- Notepad

## Referee of the following prestigious international journals and Conferences

- Chaos, Solitons and Fractals.
- Nonlinear Dynamics.
- Complex & Intelligent Systems.
- Scientific Reports.
- Indian Journal of Physics.
- Computational and Applied Mathematics.
- Mathematics.

- Symmetry.
- International Journal of Systems Science.
- Rocky Mountain Journal of Mathematics.
- AIMS Mathematics.
- The Journal of Analysis.
- Qualitative Theory of Dynamical Systems.
- Arabian Journal of Mathematics.
- Iranian Journal of Numerical Analysis and Optimization.

## Symposium

30 September and 1 October 2021 International Symposium on Recent Advances in Fractional Calculus, Department of Mathematical Sciences, P. D. Patel Institute of Applied Sciences (PDPIAS), Charotar University of Science and Technology (CHARUSAT), Changa (388 421), Gujarat, India.

## Workshops

- 2022 Dynamical behaviors of fractional systems, Alzahra University, Tehran, Iran.
- November 23-24, 2021 International Workshop on Modern Mathematical Methods and High-Performance Computing in Science & Engineering (MMHPC 2021), Anand International College of Engineering, Jaipur, India.
- 2021 Data science and its applications, 52nd Annual Iranian Mathematics Conference, Shahid Bahonar University of Kerman, Kerman, Iran.
- 2021 Mathematics education, 52nd Annual Iranian Mathematics Conference, Shahid Bahonar University of Kerman, Kerman, Iran.
- 2021 Dynamical behaviors of fractional systems, Alzahra University, Tehran, Iran.
- 2020 Turbulent fluid flows and their numerical modeling, The Third Conference on Chaotic Dynamical Systems, The Aerospace Research Institute, Tehran, Iran.
- 2020 Application of remote sensing images in monitoring chaotic atmospheric phenomena, The Third Conference on Chaotic Dynamical Systems, The Aerospace Research Institute, Tehran, Iran.
- 2020 Application of linear algebra in data mining, 10th Seminar on Linear Algebra and Its Applications, Shahid Bahonar University of Kerman, Kerman, Iran.
- 2020 Softwares in numerical algebra (Chabfan tool), 10th Seminar on Linear Algebra and Its Applications, Shahid Bahonar University of Kerman, Kerman, Iran.
- 2019 Integration methods, Shahrekord University, Shahrekord, Iran.

## Membership groups

- 2017-2021 Associate Member of the Iranian Mathematical Society
- 2017-2021 Member of National Elite Foundation

## Awards

- 2013-2021 Top researcher in mathematics at Shahrekord University.

- 2016-2020 Talented and the first rank student in Ph. D.  
 2013-2015 Talented and the first rank student in M. Sc.  
 2009-2013 Talented and the first rank student in B. Sc.  
 2017-2021 Selected by the National Elite Foundation.  
 2019-2020 Selected educational assistant at Shahrekord University from the National Elite Foundation.

## Published and accepted papers

1. S. Eshaghi, Y. Ordokhani, M. Bayram, M. Inc, Synchronization and control of fractional laser chaotic systems defined based on the regularized Prabhakar derivative with incommensurate parameters, *Nonlinear Dynamic*, 113 (2025) 5643-5669.  
<https://doi.org/10.1007/s11071-024-10455-8>.
2. S. Eshaghi, N. Kadhoda, M. Inc, Chaos control and synchronization of a new fractional laser chaotic system, *Qualitative Theory of Dynamical Systems*, 23(5) (2024) 241.  
<https://doi.org/10.1007/s12346-024-01097-7>.
3. S. Eshaghi, M.S. Tavazoei, Finiteness conditions for performance indices in generalized fractional-order systems defined based on the regularized Prabhakar derivative, *Communications in Nonlinear Science and Numerical Simulation*, 117 (2023) 106979.  
<https://doi.org/10.1016/j.cnsns.2022.106979>.
4. S. Eshaghi, Y. Ordokhani, Dynamical behaviors of the Caputo-Prabhakar fractional chaotic satellite system, *Iranian Journal of Science and Technology, Transactions A: Science*, 46(5) (2022) 1445-1459.  
<https://doi.org/10.1007/s40995-022-01358-7>.
5. Yu-Ming Chu, Mustafa Inc, Mir Sajjad Hashemi, Shiva Eshaghi, Analytical treatment of regularized Prabhakar fractional differential equations by invariant subspaces, *Computational and Applied Mathematics*, 41(6) (2022) 1-17.  
<https://doi.org/10.1007/s40314-022-01977-1>.
6. A. Ansari, S. Eshaghi, Lipschitz-Hankel identities and integral representations of toroidal functions, *Integral Transforms and Special Functions*, 32(11) (2021) 839-862.  
<https://doi.org/10.1080/10652469.2020.1855637>.
7. A. Ansari, S. Eshaghi, Macdonald's identities and integral representations of products of Airy functions, *Integral Transforms and Special Functions*, 31(9) (2020) 744-757.  
<https://doi.org/10.1080/10652469.2020.1737529>.
8. S. Eshaghi, R. Khoshsiar Ghaziani, A. Ansari, Hopf bifurcation, chaos control and synchronization of a chaotic fractional-order system with chaos entanglement function, *Mathematics and Computers in Simulation*, 172 (2020) 321-340.  
<https://doi.org/10.1016/j.matcom.2019.11.009>.
9. S. Eshaghi, R. Khoshsiar Ghaziani, A. Ansari, Stability and dynamics of neutral and integro-differential regularized Prabhakar fractional differential systems, *Computational and Applied Mathematics*, 39(250) (2020) 1-21.  
<https://doi.org/10.1007/s40314-020-01296-3>.
10. S. Eshaghi, R. Khoshsiar Ghaziani, A. Ansari, Stability and Chaos Control of Regularized Prabhakar Fractional Dynamical Systems without and with Delay, *Mathematical Methods in the Applied Sciences*, 42 (7) (2019) 2302-2323.  
<https://doi.org/10.1002/mma.5509>.

11. S. Eshaghi, A. Ansari, Finite fractional Sturm-Liouville transforms for generalized fractional derivatives, *Iranian Journal of Science and Technology, Transactions A: Science*, 41 (4) (2017) 931-937.  
DOI 10.1007/s40995-017-0311-0.
12. S. Eshaghi, A. Ansari, Lyapunov Inequality For Fractional Differential Equations With Prabhakar Derivative, *Mathematical Inequalities and Applications*, 19 (1) (2016) 349-358.  
doi:10.7153/mia-19-26.
13. S. Eshaghi, A. Ansari, R. Khoshsiar Ghaziani, M. Ahmadi Darani, Fractional Black-Scholes model with regularized Prabhakar derivative, *Publications De L'institut Mathématique*, 102 (116) (2017) 121-132.  
DOI: <https://doi.org/10.2298/PIM1716121E>.
14. S. Eshaghi, A. Ansari, R. Khoshsiar Ghaziani, Lyapunov-Type Inequality For Nonlinear Systems With Riemann-Liouville Fractional Derivatives, *Novi Sad Journal of mathematics*, 49(2) (2019) 17-34.  
<https://doi.org/10.30755/NSJOM.07194>.
15. S. Eshaghi, A. Ansari, Autoconvolution equations and generalized Mittag-Leffler functions, *International Journal of Industrial Mathematics*, 7 (4) (2015) 335-341.  
<http://ijim.srbiau.ac.ir>.
16. S. Eshaghi, A. Ansari, R. Khoshsiar Ghaziani, Generalized Mittag-Leffler stability of nonlinear fractional regularized Prabhakar differential systems, *International Journal of Nonlinear Analysis and Applications*, 12(2) (2021) 665-678.  
<http://dx.doi.org/10.22075/ijnaa.2020.19291.2069>.
17. S. Eshaghi, A. Ansari, R. Khoshsiar Ghaziani, Lyapunov-type inequalities for nonlinear systems with Prabhakar fractional derivatives, *Acta Mathematica Academiae Paedagogicae Nyíregyháziensis*, 34 (2023) 34-49.
18. S. Eshaghi, Y. Ordokhani, Numerical solution of generalized fractional Volterra integro-differential equations via approximation the Bromwich integral, *J. Phys.: Conf. Ser.*, 2090 (2021) 012131.  
<http://dx.doi.org/10.1088/1742-6596/2090/1/012131>.
19. S. Eshaghi, Numerical approximation for generalized fractional Volterra integro-differential equations via parabolic contour, *Caspian Journal of Mathematical Sciences (CJMS)*, 2023, DOI: 10.22080/CJMS.2023.25932.1667.

### Book

20. S. Eshaghi, Y. Ordokhani, (2022). Dynamical Analysis of a Prabhakar Fractional Chaotic Autonomous System. In: Pinto, C.M. (eds) *Nonlinear Dynamics and Complexity. Nonlinear Systems and Complexity*, vol 36. Springer, Cham. 387-411. [https://doi.org/10.1007/978-3-031-06632-0\\_19](https://doi.org/10.1007/978-3-031-06632-0_19)

### Research Projects

21. A. Ansari, S. Eshaghi, Macdonald's identities and integral representations of products of Airy functions, Finished.
22. A. Ansari, S. Eshaghi, Lipschitz-Hankel identities and integral representations of toroidal functions, Finished.

### Conference papers

23. S. Eshaghi, Stability Conditions for Fractional Systems with Nonlinear Functions, 12th International

- Conference on Mathematical Modeling in Physical Sciences, August 28-31, 2023, Belgrade, Serbia.
24. S. Eshaghi, Fractional Mathieu-Duffing System with the stability condition and chaos control, 6th International Conference on Mathematical Advances and Applications (ICOMAA2023), MAY 10-13, 2023, Yildiz Technical University, Turkey.
  25. S. Eshaghi, Numerical scheme for the fractional-order system derived from the Lorenz system, 16th MAS International European Conference on Mathematics, Engineering, Natural & Medical Sciences, February 22-23, 2022, Mardin, Turkey.
  26. S. Eshaghi, Approximate analytical solutions for fractional European options, 5th International ICONTECH Conference on Innovative Surveys in Positive Sciences, February 5-6, 2022, Sanliurfa, Turkey.
  27. S. Eshaghi, Mittag-Leffler stability of fractional-order systems, 7th International Mardin Artuklu Scientific Researches Conference, December 10-12, 2021, Mardin, Turkey.
  28. S. Eshaghi, On stability of nonlinear fractional dynamical system, EJONS 13th International Conference on Mathematics, Engineering, Natural & Medical Sciences, October 26-27, 2021, Cappadocia, Turkey.
  29. S. Eshaghi, Y. Ordokhani, Lyapunov stability for Controlling chaos of a new fractional chaotic autonomous system, 2nd Online Conference on Nonlinear Dynamics and Complexity, October 4-6, 2021, ISEP, Porto, Portugal.
  30. S. Eshaghi, Y. Ordokhani, Numerical solution of generalized fractional Volterra integro-differential equations via approximation the Bromwich integral, 10th Int'l Conference on Mathematical Modeling in the Physical Sciences, September 6-9, 2021, Virtual, online Conference, Greece.
  31. S. Eshaghi, Lyapunov direct method for stability analysis of nonlinear generalized fractional systems, 4th International Conference on Mathematics "An Istanbul Meeting for World Mathematicians" 27-28 Oct 2020, Istanbul, Turkey.
  32. S. Eshaghi, Dynamical Behavior of a Fractional Gause-Type prey-predator Model with Holling Type II Functional Response, First Online Conference on Modern Fractional Calculus and its Applications (OCMFCA-2020), Biruni University, Istanbul, Turkey, 4-6 December 2020.
  33. S. Eshaghi, Generalized Fractional Adams-Bashforth-Moulton Method for Numerical Solution of the Differential Equations with Regularized Prabhakar Fractional Derivative, First Online Conference on Modern Fractional Calculus and its Applications (OCMFCA-2020), Biruni University, Istanbul, Turkey, 4-6 December 2020.
  34. S. Eshaghi, Stability and chaos control of a chaotic generalized fractional system, The Third Conference on Chaotic Dynamical Systems, 2020, The Aerospace Research Institute, Tehran, Iran.
  35. S. Eshaghi, Hopf bifurcation of a new chaotic fractional dynamical system, The Third Conference on Chaotic Dynamical Systems, 2020, The Aerospace Research Institute, Tehran, Iran.
  36. S. Eshaghi, Synchronize and control of a chaotic fractional laser system, The Third Conference on Chaotic Dynamical Systems, 2020, The Aerospace Research Institute, Tehran, Iran.
  37. S. Eshaghi, Feedback controller to control and synchronize chaotic fractional-order system, 3rd National Conference on New Technologies in Electrical and Computer Engineering, 2020, Esfahan, Iran.
  38. S. Eshaghi, Controlling chaos for chaotic fractional 3-neuron hopfield neural network system with delay, 3rd National Conference on New Technologies in Electrical and Computer Engineering, 2020, Esfahan, Iran.
  39. S. Eshaghi, R. Khoshshiar Ghaziani, A. Ansari, Stability analysis and chaos control of fractional-order T system, 14th Seminar on Differential Equations, Dynamical Systems and Applications, July 2018, IASBS, Zanjan, Iran.

40. S. Eshaghi, R. Khoshsiar Ghaziani, A. Ansari , A numerical scheme to solve differential equations with Prabhakar fractional derivative, 14th Seminar on Differential Equations, Dynamical Systems and Applications, July 2018, IASBS, Zanjan, Iran.
41. S. Eshaghi, A. Ansari, Green's function for fractional differential equation with Hilfer derivative, 46th Annual Iranian Mathematics Conference, August 2015, Yazd University, Yazd, Iran.
42. S. Eshaghi, A. Ansari, Green Function For Distributed Order Fractional Hill Equation, 12th Seminar on Differential Equations and Dynamical Systems, May 27-29, 2015, University of Tabriz, Tabriz, Iran.
43. S. Eshaghi, A new method of dynamical stability in fractional systems, Ahi Evran International Conference on Scientific Research, Kirsehir Ahi Evran University, Turkey, November 30-December 1-2, 2021.

## Communication Skills

### Oral Presentations

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|----------------|--|
| 11 May 2023    | 1 Oral Presentation at 6th International Conference on Mathematical Advances and Applications (ICOMAA2023), Yildiz Technical University, Turkey. |
| 31 August 2023 | 1 Oral Presentation at 12th International Conference on Mathematical Modeling in Physical Sciences, Belgrade, Serbia.                            |
| 22 Feb 2022    | 1 Oral Presentation at 16th MAS International European Conference on Mathematics, Engineering, Natural & Medical Sciences, Mardin, Turkey.       |
| 5 Feb 2022     | 1 Oral Presentation at 5th International ICONTECH Conference on Innovative Surveys in Positive Sciences, Sanliurfa, Turkey.                      |
| 11 Dec 2021    | 1 Oral Presentation at 7th International Mardin Artuklu Scientific Researches Conference, Mardin, Turkey.  |
| 1 Dec 2021     | 1 Oral Presentation at Ahi Evran International Conference on Scientific Research, Kirsehir Ahi Evran University, Turkey.                         |
| 26 Oct 2021    | 1 Oral Presentation at EJONS 13th International Conference On Mathematics, Engineering, Natural & Medical Sciences, Turkey.                      |
| 4 Oct 2021     | 1 Oral Presentation at 2nd Online Conference on Nonlinear Dynamics and Complexity, Portugal.   |
| 6 Sep 2021     | 1 Oral Presentation at 10th Int'l Conference on Mathematical Modeling in the Physical Sciences, Greece.  |
| 28 Oct 2020    | 1 Oral Presentation at 4th International Conference On Mathematics "An Istanbul Meeting for World Mathematicians", Istanbul, Turkey.             |
| 6 Dec 2020.    | 2 Oral Presentations at First Online Conference On Modern Fractional Calculus And Its Applications, Biruni University, Istanbul, Turkey.         |
| 16 Jun 2020    | 3 Oral Presentations at The Third Conference on Chaotic Dynamical Systems, The Aerospace Research Institute, Tehran, Iran.                       |
| 23 Jun 2020    | 2 Oral Presentations at 3rd National Conference on New Technologies in Electrical and Computer Engineering, Esfahan, Iran.                       |
| 17,18 Jul 2018 | 2 Oral Presentations at 14th Seminar on Differential Equations, Dynamical Systems and Applications, IASBS, Zanjan, Iran.                         |



25 Aug 2015 1 Oral Presentation at 46th Annual Iranian Mathematics Conference, Yazd University, Yazd, Iran.

[Posters](#)

27 May 2015 Poster at 12th Seminar on Differential Equations and Dynamical Systems, University of Tabriz, Tabriz, Iran