Ali Abdi Kalasour

Curriculum Vitae

Professor of Applied Mathematics-Numerical Analysis
at the University of Tabriz

Personal Details

Gender	Male
Date of birth	4th February, 1982
Place of birth	Tabriz, Iran
Citizenship	Iranian
ORCID ID	0000-0002-0819-5557
Scopus ID	36522114500

Education

2008–2012 **PhD in Applied Mathematics**, *University of Tabriz*, Tabriz, *GPA – 19.38.*
First rank holder among Applied Mathematics PhD students starting the University of Tabriz together
Title of thesis: Extension of general linear methods for the numerical solution of ODEs

2004–2007 **Master of Applied Mathematics**, *Tarbiat Modares University (T.M.U)*, Tehran, *GPA – 16.66.*
Title of thesis: The resolution of the Gibbs phenomenon for Fourier approximation

2000–2004 **Bachelor of Mathematics Education**, *Azad University of Tabriz*, Tabriz, *GPA – 18.30.*
First rank holder among Mathematics BSc students starting Islamic Azad University of Tabriz together

Professional Experience

2022–Present Full Professor at the University of Tabriz, Tabriz, Iran

2022–2023 and 2024 Alexander von Humboldt Research Fellow, Martin Luther University, Halle, Germany (July 2022 – September 2023 + July – September 2024)

2018–2022 Associate Professor at the University of Tabriz, Tabriz, Iran

Faculty of Mathematical Sciences, University of Tabriz, 29 Bahman Blvd., Tabriz, Iran
+98 912 810 9852 • ☎ +98 41 3339 2900 • FAX +98 41 3334 2102
a_abdi@tabrizu.ac.ir; ali.abdi@mathematik.uni-halle.de; ali.abdi.kalasour@gmail.com
simap.tabrizu.ac.ir/homepage/a_abdi

2014–2018 Assistant Professor at the University of Tabriz, Tabriz, Iran

Teaching Experience

2009–Present Numerical solution of ODEs, Geometric Numerical Integration, Adv. Numer. Anal., Found. Numer. Anal., Numer. Comp., Numer. Lin. Alg., Adv. Numer. Comp., Calculus 1, Calculus 2 (Multivariable Calculus) and Differential Equations at the University of Tabriz

2009–2010 Numer. Anal. 2 and ODEs at the University of Maragheh

2009–2010 Math. 2 and ODEs at the Islamic Azad University–Azarshar Branch

2008–2010 Numer. Comp. and OR 2 at Payam-Noor University of Tabriz

Prizes, awards, research grants and fellowships

2023 Outstanding researcher of the University of Tabriz from international activities point of view, awarded by the University of Tabriz, Tabriz, Iran.

2022 A research Fellowship from the Alexander von Humboldt Foundation for 18 months: Georg Forster Research Fellowship for experienced researchers – The host university: Martin Luther University, Halle (Saale), Germany.

2022 Outstanding faculty researcher, awarded by the University of Tabriz, Tabriz, Iran.

2021 Scholarship for research stays for University academics and scientists, supported by German Academic Exchange Service (DAAD), Institute for Mathematics, Martin Luther University, Halle (Saale), Germany.

2020 A financial support for scientific research to promote international exchanges, granted by the Research Fund of the University of Fribourg, Fribourg, Switzerland.

2019 A financial support for scientific research to promote international exchanges, granted by the Research Fund of the University of Fribourg, Fribourg, Switzerland.

2018 Outstanding faculty researcher, awarded by the University of Tabriz, Tabriz, Iran.

2018 Scholarship for research stays for University academics and scientists, supported by German Academic Exchange Service (DAAD), Institute for Mathematics, Martin Luther University, Halle (Saale), Germany.

2016 Scholarship for research stay at Post-Doctorate level, supported by IRO (International Relation Office) of the University of Fribourg, Fribourg, Switzerland.

2010-2011 Scholarship for a six-month research stay at the University of Auckland, New Zealand, supported by the Ministry of Science, Research and Technology of Iran.

2009-2012 Scholarship for PhD students, supported by the Ministry of Science, Research and Technology of Iran.

Administrative and management position

2022–Present Head of the Research Department of Computational Algorithms and Mathematical Models, University of Tabriz.

2020–2022 Deputy director of the Electronic and Open Learning Center of the University of Tabriz.

Present Research/Professional Speciality

- Numerical methods for ODEs
- Efficient solution of stiff differential equations
- Stability and order barriers
- Numerical methods for hyperbolic PDEs with shocks
- Oscillatory Hamiltonian problems and geometric numerical integration
- Linear barycentric rational interpolation and its applications
- Numerical methods for Volterra integral and integro–differential equations
- Numerical methods for differential-algebraic equations
- The resolution of the Gibbs phenomenon for Fourier spectral methods

Visiting Positions

2022-2023 and 2024 Humboldt research fellow supported by the Alexander von Humboldt Foundation (Georg Forster Research Fellowship for experienced researchers) in the Institude for Mathematics, Martin Luther University, Halle (Saale), Germany.

2022 Scientific collaboration with Professor D. Conte, University of Salerno, Fisciano (SA), Italy.

2021 Sabbatical research in the Institude for Mathematics (with Professor H. Podhaisky), Martin Luther University, Halle (Saale), Germany.

2020 Scientific collaboration with Professor D. Conte, University of Salerno, Fisciano (SA), Italy.

2019 Scientific collaboration with Professor J.-P. Berrut, University of Fribourg, Fribourg, Switzerland.

2018 Sabbatical research at the Institude for Mathematics (with Professor H. Podhaisky), Martin Luther University, Halle (Saale), Germany.

2016 Sabbatical research at the Department of Mathematics (with Professor J.-P. Berrut), University of Fribourg, Fribourg, Switzerland.

2010-2011 A six-month research stay under the supervision of Professor J.C. Butcher, The University of Auckland, Auckland, New Zealand.

Editorial-Board Positions

- Member of editorial board, Bulletin of the Iranian Mathematical Society (BIMS)
- Member of editorial board, Iranian Journal of Numerical Analysis and Optimization (IJNAO)

Referee Activities

Cooperation with:

- Mathematical Reviews (mathrev)
- Applied Numerical Mathematics
- Journal of Computational and Applied Mathematics
- Numerical Algorithms
- Applied Mathematics Letters
- Mathematics and Computers in Simulation
- Computational and Applied Mathematics
- Communications in Nonlinear Science and Numerical Simulation
- Bulletin of the Iranian Mathematical Society
- Iranian Journal of Numerical Analysis and Optimization
- Journal of Mathematical Modeling
- ...

Workshops & Conferences

2024 Conference on the Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-17), 9–13 September 2024, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2024 The 10th International Seminar on Numerical Analysis and its Applications (SNAA): as the executive editor of the seminar, 3–4 July 2024, University of Tabriz, Tabriz, Iran.

2023 The 12th International Seminar on Linear Algebra and its Applications (SLAA), 18–19 July 2023, Sahand University of Technology, Sahand New-Town, Tabriz, Iran.

2021 Conference on the Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-16), 6–10 September 2021, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2020 A two-day workshop on structure-preserving approximation of evolutive problems and applications (STRUCTAPP2020), 23–24 January 2020, University of L'Aquila, L'Aquila, Italy

2018 Conference on the Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-15), 3–7 September 2018, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2018 The 1st International Conference on Boundary Value Problems and Applications, 4–5 July 2018, University of Tabriz, Tabriz, Iran.

2017 International Conference on Computational Methods and Function Theory (CMFT 2017), 10–15 July 2017, Maria Curie-Skłodowska University, Lublin, Poland.

2015 International conference on scientific computation and differential equations (SciCADE 2015), 14–18 Sep. 2015, University of Potsdam, Potsdam, Germany.

2015 A one-day Workshop on "Biomathematics", 27 May 2015, University of Tabriz, Tabriz, Iran.

2015 12th Seminar on Differential Equations and Dynamical Systems, 27–29 May 2015, University of Tabriz, Tabriz, Iran.

2013 The 44th Annual Iranian Mathematics Conference, 27–30 Aug. 2013, Ferdowsi University of Mashhad, Mashhad, Iran.

2013 A one-day Workshop on "parallel and fast computing", 13 Mar. 2013, University of Tabriz, Tabriz, Iran.

2012 A one-day Workshop on "relationship between Mathematics and Industry", 28 Aug. 2012, University of Tabriz, Tabriz, Iran.

2012 The 43rd Annual Iranian Mathematics Conference, 27–30 Aug. 2012, University of Tabriz, Tabriz, Iran.

2006 The 37th Annual Iranian Mathematical Conference, 2–5 Sep. 2006, Tarbiat Moallem University of Azarbaijan, Tabriz, Iran.

Developed MATLAB codes

The codes for ODEs:

`irks14.m` [link] A variable-stepsize/variable-order code for solving non-stiff ODEs based on explicit general linear methods—in collaboration with Z. Jackiewicz.

`tpeer14.m` [link] A variable-stepsize/variable-order code for solving non-stiff ODEs based on explicit two-step peer methods—in collaboration with G. Hojjati, Z. Jackiewicz, H. Podhaisky, M. Sharifi.

`SGLM4.m` [link] A variable-stepsize code for solving stiff ODEs based on an implicit second derivative general linear method of order four—in collaboration with D. Conte.

`rbdf15s.m` [link] A variable-stepsize/variable-order code for solving stiff ODEs based on rational BDF methods—in collaboration with S.A. Hosseini, H. Podhaisky.

The codes for integral equations:

`nvrk4.m` [link] A variable-stepsize code for solving stiff Volterra integral equations based on a natural Volterra Runge–Kutta method of order four—in collaboration with G. Hojjati, Z. Jackiewicz, H. Mahdi.

`vglm4.m` [link] A variable-stepsize code for solving stiff Volterra integral equations based on a general linear method of order four—in collaboration with D. Conte.

Publications

Journal articles:

(Submitted)

1. **A. Abdi**, H. Podhaisky, Variable stepsize general linear methods for ODEs, submitted.

2. **A. Abdi**, S.A. Hosseini, K. Hormann, Linear barycentric rational Hermite quadrature and its application to Volterra integral equations, submitted.

3. P. Khakzad, A. Moradi, **A. Abdi**, Strong stability preserving integrating factor second derivative general linear methods, submitted.

(To appear)

4. **A. Abdi**, S.A. Hosseini, H. Podhaisky, The linear barycentric rational backward differentiation formulae for stiff ODEs on nonuniform grids, *Numer. Algor.*, to appear.

5. M. Sharifi, **A. Abdi**, G. Hojjati, A. Mousavi, Implicit–explicit two–step peer methods with RK stability for implicit part, *Numer. Algor.*, to appear.

6. P. Khakzad, A. Moradi, **A. Abdi**, G. Hojjati, Strong stability preserving second derivative multistep methods, *Numer. Algor.*, to appear.

(2024)

7. **A. Abdi**, M. Arnold, H. Podhaisky, The barycentric rational numerical differentiation formulas for stiff ODEs and DAEs, *Numer. Algor.* 97 (2024) 431–451.

8. **A. Abdi**, J.-P. Berrut, H. Podhaisky, The barycentric rational predictor–corrector schemes for Volterra integral equations, *J. Comput. Appl. Math.* 440 (2024) 115611:1–18.

9. M. Sharifi, **A. Abdi**, G. Hojjati, On the construction of diagonally implicit two–step peer methods with RK stability, *Appl. Numer. Math.* 198 (2024) 138–147.

10. M. Sharifi, **A. Abdi**, M. Braś, G. Hojjati, A class of explicit second derivative general linear methods for non-stiff ODEs, *Math. Model. Anal.* 29 (2024) 621–640.

11. A. Moradi, **A. Abdi**, G. Hojjati, Strong stability preserving second derivative general linear methods based on Taylor series conditions for discontinuous Galerkin discretizations, *J. Sci. Comput.* 98 (2024) 20:1–21.

12. M. Eghbaljoo, G. Hojjati, **A. Abdi**, Adaptive second derivative multistep methods for solving stiff chemical problems, *J. Math. Chem.* 62 (2024) 1114–1133.

13. L. Taheri Koltape, G. Hojjati, S. Fazeli, **A. Abdi**, Super implicit two-step collocation methods for ordinary differential equations, *Comp. Appl. Math.* 43 (2024) 321:1–22.

(2023)

14. **A. Abdi**, G. Hojjati, Z. Jackiewicz, H. Podhaisky, M. Sharifi, On the implementation of explicit two-step peer methods with Runge–Kutta stability, *Appl. Numer. Math.* 186 (2023) 213–227.

15. M. Sharifi, **A. Abdi**, M. Braś, G. Hojjati, High order second derivative diagonally implicit multistage integration methods for ODEs, *Math. Model. Anal.* 28 (2023) 53–70.

16. R. Akbari, G. Hojjati, **A. Abdi**, Algebraic stability and irreducibility of second derivative methods, *Appl. Numer. Math.* 191 (2023) 45–54.

17. A. Moradi, **A. Abdi**, G. Hojjati, RK-stable second derivative multistage methods with strong stability preserving based on Taylor series conditions, *Comp. Appl. Math.* 42 (2023) 193:1–27.

18. **A. Abdi**, Order arrows and stability of the numerical methods for ordinary differential equations, Mathematical Researches, 9 (2023) 15–30 (In Persian).

(2022)

19. **A. Abdi**, G. Hojjati, G. Izzo, Z. Jackiewicz, Global error estimation for explicit general linear methods, *Numer. Algor.* 89 (2022) 1075–1093.
20. **A. Abdi**, J.-P. Berrut, S.A. Hosseini, Explicit methods based on barycentric rational interpolants for solving non-stiff Volterra integral equations, *Appl. Numer. Math.* 174 (2022) 127–141.
21. **A. Abdi**, G. Hojjati, G. Izzo, Z. Jackiewicz, Global error estimation for explicit second derivative general linear methods, *Numer. Algor.* 90 (2022) 833–850.
22. **A. Abdi**, D. Conte, R. D'Ambrosio, B. Paternoster, Multivalue second derivative collocation methods, *Appl. Numer. Math.*, *Appl. Numer. Math.* 182 (2022) 344–355.
23. B. Talebi, **A. Abdi**, G. Hojjati, Composite symmetric second derivative general linear methods for Hamiltonian systems, *Calcolo* 59 (2022) 17:1–27.
24. T. Majidi, **A. Abdi**, G. Hojjati, Generalized second derivative linear multistep methods for ordinary differential equations, *Numer. Algor.* 91 (2022) 227–250.
25. A. Moradi, **A. Abdi**, G. Hojjati, Implicit-explicit second derivative general linear methods with strong stability preserving explicit part, *Appl. Numer. Math.* 181 (2022) 23–45.
26. A. Moradi, **A. Abdi**, G. Hojjati, High-order explicit second derivative methods with strong stability properties based on Taylor series conditions, *ANZIAM J.* 64 (2022) 264–291.
27. **A. Abdi**, G. Hojjati, L. Taheri Koltape, Extended SDBDF-type methods based on linear barycentric rational interpolants for ODEs, *Bull. Iranian Math. Soc.* 48 (2022) 3255–3268.
28. P. Ramazani, **A. Abdi**, G. Hojjati, A. Moradi, Explicit Nordsieck second derivative general linear methods for ODEs, *ANZIAM J.* 64 (2022) 69–88.
29. A. Moradi, **A. Abdi**, G. Hojjati, Strong stability preserving implicit and implicit-explicit second derivative general linear methods with RK stability, *Comp. Appl. Math.* 41 (2022) 135:1–23.

(2021)

30. **A. Abdi**, D. Conte, Implementation of general linear methods for Volterra integral equations, *J. Comput. Appl. Math.* 386 (2021) 113261:1–12.
31. **A. Abdi**, G. Hojjati, Second derivative backward differentiation formulae for ODEs based on barycentric rational interpolants, *Numer. Algor.* 87 (2021) 1577–1591.
32. A. Jalilian, **A. Abdi**, G. Hojjati, Variable stepsize SDIMSIMs for ordinary differential equations, *Appl. Numer. Math.* 168 (2021) 115–126.
33. Z. Esmaeelzadeh, **A. Abdi**, G. Hojjati, EBDF-type methods based on the linear barycentric rational interpolants for stiff IVPs, *J. Appl. Math. Comput.* 66 (2021) 835–851.
34. A.Y.J. Almasoodi, **A. Abdi**, G. Hojjati, A GLMs-based difference-quadrature scheme for Volterra integro-differential equations, *Appl. Numer. Math.* 163 (2021) 292–302.

Faculty of Mathematical Sciences, University of Tabriz, 29 Bahman Blvd., Tabriz, Iran
+98 912 810 9852 • ☎ +98 41 3339 2900 • FAX +98 41 3334 2102
✉ a_abdi@tabrizu.ac.ir; ali.abdi@mathematik.uni-halle.de; ali.abdi.kalasour@gmail.com
simap.tabrizu.ac.ir/homepage/a_abdi

35. A. Moradi, J. Farzi, **A. Abdi**, Order conditions for second derivative general linear methods, *J. Comput. Appl. Math.* 387 (2021) 112488:1–16.

36. **A. Abdi**, Recent advances in the numerical solution of Volterra integral equations, *J. Math. Model.* 9 (2021) 361—373.

(2020)

37. **A. Abdi**, D. Conte, Implementation of second derivative general linear methods, *Calcolo* 57 (2020) 20:1–29.

38. **A. Abdi**, S.A. Hosseini, H. Podhaisky, Numerical methods based on the Floater–Hormann interpolants for stiff VIEs, *Numer. Algor.* 85 (2020) 867–886.

39. A. Moradi, **A. Abdi**, J. Farzi, Strong stability preserving second derivative general linear methods with Runge–Kutta stability, *J. Sci. Comput.* 85 (2020) 1:1–39.

40. **A. Abdi**, G. Hojjati, M. Sharifi, Implicit-explicit second derivative diagonally implicit multistage integration methods, *Comp. Appl. Math.* 39 (2020) 228:1–15.

41. A. Moradi, M. Sharifi, **A. Abdi**, Transformed implicit-explicit second derivative diagonally implicit multistage integration methods with strong stability preserving explicit part, *Appl. Numer. Math.* 156 (2020) 14–31.

42. **A. Abdi**, G. Hojjati, Projection of second derivative methods for ordinary differential equations with invariants, *Bull. Iranian Math. Soc.* 46 (2020) 99–113.

43. A. Moradi, **A. Abdi**, J. Farzi, Strong stability preserving second derivative diagonally implicit multistage integration methods, *Appl. Numer. Math.* 150 (2020) 536–558.

(2019)

44. **A. Abdi**, Z. Jackiewicz, Towards a code for nonstiff differential systems based on general linear methods with inherent Runge–Kutta stability, *Appl. Numer. Math.* 136 (2019) 103–121.

45. **A. Abdi**, S.A. Hosseini, H. Podhaisky, Adaptive linear barycentric rational finite differences method for stiff ODEs, *J. Comput. Appl. Math.* 357 (2019) 204–214.

46. **A. Abdi**, G. Hojjati, Z. Jackiewicz, H. Mahdi, A new code for Volterra integral equations based on natural Runge–Kutta methods, *Appl. Numer. Math.* 143 (2019) 35–50.

47. **A. Abdi**, General linear methods with large stability regions for Volterra integral equations, *Comp. Appl. Math.* 38 (2019) 52:1–16.

48. H. Mahdi, G. Hojjati, **A. Abdi**, Explicit general linear methods with a large stability region for Volterra integro-differential equations, *Math. Model. Anal.* 24 (2019) 478–493.

49. A. Moradi, J. Farzi, **A. Abdi**, Strong stability preserving second derivative general linear methods, *J. Sci. Comput.* 81 (2019) 392–435.

50. H. Mahdi, G. Hojjati, **A. Abdi**, On the numerical stability of the general linear methods for Volterra integro-differential equations, *Appl. Numer. Math.* 142 (2019) 139–150.

51. B. Talebi, **A. Abdi**, Nordsieck representation of high order predictor-corrector Obreshkov methods and their implementation, *Computational Methods for Differential Equations* 7

(2019) 16–27.

(2018)

52. **A. Abdi**, S.A. Hosseini, The barycentric rational difference-quadrature scheme for systems of Volterra integro-differential equations, *SIAM J. Sci. Comput.* 40 (2018) A1936–A1960.
53. **A. Abdi**, J.-P. Berrut, S.A. Hosseini, The linear barycentric rational method for a class of delay Volterra integro-differential equations, *J. Sci. Comput.* 75 (2018) 1757–1775.
54. **A. Abdi**, B. Behzad, Efficient Nordsieck second derivative general linear methods: Construction and implementation, *Calcolo* 55 (2018) 28:1–16.
55. B. Behzad, B. Ghazanfari, **A. Abdi**, Construction of the Nordsieck second derivative methods with RK stability for stiff ODEs, *Comp. Appl. Math.* 37 (2018) 5098–5112.
56. N. Yousefzadeh, G. Hojjati, **A. Abdi**, Construction of implicit–explicit second derivative BDF methods, *Bull. Iranian Math. Soc.* 44 (2018) 991–1006.
57. N. Barghi Oskouie, G. Hojjati, **A. Abdi**, Efficient second derivative methods with extended stability regions for non-stiff IVPs, *Comp. Appl. Math.* 37 (2018) 2001–2016.
58. N. Barghi Oskouie, **A. Abdi**, G. Hojjati, Some efficient Nordsieck integration methods for IVPs, *Iranian J. Numer. Anal. Opt.* 8 (2018) 111–128.
59. Hassan Mahdi, **A. Abdi**, G. Hojjati, Efficient general linear methods for a class of Volterra integro-differential equations, *Appl. Numer. Math.* 127 (2018) 95–109.
60. M. Hosseini Nasab, **A. Abdi**, G. Hojjati, Symmetric second derivative integration methods, *J. Comput. Appl. Math.* 330 (2018) 618–629.

(2017)

61. **A. Abdi**, S.A. Hosseini, Symplectic and symmetric methods for the numerical solution of some mathematical models of celestial objects, *Journal of new researches in methematics* 3 (2017) 109–118 (In Persian).
62. A. Movahedinejad, G. Hojjati, **A. Abdi**, Construction of Nordsieck second derivative general linear methods with inherent quadratic stability, *Math. Model. Anal.* 22 (2017) 60–77.
63. M. Hosseini Nasab, G. Hojjati, **A. Abdi**, G-symplectic second derivative general linear methods for Hamiltonian problems, *J. Comput. Appl. Math.* 313 (2017) 486–498.
64. M. Hosseini Nasab, G. Hojjati, **A. Abdi**, A Class of Methods with Optimal Stability Properties for the Numerical Solution of IVPs: Construction and Implementation, *International Journal of Computational Methods* 14 (2017) 1–17.

(2016)

65. A. Movahedinejad, **A. Abdi**, G. Hojjati, A hybrid method with optimal stability properties for the numerical solution of stiff differential systems, *Computational Methods for Differential Equations* 4 (2016) 217–229.
66. A. Movahedinejad, G. Hojjati, **A. Abdi**, Second derivative general linear methods with inherent Runge–Kutta stability, *Numer. Algor.* 73 (2016) 371–389.

67. **A. Abdi**, Construction of high-order quadratically stable second-derivative general linear methods for the numerical integration of stiff ODEs, *J. Comput. Appl. Math.* 303 (2016) 218–228.

68. S. A. Hosseini, **A. Abdi**, On the numerical stability of the linear barycentric rational quadrature method for Volterra integral equations, *Appl. Numer. Math.* 100 (2016) 1–13.

69. **A. Abdi**, F. Fazeli, G. Hojjati, Construction of efficient general linear methods for stiff Volterra integral equations, J. Comput. Appl. Math. 292 (2016) 417–429.

(2015)

70. **A. Abdi**, G. Hojjati, Implementation of Nordsieck second derivative methods for stiff ODEs, *Appl. Numer. Math.* 94 (2015) 241–253.

71. **A. Abdi**, G. Hojjati, High order second derivative methods with Runge–Kutta stability for the numerical solution of stiff ODEs, *Iranian J. Numer. Anal. Opt.* 5 (2015) 1–10.

72. A. K. Ezzeddine, G. Hojjati, **A. Abdi**, Perturbed second derivative multistep methods, *J. Numer. Math.* 23 (2015) 235–245.

(2014)

73. G. Hojjati, **A. Abdi**, F. Mirzaee, S. Bimesl, Numerical solution of stiff systems of differential equations arising from chemical reactions, *Iranian J. Numer. Anal. Opt.* 4 (2014) 25–39.

74. **A. Abdi**, M. Braś, G. Hojjati, On the construction of second derivative diagonally implicit multistage integration methods for ODEs, *Appl. Numer. Math.* 76 (2014) 1–18.

75. A. K. Ezzeddine, G. Hojjati, **A. Abdi**, Sequential second derivative general linear methods for stiff systems, *Bull. Iranian Math. Soc.* 40 (2014) 83–100.

(2012)

76. **A. Abdi**, J.C. Butcher, Applications of order arrows, *Appl. Numer. Math.* 62 (2012) 556–566.

77. **A. Abdi**, J.C. Butcher, Order bounds for second derivative approximations, *BIT Numer. Math.* 52 (2012) 273–281.

(2011)

78. **A. Abdi**, G. Hojjati, Maximal order for second derivative general linear methods with Runge-Kutta stability, *Appl. Numer. Math.* 61 (2011) 1046–1058.

79. **A. Abdi**, G. Hojjati, An extension of general linear methods, *Numer. Algor.* 57 (2011) 149–167.

(2008)

80. **A. Abdi**, S. M. Hosseini, An investigation of resolution of 2-variate Gibbs phenomenon, *Appl. Math. Comp.* 203 (2008) 714–732.

Conference articles (Proceedings):

1. M. Sharifi, **A. Abdi**, Application of Fourier series in deriving stability polynomial of multivalue methods for ODEs, The 12th Seminar on Linear Algebra and its Applications, 18–19 July 2023, Sahand University of Technology, Tabriz, Iran.
2. R. Akbari, G. Hojjati, **A. Abdi**, Applications of positive definite matrices in the numerical methods for ODEs, The 12th Seminar on Linear Algebra and its Applications, 18–19 July 2023, Sahand University of Technology, Tabriz, Iran.
3. M. Sharifi, **A. Abdi**, Construction of Implicit-Explicit multivalue methods of high order and stage order for ODEs, The 52nd Annual Iranian Mathematics Conference, 30 Aug.–02 Sep. 2021, Shahid Bahonar University of Kerman, Kerman, Iran, pp. 615–618.
4. P. Ramazani, **A. Abdi**, A. Moradi, On the construction of second derivative methods with inherent quadratic stability, The 52nd Annual Iranian Mathematics Conference, 30 Aug.–02 Sep. 2021, Shahid Bahonar University of Kerman, Kerman, Iran, pp. 498–501.
5. B. Talebi, **A. Abdi**, Symmetric methods based on triple-jump composition for solving periodic differential equations, The 52nd Annual Iranian Mathematics Conference, 30 Aug.–02 Sep. 2021, Shahid Bahonar University of Kerman, Kerman, Iran, pp. 641–644.
6. B. Talebi, **A. Abdi**, Time-reversible numerical methods for solving Hamiltonian systems, The 15th Seminar on Differential Equations and Dynamical Systems 6–8 Mar. 2021, University of Guilan, Rasht, Iran, pp. 228–231.
7. A.Y.J. Almasoodi, **A. Abdi**, Efficient methods for solving second kind Volterra integro-differential equations, The 15th Seminar on Differential Equations and Dynamical Systems 6–8 Mar. 2021, University of Guilan, Rasht, Iran, pp. 113–116.
8. M. Hosseini Nasab, Z. Esmaeilzadeh, G. Hojjati, **A. Abdi**, A sixth-order symmetric second derivative method for reversible problems, The 49th Annual Iranian Mathematics Conference, 23–26 Aug. 2018, Iran University of Science & Technology, Tehran, Iran, pp. 975–979.
9. G. Hojjati, **A. Abdi**, M. Hosseini Nasab, Symmetric methods for reversible Hamiltonian problems, The 14th Seminar on Differential Equations, Dynamical Systems and Applications, 17–19 July 2018, Institute for Advanced Studies in Basic Sciences, Zanjan, Iran, pp. 129–132.
10. M. Hosseini Nasab, G. Hojjati, **A. Abdi**, Symmetric second derivative methods for ODEs, The 47th Annual Iranian Mathematics Conference, 28–31 Aug. 2016, Kharazmi University, Karaj, Iran, pp. 975–979.
11. B. Talebi, **A. Abdi**, Predictor–corrector second derivative methods of high order, The 6th Seminar on Numerical Analysis and its Applications, 20–21 July 2016, University of Maragheh, Maragheh, Iran, pp. 491–494.
12. A. Movahedinejad, G. Hojjati, **A. Abdi**, A hybrid method in the Nordsieck form for the numerical solution of IVPs, The 6th Seminar on Numerical Analysis and its Applications, 20–21 July 2016, University of Maragheh, Maragheh, Iran, pp. 212–215.
13. M. Hosseini Nasab, G. Hojjati, **A. Abdi**, Nearly conservative second derivative methods for ODEs, The 6th Seminar on Numerical Analysis and its Applications, 20–21 July 2016, University of Maragheh, Maragheh, Iran, pp. 140–143.
14. N. Barghi Oskouie, G. Hojjati, **A. Abdi**, Explicit multivalue methods for IVPs with a large

stability region, The 6th Seminar on Numerical Analysis and its Applications, 20–21 July 2016, University of Maragheh, Maragheh, Iran, pp. 61–64.

15. S.A. Hosseini, **A. Abdi**, The stability behavior of the composite barycentric rational quadrature method for the numerical solution of VIEs, The 12th Seminar on differential equations and dynamical systems, 27–29 May 2015, University of Tabriz, Tabriz, Iran, pp. 267–271.
16. M. Hosseininasab, **A. Abdi**, An investigation of numerical methods for Hamiltonian systems, The 12th Seminar on differential equations and dynamical systems, 27–29 May 2015, University of Tabriz, Tabriz, Iran, pp. 182–186.
17. N. Barghi Oskouie, **A. Abdi**, A class of diagonally implicit multistage integration methods, The 45th Annual Iranian Mathematics Conference, 26–29 Aug. 2014, Semnan University, Semnan, Iran, pp. 498–501.
18. M. Hosseininasab, **A. Abdi**, Second derivative methods with extensive stability regions, The 45th Annual Iranian Mathematics Conference, 26–29 Aug. 2014, Semnan University, Semnan, Iran, pp. 502–505.
19. **A. Abdi**, G. Hojjati, A class of implicit methods for solving stiff initial value problems, The 44th Annual Iranian Mathematics Conference, 27–30 Aug. 2013, Ferdowsi University of Mashhad, Mashhad, Iran, pp. 975–978.
20. **A. Abdi**, S. Fazeli, Multistage–multivalue methods for Volterra integral equations, The 44th Annual Iranian Mathematics Conference, 27–30 Aug. 2013, Ferdowsi University of Mashhad, Mashhad, Iran, pp. 979–982.
21. **A. Abdi**, Order stars and order arrows, The 43rd Annual Iranian Mathematics Conference, 27–30 Aug. 2012, University of Tabriz, Tabriz, Iran, pp. 458–460.
22. A. K. Ezzeddine, **A. Abdi**, Construction of efficient second derivative methods for stiff differential systems, The 43rd Annual Iranian Mathematics Conference, 27–30 Aug. 2012, University of Tabriz, Tabriz, Iran, pp. 461–464.
23. **A. Abdi**, G. Hojjati, On the second derivative general linear methods, The 42nd Annual Iranian Mathematics Conference, 5–8 Sep. 2011, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran, pp. 933–936.
24. **A. Abdi**, G. Hojjati, The construction of second derivative general linear methods for numerical solution of ODEs, Extended Abstracts of the NumAn2010, 15–18 Sep. 2010, Crete, Greece, pp. 1–6.
25. **A. Abdi**, J. Farzi, S. M. Hosseini, The Resolution of the Gibbs phenomenon for Fourier Approximation, The 37th Annual Iranian Mathematical Conference, 2–5 Sep. 2006, Tarbiat Moallem University of Azarbaijan, Tabriz, Iran, pp. 97–99 (In Persian).

Conference articles (Abstracts):

1. **A. Abdi**, Z. Jackiewicz, Experiments with a variable-stepsize/variable-order code based on explicit general linear methods, NUMDIFF-17, 9–13 September 2024, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
2. **A. Abdi**, A. Jalilian, G. Hojjati, Variable stepsize second derivative general linear methods, NUMDIFF-16, 6–10 September 2021, Martin Luther University Halle-Wittenberg, Halle

(Saale), Germany.

3. G. Hojjati, **A. Abdi**, On the construction of numerical integrators for ODEs based on the linear barycentric rational interpolants, NUMDIFF-16, 6–10 September 2021, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
4. S.A. Hosseini, **A. Abdi**, Efficient methods for Volterra integro-differential equations based on Floater-Hormann interpolants, NUMDIFF-16, 6–10 September 2021, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
5. **A. Abdi**, Second derivative general linear methods for ordinary differential equations, STRUCTAPP2020, 23–24 January 2020, University of L'Aquila, L'Aquila, Italy.
6. G. Hojjati, **A. Abdi**, Recent methods for the numerical solution of Hamiltonian systems, IECMSA-2019, 27–30 August 2019, Baku, Azerbaijan.
7. **A. Abdi**, S.A. Hosseini, G. Hojjati, A class of multivalue-multistage schemes for the numerical solution of Volterra integral equations, NUMDIFF-15, 3–7 September 2018, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
8. G. Hojjati, **A. Abdi**, H. Mahdi, Multivalue-multistage methods for the numerical solution of the nonlinear Volterra integro-differential equations, NUMDIFF-15, 3–7 September 2018, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
9. S.A. Hosseini, **A. Abdi**, H. Podhaisky, Rational finite differences method based on the barycentric interpolants for ODEs , NUMDIFF-15, 3–7 September 2018, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.
10. **A. Abdi**, G. Hojjati, Efficient high order second derivative methods for IVPs, The 1st International Conference on Boundary Value Problems and Applications, 4–5 July 2018, University of Tabriz, Tabriz, Iran.
11. J.-P. Berrut, **A. Abdi**, S.A. Hosseini, The linear barycentric rational method for a class of delay Volterra integro-differential equations, SciCADE 2017, 11–15 Sep. 2017, University of Bath, Bath, England.
12. **A. Abdi**, G. Hojjati, S.A. Hosseini, Geometric second derivative numerical methods for solving Hamiltonian problems, CMFT 2017, 10–15 July 2017, Maria Curie-Skłodowska University, Lublin, Poland.
13. G. Hojjati, **A. Abdi**, S.A. Hosseini, Multistage-multivalue methods with inherent stability property for ordinary dffirential equations, CMFT 2017, 10–15 July 2017, Maria Curie-Skłodowska University, Lublin, Poland.
14. S.A. Hosseini, **A. Abdi**, On the numerical solution of nonlinear systems of delay Volterra integro-dffirential equations with constant delay, CMFT 2017, 10–15 July 2017, Maria Curie-Skłodowska University, Lublin, Poland.
15. **A. Abdi**, G. Hojjati, M. Hosseini Nasab, Efficient Geometric Numerical Methods for Solving Differential Systems, International Conference on Biomath 2016, 19–25 Jun. 2016, University centre Bachinovo, Blagoevgrad, Bulgaria.
16. **A. Abdi**, G. Hojjati, Construction and implementation of two-stage second derivative methods for stiff ODEs, SciCADE 2015, 14–18 Sep. 2015, University of Potsdam, Potsdam,

Germany.

17. G. Hojjati, **A. Abdi**, Practical experiments with second derivative methods for stiff ODEs, SciCADE 2015, 14–18 Sep. 2015, University of Potsdam, Potsdam, Germany.
18. S.A. Hosseini, **A. Abdi**, Theoretical results on the stability of the linear barycentric rational quadrature methods, SciCADE 2015, 14–18 Sep. 2015, University of Potsdam, Potsdam, Germany.
19. G. Hojjati, **A. Abdi**, On the construction of sequential second derivative general linear methods, SciCADE 2013, 16–20 September 2013, Valladolid, Spain.
20. **A. Abdi**, J.C. Butcher, Experiments with Order Arrows, SciCADE 2011, 11–15 July 2011, Toronto, Canada.
21. **A. Abdi**, G. Hojjati, Numerical solution of stiff ODEs using second derivative general linear methods, SciCADE 2011, 11–15 July 2011, Toronto, Canada.

Books:

1. G. Hojjati, **A. Abdi**, Numerical Methods for Ordinary Differential Equations, Tabriz University Press, 2021 (In Persian).
2. **A. Abdi**, S.A. Hosseini, Foundations of Numerical Analysis with MATLAB, Tabriz University Press, (In Persian): 2015 (first edition), 2022 (second edition).
3. **A. Abdi** et al., Numerical Computations, Azad University of Qazvin Scientific Press, 2008 (In Persian).

Postdocs supervised

2020-2021 **Dr. Afsaneh Moradi**, (Jointly with Prof. G. Hojjati) supported by a grant from the University of Tabriz.

2021-2022 **Dr. Afsaneh Moradi**, (Jointly with Prof. G. Hojjati) supported by a grant from Iran National Science Foundation (INSF).

Visitors

2017 **Batoul Behzad** (PhD student) from Lorestan University, January–June 2017.

PhD Students

2018-2022 **Behnaz Talebi**, *Title of thesis:* Second derivative general linear methods for Hamiltonian systems.

2018-2022 **Tahereh Majidi**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Generalized second derivative linear multistep methods.

2018-2021 **Arash Jalilian**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Variable stepsize second derivative general linear methods for ordinary differential equations.

2017-2022 **Zahra Esmaeelzadeh**, *Title of thesis:* Efficient numerical methods based on barycentric rational interpolants for stiff IVPs.

2016-2019 **Hassan Mahdi**, (Jointly with Prof. G. Hojjati) *Title of thesis:* General linear methods for Volterra integro-differential equations.

2013-2018 **Nasrin Barghi Oskouie**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Construction and implementation of SGLMs with the maximum area of stability region.

2013-2017 **Nazila Yousefzadehfard**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Implicit-Explicit second derivative linear multistep methods for the numerical solution of initial value problems.

2013-2017 **Masoumeh Hosseini Nasab**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Efficient numerical methods preserving geometric structure for solving ordinary differential equations.

2013-2016 **Akram Movahedinejad**, (Jointly with Prof. G. Hojjati) *Title of thesis:* Multivalue–multistage methods with inherent stability property.

Presentations

2024 *Experiments with a variable-stepsize/variable-order code based on explicit general linear methods*, NUMDIFF-17, 9–13 September 2024, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2022 *Second derivative general linear methods for ODEs: implementation issues*, 11 October 2022, The first slot of the seminars of institute for Mathematics of Martin Luther University in the fall semester, Halle (Saale), Germany.

2022 *Advance and develop academic research through international collaborations and related grants*, Golestan University, Iran.

2021 *Development of a practical MATLAB code for ODEs based on general linear methods*, 14 December 2021, University Of Isfahan, Iran.

2021 *Variable stepsize second derivative general linear methods*, NUMDIFF-16, 6–10 September 2021, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2021 *Workshop on: Effective use of international cooperations and related grants to advance and develop academic research*, 8^{th} Seminar on Numerical Analysis and its Applications, 06–09 April 2021, University Of Kurdistan, Iran.

2020 *Recent advances in the numerical solution of ordinary differential equations: developed codes*, 29 December 2020, Institute for Advanced Studies in Basic Sciences (IASBS), Zanjan, Iran.

2020 *Second derivative general linear methods for ordinary differential equations*, STRUCTAPP2020, 23–24 January 2020, University of L'Aquila, L'Aquila, Italy.

2020 *General linear methods for Volterra integral equations*, University of Salerno, Fisciano (SA), Italy.

2018 *A class of multivalue-multistage schemes for the numerical solution of Volterra integral equations*, NUMDIFF-15, 3–7 September 2018, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany.

2018 *Second derivative general linear methods*, 10 July 2018, The last slot of the seminars of institute for Mathematics of Martin Luther University before the spring semester ends, Halle (Saale), Germany.

2018 *Efficient high order second derivative methods for IVPs*, The 1st International Conference on Boundary Value Problems and Applications, 4–5 July 2018, University of Tabriz, Tabriz, Iran.

2017 *Geometric second derivative numerical methods for solving Hamiltonian problems*, CMFT 2017, 10–15 July 2017, Maria Curie-Skłodowska University, Lublin, Poland.

2015 *Construction and implementation of two-stage second derivative methods for stiff ODEs*, SciCADE 2015, 14–18 Sep. 2015, University of Potsdam, Potsdam, Germany.

2013 *Multistage–multivalue methods for Volterra integral equations*, The 44th Annual Iranian Mathematics Conference, Ferdowsi University of Mashhad 27–30 Aug. 2013, Mashhad, Iran.

2012 *Order stars and order arrows*, The 43rd Annual Iranian Mathematics Conference, University of Tabriz 27–30 Aug. 2012, Tabriz, Iran.

2012 *Extension of general linear methods for numerical solution of ODEs*, The Presentation of the PhD viva examination, Faculty of Mathematical Sciences, University of Tabriz, 27 June 2012, Tabriz, Iran.

2011 *Order stars*, Faculty of Mathematical Sciences, University of Tabriz, 1 June 2011, Tabriz, Iran.

2007 *The Resolution of the Gibbs phenomenon for Fourier Approximation*, The Presentation of the MSc viva examination, Department of Applied Mathematics, Tarbiat Modares University, 3 Feb. 2007, Tehran, Iran.

2006 *The Resolution of the Gibbs phenomenon for Fourier Approximation*, The 37th Annual Iranian Mathematical Conference, Tarbiat Moallem University of Azarbaijan, 2–5 Sep. 2006, Tabriz, Iran.

Computer skills

Intermediate C programming, Microsoft Office, Microsoft Windows

Advanced Matlab, Maple, Mathematica, LaTeX, FTeX, XeLaTeX, XePersian

Languages

Turkish **Mothertongue**

Persian **Official Language**

English **Advanced** *Conversational fluent*

Interests

- Iranian traditional music
- Football
- Mountain Climbing
- Running

References

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

Faculty of Mathematical Sciences, University of Tabriz, 29 Bahman Blvd., Tabriz, Iran
+98 912 810 9852 • ☎ +98 41 3339 2900 • FAX +98 41 3334 2102
a_abdi@tabrizu.ac.ir; ali.abdi@mathematik.uni-halle.de; ali.abdi.kalasour@gmail.com
simap.tabrizu.ac.ir/homepage/a_abdi

- **Prof. M. Arnold**, Professor of Applied Mathematics, Institute for Mathematics, Martin Luther University Halle-Wittenberg, 06099 Halle (Saale), Germany.
  Email: martin.arnold@mathematik.uni-halle.de
- **Prof. M. Asadzadeh**, Emeritus professor of Applied Mathematics, Faculty of Mathematics, Chalmers University of Technology, Sweden.
  Email: mohammad@chalmers.se
- **Prof. J.-P. Berrut**, Emeritus professor of Applied Mathematics, Department of Mathematics, University of Fribourg, Fribourg, Switzerland.
  Email: jean-paul.berrut@unifr.ch
- **Prof. J.C. Butcher**, Emeritus professor of Mathematics, Department of Mathematics, The University of Auckland, Auckland, New Zealand.
  Private Bag 92019, E-mail: butcher@math.auckland.ac.nz
- **Prof. D. Conte**, Professor of Applied Mathematics, Department of Mathematics, University of Salerno, Fisciano (SA), Italy.
  Email: dajconte@unisa.it
- **Prof. Z. Jackiewicz**, Professor of Applied Mathematics, School of Mathematical & Statistical Sciences, Arizona State University, Tempe, United States of America.
  Email: jackiewicz@asu.edu
- **Prof. H. Podhaisky**, Professor of Applied Mathematics, Institute for Mathematics, Martin Luther University Halle-Wittenberg, 06099 Halle (Saale), Germany.
  Phone: +49 178 5076714, Email: helmut.podhaisky@mathematik.uni-halle.de