

M. A. Abdelkawy

Personal Information:

Name : Mohamed Abdelkawy Abdelhalim Mohamed
Date of birth : Dec. 16, 1982
Nationality : Egyptian
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Current address : Department of Math. & Stat., College of Science, Al-Imam Mohammed Ibn- Saud Islamic University, Riyadh, Saudi Arabia



Educations:

- **Ph.D. Degree** in Pure Mathematics (Numerical Analysis and Approximation Theory), Department of Mathematics and Computer Science, Faculty of Science, Beni-Suef University, Egypt, Sept. 2014.
- **M.Sc. Degree** in Applied Mathematics, Department of Mathematics, Faculty of Science, Beni-Suef University, Egypt, July 2011.
- **B.Sc. Degree**, Department of Mathematics, Faculty of Science (Beni-Suef), Cairo University, Egypt, May 2003 Grade: “Excellent with Honor”.

Employment:

- **Assistant Professor:** Department of Math. & Stat., College of Science, Al-Imam Mohammed Ibn- Saud Islamic University, Riyadh, Saudi Arabia.
- **Lecturer:** Department of Mathematics, Faculty of Science, Beni-Suef University, Egypt. October 2014-February 2016.
- **Assistant Lecturer:** Department of Mathematics, Faculty of Science, Beni-Suef University, Egypt. July 2011- September 2014.
- **Demonstrator:** Department of Mathematics, Faculty of Science, Beni-Suef University, Egypt. September 2005– July 2011.
- **Demonstrator:** Department of Mathematics, Faculty of Science, Beni-Suef Branch, Cairo University, Egypt. April 2004 - September 2005.

Main Research Interests:

- Numerical analysis and scientific computing.
- Spectral methods and their applications.
- Developing spectral methods for solving ordinary/partial functional differential equations.
- Nonlinear partial differential equations.
- Functional differential equations.
- Fractional Differential Equations.

- Variable order fractional differential equations.
- Integral equations.
- Fractional integral equations.
- Fractional integro-differential equations.
- Variable order fractional integro-differential equations.
- Distributed order fractional differential equations.
- Complex partial differential equations.
- Error and convergence analysis.
- Orthogonal polynomials.
- Exact solutions of nonlinear partial differential equations that describe nonlinear phenomena appear in many scientific and engineering fields.

Recent Publications:

• Papers published or to be published in refereed journals:

1. **M. A. Abdelkawy**, A. Z. M. Amin, A. H. Bhrawy, J. A. T Machado, A. M. Lopes, Jacobi Collocation Approximation for Solving Multi-dimensional Volterra Integral Equations, *International Journal of Nonlinear Sciences and Numerical Simulation*, Accepted.
2. M. A. Zaky, I. G. Ameen, **M. A. Abdelkawy**, A new operational matrix based on JACOBI wavelets for a class of variable-order fractional differential equations, *PROCEEDINGS OF THE ROMANIAN ACADEMY, Series A*, Accepted.
3. A. H. Bhrawy, **M. A. Abdelkawy**, D. Baleanu, A. Z.M. Amin, A spectral technique for solving two-dimensional fractional integral equations with weakly singular kernel, *Haccettepe Journal*, Accepted.
4. S.S. Ezz-Eldien, E.H. Doha, A.H. Bhrawy, **M.A. Abdelkawy**, D. Baleanu, Solving Fractional Optimal Control Problems within a Chebyshev-Legendre Operational Technique, *International Journal of Control* (2017) Accepted.
5. **M.A. Abdelkawy**, Rubayyi T. Alqahtani, Shifted Jacobi spectral collocation method for solving two-sided fractional water wave models, *The European Physical Journal Plus*, (2017) Accepted .
6. **M. A. Abdelkawy**, E. H. Doha, A. H. Bhrawy, A. Z. A. Amin, Efficient pseudospectral scheme for 3D integral equations, *Proc. Romanian Acad. A*, (2017) Accepted.
7. **M.A. Abdelkawy**, A.H. Bhrawy, R. Alqahtani , D. Baleanu, Pseudo-spectral method with basis functions for solving nonlinear fractional variable-order Stokes' first problems, *Computers and Mathematics with Applications*, (2017) Accepted
8. **M.A. Abdelkawy**, Rubayyi T. Alqahtani, Space-time spectral collocation algorithm for the variable-order Galilei invariant advection diffusion equations with a nonlinear source term, *Mathematical Modelling and Analysis*, **22**(1), (2017) 1-20.
9. A.H. Bhrawy, **M.A. Abdelkawy**, J. Tenreiro Machado, A.Z.M. Amin, Legendre-Gauss-Lobatto collocation method for solving multi-dimensional Fredholm integral equations, *Computers and Mathematics with Applications*, In Press.
10. **M. A Abdelkawy**, Rubayyi T. Alqahtani, Shifted Jacobi collocation method for solving multi-dimensional fractional Stokes' first problem for a heated generalized second grade fluid, *Advances in Difference Equations* (2016) 2016**2016**:114 **DOI**: 10.1186/s13662-016-0845-z.
11. A.H. Bhrawy, E.H. Doha, J.F. AL-Zaidi, **M.A. Abdelkawy**, A space-time spectral collocation algorithm for the variable order fractional wave equation, *SpringerPlus* (2016) 5:1220 **DOI**: 10.1186/s40064-016-2899-5
12. **M.A. Abdelkawy**, Engy A. Ahmed, Rubayyi T. Alqahtani, A new numerical algorithm for solving time-fractional Tricomi-type equations, *Open Physics*, (2016) , **14** (2016) 269–280.

13. M. A. Abdelkawy, A. H. Bhrawy , Essaid Zerrad and Anjan Biswas, Application of tanh method to complex coupled nonlinear evolution equations, *Acta Physica Polonica A*, **129** (2016) 278-283.
14. A. H. Bhrawy, **M. A Abdelkawy**, Efficient spectral collocation algorithm for solving parabolic inverse problems, *International Journal of Computational Methods*, (2016) [dx.doi.org/10.1142/S0219876216500365](https://doi.org/10.1142/S0219876216500365).
15. A. H. Bhrawy, F. Mallawi, **M. A Abdelkawy**, New spectral collocation algorithms for one and two-dimensional Schrödinger equations with Kerr law nonlinearity, *Advances in Difference Equations*, (2016) 2016:18 DOI 10.1186/s13662-016-0752-3.
16. A. H. Bhrawy, J. F. Alzaidy, **M. A. Abdelkawy**, Anjan Biswas, Jacobi spectral collocation approximation for multi-dimensional time fractional Schrödinger equations, *Nonlinear Dynamics*, (2016), **84** 1553-1567..
17. A. H. Bhrawy , **M. A. Abdelkawy**, S. S. Ezz-Eldien, Efficient Spectral Collocation Algorithm for a Two-Sided Space Fractional Boussinesq Equation with Non-local Conditions, *Mediterranean Journal of Mathematics* 10.1007/s00009-015-0635-y
18. A.H. Bhrawy, E.H. Doha, **M.A. Abdelkawy**, R.A. Van Gorder, Jacobi–Gauss–Lobatto collocation method for solving nonlinear reaction–diffusion equations subject to Dirichlet boundary conditions, *Applied Mathematical Modelling*, **40** (2016) 1703–1716.
19. A.H. Bhrawy, E.H. Doha, S.S. Ezz-Eldien, **M.A. Abdelkawy**, A numerical technique based on the shifted Legendre polynomials for solving the time-fractional coupled KdV equation, *Calcolo*, **53** (2016) 1–17.
20. R.M. Hafez, **M.A. Abdelkawy**, E.H. Doha, A.H. Bhrawy, A new collocation scheme for solving hyperbolic equations of second order in a semi-infinite domain, *Rom Rep Phys*, **68**, (2016) 112–127.
21. A.H. Bhrawy, **M. A. Abdelkawy**, Fouad Mallawi, An Accurate Chebyshev pseudospectral scheme for multi-dimensional parabolic problems with time delays, *Boundary Value Problems*, (2015) 2015: 103.
22. A.H. Bhrawy, E.H. Doha, S.S. Ezz-Eldien, **M.A. Abdelkawy**, A Jacobi spectral collocation scheme based on operational matrix for time-fractional modified Korteweg-de Vries equations, *Computer Modeling in Engineering & Sciences*, **104** (2015) 185-209.
23. AH Bhrawy, **M. A. Abdelkawy**, A fully spectral collocation approximation for multi-dimensional fractional Schrodinger equations, *J. Comput. Phys.* **294** (2015) 462–483.
24. E. H Doha, A H Bhrawy, **M A. Abdelkawy**, An accurate Jacobi pseudo-spectral algorithm for parabolic partial differential equations with non-local boundary conditions, *J. Comput. Nonlin. Dyn.* **10** (2015) 021016-13.
25. A.H. Bhrawy, T.M. Taha, **M. A. Abdelkawy**, R.M. Hafez, On numerical methods for fractional differential equation on a semi-infinite interval, A Book chapter.
26. A.H. Bhrawy, M.A. Zaky, D. Baleanu, **M.A. Abdelkawy**, A novel spectral approximation for the two-dimensional fractional sub-diffusion problems, *Rom. Rep. Phys.*, **60** (2015) 344–359.
27. **M.A. Abdelkawy**, M.A. Zaky, A.H. Bhrawy, D. Baleanu, Numerical simulation of time variable fractional order mobile-immobile advection-dispersion model, *Rom. Rep. Phys.*, **67** (2015) 773–791.
28. A.H. Bhrawy, E.H. Doha, **M.A. Abdelkawy**, R.M. Hafez, An efficient collocation algorithm for multidimensional wave type equations with nonlocal conservation conditions, *Appl. Math. Model.*, **39** (18) (2015) 5616–5635.
29. **M. A. Abdelkawy**, Engy A. Ahmed and P. Sanchez, A method based on Legendre pseudo-spectral approximations for solving inverse problems of parabolic types equations, *Math. Sci. Lett.*, **4** (2015) 81-90.
30. A.H. Bhrawy, **M.A. Abdelkawy**, A.A. Alzahrani, D. Baleanu, E.O. Alzahrani, A Chebyshev-Laguerre Gauss-Radau collocation scheme for solving time fractional sub-diffusion equation on a semi-infinite domain, *Proceedings of The Romanian Academy, Series A*, (2015) **16**, (2015) 490–498.

31. A.H. Bhrawy, E.H. Doha, D. Baleanu, S.S. Ezz-Eldien, **M.A. Abdelkawy**, An accurate numerical technique for solving fractional optimal control problems, *Proceedings of The Romanian Academy, Series A*, 16 (2015) 47–54.
32. E. H Doha, A. H. Bhrawy, **M. A. Abdelkawy**, R. M. Hafez, Numerical solution of initially-boundary system of nonlinear hyperbolic equations, *Indian Journal of Pure and Applied Mathematics*, 46 (2015) 647-668.
33. **M. A. Abdelkawy**, S. S. Ezz-Eldien, A. Z. M. Amin, A Jacobi Spectral Collocation Scheme for Solving Abel's Integral Equations, *Progress in Fractional Differentiation and Applications*, 1(3) (2015) 187-200.
34. E. H. Doha, A. H. Bhrawy, **M. A. Abdelkawy**, A shifted Jacobi collocation algorithm for wave type equations with non-local conservation conditions, *Central European Journal of Physics*, **12** (2014) 637-653.
35. E. H Doha, A H Bhrawy, **M A Abdelkawy**, R. A. Van Gorder, Jacobi-Gauss-Lobatto collocation method for the numerical solution of 1+1 nonlinear Schrödinger equations, *J. Comput. Phys.*, **261** (2014) 244–255.
36. A. Biswas, A. H. Bhrawy, **M. A. Abdelkawy**, A. A. Alshaery, E. M. Hilal, Symbolic computation of some nonlinear fractional differential equations, *Romanian Journal of Physics* **59** (2013) 433-442.
37. E.H. Doha, A.H. Bhrawy D. Baleanu, **M.A. Abdelkawy**, Numerical treatment of Coupled Nonlinear Hyperbolic Klein-Gordon Equations, *Romanian Journal of Physics*, **59** (2014) 247–264
38. A. H. Bhrawy, **M. A. Abdelkawy**, A. A. Alshaery, E. M. Hilal, Anjan Biswas, Solitons, cnoidal waves, snoidal waves and other solutions to Whitham-Broer-Kaup system, *Applied Mathematics & Information*, **8** (2014) 2119-2128 .
39. E.H. Doha, A.H. Bhrawy, **M.A. Abdelkawy**, R.M. Hafez, A Jacobi collocation approximation for nonlinear coupled viscous Burgers' equation, *Central European Journal of Physics*, **12** (2014) 111-122.
40. E.H. Doha, A.H. Bhrawy, D. Baleanu, and **M.A. Abdelkawy**, An accurate Legendre collocation scheme for coupled hyperbolic equations with variable coefficients. *Romanian Journal of Physics* **59** (2014) 247-264.
41. A. H. Bhrawy, **M. A. Abdelkawy** and Anjan Biswas, Optical solitons in (1+1) and (2+1) dimensions, *Optik*, **125** (2014) 1537–1549.
42. **M. A. Abdelkawy** and T.M. Taha, An operational matrix of fractional derivatives of Laguerre polynomials, *Walailak J Sci & Tech.*, 11(**12**) (2014) 1041-1055.
43. E. H. Doha, A. H. Bhrawy, R.M. Hafez and **M. A. Abdelkawy**, A Chebyshev-Gauss-Radau scheme for nonlinear hyperbolic system of first order, *Applied Mathematics & Information Sciences*, **8** (2014) 535-544.
44. E. H. Doha, D. Băleanu, A. H. Bhrawy, and **M. A. Abdelkawy**, A Jacobi collocation method for solving nonlinear Burgers'-type equations , *Abstract and applied analysis* **2013**, ID 760542, 12 pp. (2013).
45. A. H. Bhrawy, **M. A. Abdelkawy**, Anjan Biswas, Topological solitons and cnoidal waves to a few nonlinear wave equations in theoretical physics, *Indian Journal of Physics*, **87** (2013) 1125-1131
46. A. H. Bhrawy, **M. A. Abdelkawy**, Computational study of some nonlinear shallow water equations, *Central European Journal of Physics*, **11** (2013) 518-525
47. A.H. Bhrawy and **M. A. Abdelkawy**, Integrable system modeling shallow water waves: Kaup-Boussinesq shallow water system, *Indian Journal of Physics*, **87** (2013) 665-671.
48. A.H. Khater, D.K. Callebaut, A.H. Bhrawy and **M.A. Abdelkawy**, Nonlinear periodic solutions for isothermal magnetostatic atmospheres, *Journal of Computational and Applied Mathematics*, **242** (2013) 28–40.
49. A. H. Bhrawy, **M. A. Abdelkawy** and A. Biswas, Cnoidal and snoidal wave solutions to coupled nonlinear wave equations by the extended Jacobi's elliptic function method, *Communications in Nonlinear Science and Numerical Simulation*, **18** (2013) 915–925.

50. **M. A. Abdelkawy** and A.H. Bhrawy, G'/G-expansion method for two-dimensional force-free magnetic fields described by some nonlinear equations, *Indian Journal of Physics*, **87** (2013) 555-565
51. A. H. Bhrawy, **M. A. Abdelkawy**, Sachin Kumar, Stephen Johnson, Anjan Biswas, Solitons and other solutions to quantum Zakharov-Kuznetsov equation in quantum magneto-plasmas, *Indian Journal of Physics*, 2013, **87**, 455-463.
52. A.H. Bhrawy, K. Boubaker and **M.A. Abdelkawy**, Extended F-expansion method for (2+1)-dimensional B-type Kadomtsev-Petviashvili equation, *Physical Chemistry: An Indian Journal*, **8** (2013) 8-16.
53. A.H. Bhrawy, A. Yildirim, M. M. Tharwat and **M. A. Abdelkawy**, A Jacobi elliptic function method for nonlinear arrays of vortices, *Indian Journal of Physics*, **86** (2012) 1107-1113.
54. Ali H. Bhrawy, M. Sh. Alhuthali and **Mohammed A. Abdelkawy**, New solutions for (1+1)-dimensional and (2+1)-dimensional Ito equations, *Mathematical Problems in Engineering*, **2012**, Article ID 537930, pp. 24 (2012).
55. A. S. Alofi and M.A. Abdelkawy, Jacobi elliptic function expansion method for Zakharov-Kuznetsov (ZK) equations and Kadomtsov-Petvtshtvilli (KP) equations, *ISST journal of applied physics*, **3** (2012) 31-38.
56. A.H. Bhrawy, A.S. Alofi, **M.A. Abdelkawy**, Time-dependent two-dimensional Zakharov-Kuznetsov equation in the electron-positron-ion plasmas. *Life Science Journal*, **9** (2012) 1804-1813
57. **M. A. Abdelkawy**, M. A. Alghamdi and A.H. Bhrawy, Jacobi doubly periodic wave solutions for three versions of Benjamin-Bona- Mahony equation, *Scientific Research and Essays*, **7** (2012) 2417-2423.
58. A.H. Bhrawy, **M. A. Abdelkawy**, S. Kumar and A. Biswas, Solitons and other solutions to Kadomtsev-Petviashvili equation of B-type, *Romanian Journal of Physics*, **58**, (2013) 729-748
59. A.S. Alofi and **M.A. Abdelkawy**, New exact solutions of Boiti-Leon-Manna-Pempinelli equation using extended F-expansion method, *Life Science Journal*, **9** (2012).
60. A. H. Khater, D. K. Callebaut and **M. A. Abdelkawy**, Two-dimensional force-free magnetic fields described by some nonlinear equations, *Phys. of plasmas*, **17** (2010) 122902.

Reviewer for the following Journals:

- Abstract and Applied Analysis.
- Journal of Optoelectronics and Advanced Materials.
- Applications and Applied Mathematics.
- Advances in Difference Equations.
- Journal of Computational and Applied Mathematics.
- Journal of Abstract and Computational Mathematics.
- Applied Mathematics and Computation.
- Communication in Mathematical Modeling and Applications.
- Punjab University Journal of Mathematics.
- Optics Communications.
- Applied Mathematics.

Conferences and Workshops Participation:

- International Association of Geomagnetism and Aeronomy (IAGA) 2nd Symposium Cairo, Egypt, 4th-8th December (2009).

- International Congress on Computational and Applied Mathematics, Leuven, Belgium 5th-9th July (2010).

Organization

- A member of the Egyptian Mathematical Society.

Co-Supervisor of the following thesis

- A. Z. M. Amin, M.Sc. Jan. 2015, thesis entitled: "Spectral methods for solving fractional integral equations"
- A. Z. M. Amin, Ph.D. May. 2017, thesis entitled: "Numerical spectral methods for solving variable-order fractional and Stochastic fractional differential and integro-differential equations"
- T. M. Taha, Ph.D. Jul. 2015, thesis entitled: "Numerical methods for solving fractional partial differential equations on a semi-infinite domain".
- Ibrahim Gamal, Ph.D. Feb. 2017, thesis entitled: "Improved wavelet techniques for solving fractional differential equations"

Citation Overview

- According to the database of Scopus, the number of Citations is about 321 with 10 h-index.
- According to Google Search Scholar, the number of Citations is about 479 with 12 h-index.

Awarded Projects

- **Project entitled** "A new spectral method for solving a two-dimensional fractional diffusion equation" funded by faculty of science, Beni-Suef University.
- **Project entitled** "A new numerical algorithms for solving a multi-dimensional fractional partial differential equations" funded by Beni-Suef University.

Awarded prize

- The University Incentive Award for 2017 awarded from Beni-Suef University.
- The prize of the best Ph.D. thesis for 2014 awarded from faculty of science, Beni-Suef University.
- The prize of the best Ph.D. thesis for 2015 awarded from the Egyptian Mathematical Society.
- The prize of the best Ph.D. thesis for 2016 awarded from Beni-Suef University.
- The prize of the best mathematical article (article no. 49) for 2013 awarded from faculty of science, Beni-Suef University.
- The prize of the best mathematical article (article no. 35) for 2014 awarded from faculty of science, Beni-Suef University
- The prize of the best mathematical article (article no. 23) for 2015 awarded from King Abdulaziz University, Faculty of Science, Department of Mathematics, Jeddah, Saudi Arabia.

Skills:

★ Teaching Experiences:

1- Courses for undergraduates:

I have experience in teaching courses in numerical analysis, special functions and orthogonal polynomials, differential equations, precalculus, calculus, advanced calculus, analytical geometry, linear algebra, introduction to computer, mathematical statistics, theory of probability, mechanics (statics and dynamics), in Faculty of Science, Faculty of Education, Faculty of Engineering and Faculty of Pharmacy, Beni-Suef University.

★ Computer science Experiences:

1. I have programming skills in MATHEMATICA.

2. I have experience in teaching course in numerical analysis using MATHEMATICA.

---- Dr. M. A. Abdelkawy ----