

CURRICULUM VITAE

PERSONAL DATA

Name	Mohamed Meabed Bayuomi Khader
Nationality	Egyptian
Position	Prof.
E-Mail	Mmkhader@imamu.edu.sa
Phone	0552341720

EDUCATION

Year	Academic Degree	Institution
1995	B. Sc. Degree in Mathematics	Benha Univeristy
2002	M. Sc. Degree in Pure Mathematics (Numerical Analysis)	Benha Univeristy
2009	Ph. D. Degree in Pure Mathematics (Numerical Analysis)	Benha Univeristy

WORK EXPERIENCE

Period	Position	Address
1996-2002	A Demonstrator	Faculty of Science, Benha University
2003-2009	An Assistant Lecturer	Faculty of Science, Benha University
2009-2015	A Lecturer	Faculty of Science, Benha University
2015-2021	Assistant Prof.	Faculty of Science, Benha University

RESEARCH INTERESTS

- 1- Numerical solution of (Ordinary – partial differential equations);
- 2- Numerical solution of fractional (Ordinary – partial) differential equations;
- 3-Numerical solution of Integro-differential equations;
- 4-Numerical solution of difference equations;
- 5- Numerical solution of nonlinear system of algebraic equations;

The used methods are:

Adomian decomposition method-Variational iteration method- Homotopy perturbation method- Homotopy Analysis method-Finite difference method- Finite element method-Pseudo-spectral method (Chebyshev- Legendre polynomials) – Pade approximation-Laplace transform method.

PUBLICATIONS

- [1] N. H. Sweilam and M. M. Khader, Variational iteration method for one dimensional nonlinear thermo-elasticity, *Chaos, Solitons and Fractals*, 32, p.(145–149), 2007.
- [2] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, Numerical studies for a multi-order fractional differential equation, *Physics Letters A*, 371, p.(26–33), 2007.
- [3] N. H. Sweilam and M. M. Khader, Application of homotopy perturbation method to a nonlinear focusing Manakov system, Accepted in the Proceeding of, *Proc. Math. Phys. Soc. Egypt*, 86(2), p.(245–257), 2008.
- [4] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, Nonlinear focusing Manakov systems by variational iteration method and Adomian decomposition method, *Journal of Physics: Conference Series*, 96, p.(1–7), 2008.
- [5] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, Homotopy perturbation method for multi-dimensional nonlinear coupled system of parabolic and hyperbolic equations, *Topological Methods in Nonlinear Analysis*, 31, p.(295–304), 2008.
- [6] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, On the numerical simulation of population dynamics with density-dependent migrations and the Allee effects, *Journal of Physics: Conference Series*, 96, p.(1–10), 2008.

- [7] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, Homotopy perturbation method for linear and nonlinear system of fractional integro-differential equations, International Journal of Computational Mathematics and Numerical Simulation, 1(1), p.(73-87), 2008.
- [8] N. H. Sweilam and M. M. Khader, Exact solutions of some coupled nonlinear partial differential equations using the homotopy perturbation method, Computers and Mathematics with Applications, 58, p.(2134-2141), 2009.
- [9] N. H. Sweilam and M. M. Khader, Application of He's parameter-expansion method for the non-linear differential equations, International Journal of Nonlinear Science & Numerical Simulation, 10(2), p.(265-272), 2009.
- [10] N. H. Sweilam and M. M. Khader, On the convergence of variational iteration method for nonlinear coupled system of partial differential equations, International Journal of Computer Mathematics, 87(5), p.(1120-1130), 2010.
- [11] N. H. Sweilam and M. M. Khader, Approximate solutions to the nonlinear vibrations of multiwalled carbon nanotubes using Adomian decomposition method, Applied Mathematics and Computation, 217, p.(495-505), 2010.
- [12] N. H. Sweilam and M. M. Khader, A Chebyshev pseudo-spectral method for solving fractional order integro-differential equations, ANZIAM, 51, p.(464-475), 2010.
- [13] N. H. Sweilam and M. M. Khader, A note on He's parameter-expansion method of coupled Van der Pol-Duffing oscillators, Applications and Applied Mathematics: An International Journal, Special Issue,1, p.(94-100), 2010.
- [14] N. H. Sweilam, M. M. Khader and F. T. Mohamed, On the numerical solutions of two dimensional Maxwell's equations, Studies in Nonlinear Sciences, 1(3), p.(82-88), 2010.
- [15] N. H. Sweilam and M. M. Khader, On the existence and properties of the positive definite solution of the matrix equation $X=I+A^*\sqrt{X^{-1}}A$, International Electronic Journal of Pure and Applied Mathematics, 2(4), p.(225-232), 2010.
- [16] M. M. Khader, On the numerical solutions for the fractional diffusion equation, Communications in Nonlinear Science and Numerical Simulation, 16, p.(2535-2542), 2011.

- [17] N. H. Sweilam, M. M. Khader and A. M. Nagy, Numerical solution of two-sided space-fractional wave equation using finite difference method, *Journal of Computational and Applied Mathematics*, 235, p.(2832–2841), 2011.
- [18] M. M. Khader and R. F. Al-Bar, Approximate method for studying the waves propagating along the interface between air-water, *Mathematics Problem in Engineering*, 2011, p.(1–21), 2011.
- [19] N. H. Sweilam, M. M. Khader and R. F. Al-Bar, Parameter expansion method for viscoelastic motion with fractional order damping, *Nonlinear Sci. Lett. A*, 2(3), p.(159–169), 2011.
- [20] M. M. Khader and R. F. Al-Bar, Application of Picard-Pade' technique for obtaining the exact solution of 1-D hyperbolic telegraph equation and coupled system of Burger's equations, *Global Journal of Pure and Applied Mathematics*, 7(2), p.(173–190), 2011.
- [21] M. M. Khader, Numerical solution of nonlinear multi-order fractional differential equations by implementation of the operational matrix of fractional derivative, *Studies in Nonlinear Sciences*, 2(1), p.(5–12), 2011.
- [22] S. T. Mohamed and M. M. Khader, Numerical solutions to the second order Fredholm integro-differential equations using the spline functions expansion, *Global Journal of Pure and Applied Mathematics*, 34, p.(21–29), 2011.
- [23] N. H. Sweilam and M. M. Khader, Semi exact solutions for the bi-harmonic equation using homotopy analysis method, *World Applied Sciences Journal*, 13, p.(1–7), 2011.
- [24] M. M. Khader, N. H. Sweilam and A. M. S. Mahdy, An efficient numerical method for solving the fractional diffusion equation, *Journal of Applied Mathematics and Bioinformatics*, 1, p.(1–12), 2011.
- [25] N. H. Sweilam, M. M. Khader and F. M. Atlan, Numerical studies for singularity perturbed convection reaction diffusion problems in two dimensions, *Research Journal of Mathematics and Statistics*, 3(3), p.(97–106), 2011.
- [26] N. H. Sweilam, M. M. Khader and T. A. Assiri, Efficient numerical treatment for fractional partial differential equations, *Nonlinear Science Letter A*, 2(4), p.(181–189), 2011.

- [27] M. M. Khader, Accelerated solution of high order non-linear ODEs using Chebyshev spectral method comparing with Adomian decomposition method, *Studies in Nonlinear Sciences*, 2(3), p.(91–101), 2011.
- [28] M. M. Khader and A. S. Hendy, The approximate and exact solutions of the fractional-order delay differential equations using Legendre pseudo-spectral method, *Inter. J. of Pure and Applied Mathematics*, 74(3), p.(287–297), 2012.
- [29] M. M. Khader and A. M. Megahed, On the numerical solution for the flow and heat transfer in a thin liquid film over an unsteady stretching sheet in a saturated porous medium in the presence of thermal radiation, *Journal of Applied Mechanics and Technical Physics*, 53(5), p.(710–721), 2012.
- [30] N. H. Sweilam, M. M. Khader, and A. M. S. Mahdy, Numerical studies for fractional-order Logistic differential equation with two different delays, *Journal of Applied Mathematics*, 2012, Article ID 764894, 14 pages.
- [31] N. H. Sweilam, M. M. Khader and A. M. Mahdy, Numerical studies for solving fractional-order Logistic equation, *Int. J. of Pure and Applied Mathematics*, 78(8), p.(1199–1210), 2012.
- [32] M. M. Khader and A. S. Hendy, An efficient numerical scheme for solving fractional optimal control problems, *Inter. J. of Nonlinear Science*, 14(3), p.(287–296), 2012.
- [33] N. H. Sweilam, M. M. Khader and A. M. Mahdy, On the numerical solution for the linear fractional Klein-Gordon equation using Legendre pseudo-spectral method, *International Journal of Mathematics and Computer Applications Research*, 2(4), p.(1–10), 2012.
- [34] N. H. Sweilam, M. M. Khader and M. Adel, An efficient class of FDM based on Hermite formula for solving fractional reaction-sub-diffusion equations, *International Journal of Mathematics and Computer Applications Research*, 2(4), p.(61–75), 2012.
- [35] N. H. Sweilam, M. M. Khader and A. M. Mahdy, Numerical studies for solving fractional Riccati differential equation, *Applications and Applied Mathematics: An International Journal*, 7(2), p.(1–10), 2012.
- [36] M. M. Khader, Introducing an efficient modification of the variational iteration method by using Chebyshev polynomials, *Application and Applied Mathematics:*

An International Journal, 7(1), p.(283–299), 2012.

- [37] N. H. Sweilam, M. M. Khader and H. M. Almarwm, Numerical studies for the variable–order nonlinear fractional wave equation, *Fractional Calculus and Applied Analysis*, 15(4), p.(1–15), 2012.
- [38] N. H. Sweilam, M. M. Khader and A. M. S. Mahdy, Crank–Nicolson finite difference method for solving time–fractional diffusion equation, *Journal of Fractional Calculus and Applications*, 2(2), p.(1–9), 2012.
- [39] M. M. Khader, Introducing an efficient modification of the homotopy perturbation method by using Chebyshev polynomials, *Arab Journal of Mathematical Sciences* 18, p.(61–71), 2012.
- [40] N. H. Sweilam, M. M. Khader and M. Adel, On the stability analysis of weighted average finite difference methods for fractional wave equations, *Fractional Differential Calculus*, 2(1), p.(17–29), 2012.
- [41] M. M. Khader and S. T. Mohamed, Numerical treatment for first order neutral delay differential equations using spline functions, *Engineering Mathematics Letters*, 1(1), p.(32–43), 2012.
- [42] N. H. Sweilam, M. M. Khader and A. M. S. Mahdy, Computational methods for fractional differential equations generated by optimization problem, *Proc. of the 4th. Symb. of Fractional Calculus and Applications*, 3(S)(15), p.(1–12), 2012.
- [43] M. M. Khader, Talaat S. El Danaf and A. S. Hendy, Efficient spectral collocation method for solving multi–term fractional differential equations based on the generalized Laguerre polynomials, *Journal of Fractional Calculus and Applications*, 3(13), p.(1–14), 2012.
- [44] M. M. Khader and A. S. Hendy, Fractional Chebyshev finite difference method for solving the fractional BVPs, *Journal of Applied Mathematics & Informatics*, 31(1–2), p.(299–309), 2012.
- [45] N. H. Sweilam, M. M. Khader and W. Y. Kota, On the numerical solution of Hammerstein integral equations using Legendre approximation, *International Journal of Applied Mathematical Research*, 1, p.(65–76), 2012.
- [46] M. M. Khader, Numerical treatment for solving fractional Riccati differential

equation, *Journal of the Egyptian Mathematical Society*, 21, p.(32–37), 2013.

- [47] M. M. Khader, Talaat S. El Danaf and A. S. Hendy, A computational matrix method for solving systems of high order fractional differential equations, *Applied Mathematical Modelling*, 37, p.(4035–4050), 2013.
- [48] M. M. Khader, and Ahmed M. Megahed, Numerical simulation using the finite difference method for the flow and heat transfer in a thin liquid film over an unsteady stretching sheet in a saturated porous medium in the presence of thermal radiation, *J. of King Saud University: Engineering Sciences*, 25, p.(29–34), 2013.
- [49] M. M. Khader, On the numerical solutions for chemical kinetics system using Picard–Pade' technique, *Journal of King Saud University: Engineering Sciences*, 25, p.(97–103), 2013.
- [50] M. M. Khader and A. S. Hendy, A numerical technique for solving fractional variational problems, *Mathematical Methods in Applied Sciences*, 36(10), p.(1281–1289), 2013.
- [51] R. G. Abdel–Rahman, M. M. Khader and A. M. Megahed, Melting phenomenon on MHD steady flow and heat transfer over a moving surface in the presence of thermal radiation in terms of finite difference method, *Journal of Chinese Physics B*, 22(3), p.(03XXXX1:1–6), 2013.
- [52] M. M. Khader, Numerical solution for discontinued problems arising in nanotechnology using HAM, *Journal of Nanotechnology & Advanced Materials An International Journal*, 1(1), p.(59–67), 2013.
- [53] M. M. Khader, An efficient approximate method for solving linear fractional Klein–Gordon equation based on the generalized Laguerre polynomials, *International Journal of Computer Mathematics*, 90(9), p.(1853–1864), 2013.
- [54] M. M. Khader, N. H. Sweilam and N. Y. Ali, An efficient modification of PIM by using Laguerre polynomials, *International Journal of Pure and Applied Mathematics*, 2013.
- [55] M. M. Khader, Computational approaches for solving the Logistic equation using VIM–Pade' and Chebyshev-spectral techniques, *International Journal of Nonlinear Science*, 15(2), p.(157–167), 2013.
- [56] M. M. Khader and M. M. Babatin, On approximate solutions for fractional Logistic differential equation, *Mathematical Problems in Engineering*, 2013, ID

391901, 7 pages, 2013.

- [57] M. M. Khader, Sunil Kumar and S. Abbasbandy, New homotopy analysis transform method for solving the discontinued problems arising in nano-technology, *Chinese Physics B*, 22(11), p.(110201:1–5), 2013.
- [58] M. M. Khader, N. H. Sweilam and A. M. S. Mahdy, Numerical study for the fractional differential equations generated by optimization problem using Chebyshev collocation method and FDM, *Applied Mathematics and Information Science* 7(5), p.(2013–2020), 2013.
- [59] M. M. Khader, The use of generalized Laguerre polynomials in spectral methods for fractional-order delay differential equations, *Journal of Computational and Nonlinear Dynamics*, 8 p.(041018:1-5), 2013.
- [60] M. M. Khader, N. H. Sweilam and T. A. Assiri, On the numerical solution for the fractional wave equation using Legendre pseudo-spectral method, *International Journal of Pure and Applied Mathematics*, 84(4), p.(307–319), 2013.
- [61] M. M. Khader and Ahmed M. Megahed, Numerical solution for the effect of variable fluid properties effect on the flow and heat transfer in a non-Newtonian Maxwell fluid over an unsteady stretching sheet with internal heat generation, *Ukrainian Journal of Physics*, 58(4), p.(353–361), 2013.
- [62] M. M. Khader and A. M. Megahed, Numerical studies for flow and heat transfer of the Powell–Eyring liquid thin film over an unsteady stretching sheet with internal heat generation using the Chebyshev-finite difference method, *Journal of Applied Mechanics and Technical Physics*, 54(3), p.(440–450), 2013.
- [63] M. M. Khader, An efficient modification of PIM by using Chebyshev polynomials, *International Journal of Pure and Applied Mathematics*, 7(5), p.(2011–2018), 2013.
- [64] M. M. Khader, Numerical treatment for solving the perturbed fractional PDEs using hybrid techniques, *Journal of Computational Physics*, 250, p.(565–573), 2013.
- [65] M. M. Khader and N. H. Sweilam, On the approximate solutions for system of fractional integro-differential equations using Chebyshev pseudo-spectral method, *Applied Mathematical Modelling*, 37, p.(9819–9828), 2013.

- [66] M. M. Khader, Numerical and theoretical treatment for solving linear and nonlinear delay differential equations using variational iteration method, Arab Journal of Mathematical sciences, 19(2), p.(243–256), 2013.
- [67] M. M. Khader, On the numerical solutions to nonlinear biochemical reaction model using Picard-Pade technique, World Journal of Modelling and Simulation, 9(1), p.(38–46), 2013.
- [68] N. H. Sweilam, M. M. Khader and W. Y. Kota, Numerical and analytical study for fourth-order integro-differential equations using a pseudo-spectral method, Mathematical Problems in Engineering, Volume 2013, Article ID 434753, 7 pages.
- [69] M. M. Khader and Ahmed M. Megahed, Numerical solution for boundary layer flow due to a nonlinearly stretching sheet with variable thickness and slip velocity, Eur. Phys. J. Plus (2013) 128: 100 DOI 10.1140/epjp/i2013-13100-7.
- [70] N. H. Sweilam, M. M. Khader and M. Adel, Weighted average finite difference methods for fractional order reaction-sub-diffusion equation, Walailak Journal of Science and Technology, 11(4), p.(361–377), 2014.
- [71] N. H. Sweilam, M. M. Khader and M. Adel, Numerical simulation of fractional Cable equation of spiny neuronal dendrites, Journal of Advanced Research, 5, p.(253–259), 2014.
- [72] M. M. Khader, A new formula for Adomian polynomials and the analysis of its truncated series solution for the fractional non-differentiable IVPs, ANZIAM J., 55, p.(69-92), 2014. Doi:10.1017/S1446181113000321.
- [73] M. M. Khader, A new fractional Chebyshev–FDM: An application for solving the fractional differential equations generated by optimization problem, Intent. J. of Systems Science, (2014), <http://dx.doi.org/10.1080/00207721.2013.874508>.
- [74] M. M. Khader and A. S. Hendy, A new Legendre computational matrix method: An application for solving the high order fractional differential equations, Walailak Journal of Science and Technology, 11(4), p.(289–305), 2014.
- [75] M. M. Khader and Mohammed M. Babatin, Legendre spectral collocation method for solving fractional SIRC model and influenza A, Journal of Computational Analysis and Applications, 17(2), p.(214–229), 2014.
- [76] M. M. Khader and Mohammed M. Babatin, Numerical treatment for solving

- fractional SIRC model and influenza A, *Computational and Applied Mathematics*, 33(3), p.(543–556), 2014.
- [77] M. M. Khader, N. H. Sweilam, A. M. S. Mahdy and N. K. Abdel Moniem, Numerical simulation for the fractional SIRC model and influenza A, *Applied Mathematics and Information Science*, 8(3), p.(1029–1036), 2014.
- [78] M. M. Khader, N. H. Sweilam, Z. I. EL-Sehrawy and S. A. Ghwail, Analytical study for the nonlinear vibrations of multiwalled carbon nanotubes using homotopy analysis method, *Applied Mathematics and Information Science*, 8(4), p.(1675–1684), 2014.
- [79] N. H. Sweilam, M. M. Khader and W. Y. Kota, Cardinal functions for Legendre pseudo-spectral method for solving the integro-differential equations, *Journal of the Egyptian Mathematical Society*, 22, p.(511–516) 2014.
- [80] M. M. Khader and Sunil Kumar, An accurate numerical method for solving the linear fractional Klein-Gordon equation, *Mathematical Methods in the Applied Sciences*, 37, p.(2972–2979), 2014.
- [81] M. M. Khader and N. H. Sweilam, Approximate solutions for the fractional advection-dispersion equation using Legendre pseudo-spectral method, *Computational and Applied Mathematics*, 33(3), p.(739–750), 2014.
- [82] M. M. Khader and N. H. Sweilam, An application of homotopy analysis method for estimation the diaphragm deflection in MEMS capacitive microphone, *International Journal of Non-linear Science*, 17(1), p.(3–13), 2014.
- [83] M. M. Khader and Ahmed M. Megahed, Numerical solution for the flow and heat transfer due to a permeable stretching surface embedded in a porous medium with a second-order slip and viscous dissipation, *The European Physical Journal Plus*, 129(10), 2014.
- [84] M. M. Khader, N. H. Sweilam and A. M. S. Mahdy, The Chebyshev collection method for solving fractional order Klein-Gordon equation, *Wseas Transactions on Mathematics*, 13, p.(31–38), 2014.
- [85] M. M. Khader, A. M. S. Mahdy and M. M. Shehata, Approximate analytical solution to the time-fractional biological population model equation, *Jokull*, 64(5), p.(378–394), 2014.
- [86] M. M. Khader, A. M. S. Mahdy and M. M. Shehata, A modification of the power

- series method applied to systems of linear ordinary differential equations, *Jokull*, 64(5), p.(120–130), 2014.
- [87] M. M. Khader, N. H. Sweilam and A. M. S. Mahdy, An approximate analytical solution for system of non-linear fractional diffusion equations, *Jokull*, 64(4), p.(77–93), 2014.
- [88] M. M. Khader, Numerical treatment for solving fractional Logistic differential equation, *Differential Equations and Dynamical Systems*, 24(1), p.(99–107), 2016. DOI 10.1007/s12591–014–0207–9
- [89] Abdullah Aljouiee and M. M. Khader, Approximate solution of the fractional Logistic differential equation using Legendre spectral collocation method, *Jokull*, 64(6), p.(196–205), 2014.
- [90] M. M. Khader, Laguerre collocation method for the flow and heat transfer due to a permeable stretching surface embedded in a porous medium with a second order slip and viscous dissipation, *Applied Mathematics and Computation*, 243(15), p.(503–513), 2014.
- [91] M. M. Khader, On the numerical solution and convergence study for system of non-linear fractional diffusion equations, *Canadian Journal of Physics*, 92(12), p.(1658–1666), 2014.
- [92] M. M. Khader, A. M. S. Mahdy and M. M. Shehata, An integral collocation approach based on Legendre polynomials for solving Riccati, Logistic and delay differential equations, *Applied Mathematics*, 5, p.(2360–2369), 2014.
- [93] M. M. Khader and Ahmed M. Megahed, Differential transformation method for studying flow and heat transfer due to a stretching sheet embedded in a porous medium with variable thickness, variable thermal conductivity and thermal radiation, *Applied Mathematics and Mechanics*, 35(11), p.(1387–1400), 2014.
- [94] M. M. Khader and Mohammed M. Babatin, An approximate solution of the fractional variational problems using Laguerre pseudo-spectral method, *Sylwan*, 158(7), p.(360–371), 2014.
- [95] M. M. Khader and Ahmed M. Megahed, Effect of viscous dissipation on the boundary layer flow and heat transfer past a permeable stretching surface embedded in a porous medium with a second order slip using Chebyshev finite difference method, *Transport in Porous Media*, 105, p.(487–501), 2014.
- [96] M. M. Khader and Ahmed M. Megahed, Differential transformation method for

- the flow and heat transfer due to a permeable stretching surface embedded in a porous medium with a second order slip and viscous dissipation, *Journal of Heat Transfer*, 136, p.(072602–1–072602–7), 2014.
- [97] N. H. Sweilam, M. M. Khader, and M. Adel, Chebyshev pseudo-spectral method for solving the fractional advection-dispersion equation, *Applied Mathematics*, 5, p.(3240–3248), 2014.
- [98] M. M. Khader, An efficient approximate method for solving fractional variational problems, *Applied Mathematical Modelling*, 39, p.(1643–1649), 2015.
- [99] M. M. Khader, N. H. Sweilam and M. Adel, An approximate solution for fractional optimal control problems using Chebyshev pseudo-spectral method, *Int. J. of Maths. and Computer Applications Research*, 5(2), p.(65–76), 2015.
- [100] M. M. Khader, N. H. Sweilam and A. M. S. Mahdy, Two computational algorithms for the numerical solution for system of fractional differential equations, *Arab Journal of Mathematical Sciences*, 21, p.(39–52), 2015.
- [101] M. M. Khader and S. A. Yousefi, Extended Adomian's polynomials for solving non-linear fractional differential equations, *Theoretical Mathematics & Applications*, 5(2), p.(89–114), 2015.
- [102] M. M. Khader and N. H. Sweilam, Numerical and theoretical study for solving multi-term linear fractional differential equations using a collocation method based on the generalized Laguerre polynomials, *Journal of Fractional Calculus and Applications*, 6(2), p.(53–64), 2015.
- [103] M. M. Khader, Shifted Legendre collocation method for the flow and heat transfer due to a stretching sheet embedded in a porous medium with variable thickness, variable thermal conductivity and thermal radiation, *Mediterranean Journal of Mathematics*, 13(4), p.(2319-2336), 2015, DOI 10.1007/s00009–015–0594–3.
- [104] N. H. Sweilam, M. M. Khader, and M. Adel, On the numerical solution for the fractional wave equation using pseudo-spectral method based on the generalized Laguerre polynomials, *Applied Mathematics*, 6, p.(647–654), 2015.

- [105] M. M. Khader and Ahmed M. Megahed, Boundary layer flow due to a stretching sheet with a variable thickness and slip velocity, *Journal of Applied Mechanics and Technical Physics*, 56(2), p.(241–247), 2015.
- [106] M. M. Khader, Fractional Chebyshev finite difference method for solving the fractional-order delay BVPs, *International Journal of Computational Methods*, 12(6), 1550033 (11 pages), 2015. DOI: 10.1142/S0219876215500334
- [107] A. Borhanifara and M. M. Khader, Jacobi operational matrix and its application for solving systems of ODEs, *Differential Equations and Dynamical Systems*, 24(4), p.(459–473), 2015. DOI 10.1007/s12591–015–0248–8.
- [108] E. M. Solouma and M. M. Khader, Implementation of Legendre collocation spectral method for solving fractional variational problems, *Jokull*, 65(4), p.(188–200), 2015.
- [109] Emad M. Solouma and Mohamed M. Khader, Approximate technique for solving class of fractional variational problems, *Applied Mathematics*, 6, p.(837–846), 2015.
- [110] M. M. Khader and M. Adel, Numerical treatment of the fractional SIRC model and influenza A using generalized Euler method, *Journal of Modern Methods in Numerical Mathematics*, 6(1), p.(44–56), 2015.
- [111] M. M. Khader, Mohammed M. Babatin, A. Eid and Ahmed M. Megahed, Numerical study for simulation the MHD flow and heat transfer due to a stretching sheet with variable thickness, variable thermal conductivity and thermal radiation, *Applied Mathematics*, 6, p.(2045–2056), 2015.
- [112] M. M. Khader and Mohammed M. Babatin, Numerical study of fractional Logistic differential equation using implementation of Legendre wavelet approximation, *Journal of Computational and Theoretical Nanoscience*, 13(1), p.(1022–1026), 2016.
- [113] M. M. Khader and Abdullah Aljouiee, Numerical simulation for mathematical model of the hepatitis C with different types of virus genome using Legendre spectral collocation method, *Journal of Computational and Theoretical Nanoscience*, 12(11), p.(4601–4606), 2015.
- [114] M. M. Khader and Rubayyi T. Alqahtani, On the approximate solution for the generated system of ODEs of the hepatitis C with different types of virus

- genome, *Journal of Computational and Theoretical Nanoscience*, 13(5), p.(3501–3506), 2016.
- [115] M. M. Khader and E. M. Solouma, Introducing FDM combined with Hermite formula for solving numerically the linear fractional Klein-Gordon equation, *J. of Computational and Theoretical Nanoscience*, 12(11), p.(4579–4583), 2015.
- [116] M. M. Khader and Mohammed M. Babatin, Theoretical and numerical study for solving the fractional modeling dynamics of HIV and CD4+ T-cells during primary infection, *Journal of Computational and Theoretical Nanoscience*, 13(5), p.(3005–3012), 2016.
- [117] Mohamed M. Khader, Sunil Kumar and S. Abbasbandy, Fractional homotopy analysis transforms method for solving a physical model of fractional heat-like, *Walailak Journal of Science and Technology*, 13(5), p.(337–353), 2016.
- [118] M. M. Khader and Ahmed M. Megahed, Numerical treatment for flow and heat transfer of Powell-Eyring fluid over an exponential stretching sheet with variable thermal conductivity, *Meccanica*, 51(8), p.(1763-1770), 2015, DOI 10.1007/s11012-015-0336-4.
- [119] A. Eid and M. M. Khader, Numerical studies using FDM for viscous dissipation and thermal radiation effects on the slip flow and heat transfer due to a stretching sheet embedded in a porous medium with variable thickness and variable thermal conductivity, *New Trends in Mathematical Sciences*, 4(1), p.(38–50), 2016.
- [120] M. M. Khader and Ahmed M. Megahed, Approximate solutions for the flow and heat transfer due to a stretching sheet embedded in a porous medium with variable thickness, variable thermal conductivity and thermal radiation using Laguerre collocation method, *Applications and Applied Mathematics: An International Journal*, 10(2), p.(817–834), 2015.
- [121] M. M. Khader and N. H. Sweilam, Numerical and analytical study for integro-differential equations using spectral collocation method, *New Trends in Mathematical*, 3(4), p.(144–153), 2015.

- [122] M. M. Khader and M. Adel, Numerical solutions of fractional wave equations using an efficient class of FDM based on Hermite formula, *Advances in Difference Equations*, 2016(34), p.(1–10), 2016.
- [123] M. M. Khader, A. M. S. Mahdy and E. S. Mohamed, On approximate solutions for fractional Riccati differential equation, *International Journal of Engineering and Applied Sciences*, 4(9), p.(1–10), 2014.
- [124] M. M. Khader and N. H. Sweilam, Singularly perturbed BVP to estimation of diaphragm deflection in MEMS capacitive microphone: An application of ADM, *Applied Mathematics and Computation*, 281, p.(214–222), 2016.
- [125] M. M. Khader and Abdullah Aljouiee, Implementation of Legendre-spectral-collocation method for solving the fractional Logistic differential equation, *J. of Comput. and Theoretical Nanoscience*, 13(11), p.(8370–8374), 2016.
- [126] M. M. Khader and M. Motawi Khashan, Application to fractional differential transformation method for solving fractional SIRC model and influenza A, *J. of Computational and Theoretical Nanoscience*, 13, p.(7018-7024), 2016.
- [127] M. M. Khader, Application of Homotopy Perturbation Method for Solving Nonlinear Fractional Heat-like Equations using Sumudu Transform, *Scientia Iranica*, 42(2), p.(648-655), 2017.
- [128] M. M. Khader and M. Adel, Analytical and numerical validation for solving the fractional Klein-Gordon equation using the fractional complex transform and variational iteration methods, *Nonlinear Engineering – Modeling and Application*, xx, p.(1–5), 2016.
- [129] M. M. Khader and A. M. S. Mahdy, An efficient modification of PIM by using Chebyshev polynomials, *Malaya Journal of Matematik*, 4(3), p.(453–462), 2016.
- [130] Mohamed M. Khader, Rubayyi T. Alqahtani, Approximate solution for system of fractional non-linear dynamical marriage model using Bernstein polynomials, *Journal of Nonlinear Science and Applications*, 10(3), p.(865–873), 2017.
- [131] Khadijah M. Abualnaja, M. M. Khader, A computational solution of the multi-term nonlinear ODEs with variable coefficients using the integral-collocation-

- approach based on Legendre polynomials, *Journal of Progressive Research in Mathematics*, 9(3), p.(1406–1410), 2016.
- [132] M. M. Khader and A. Borhanifar, Implementation of the matrix differential transformation procedure for obtaining the approximate solution of some nonlinear matrix evolution equations, *Applications and Applied Mathematics: An International Journal*, 11(2), p.(906–918), 2016.
- [133] M. M. Khader, On the numerical solution for the variable-order fractional some modeling dynamics problems using generalized Adams-Bashforth-Moulton method, *The Journal of Mathematics and Computer Science*, xx(x), p.(xxx–xxx), 2017.
- [134] M. M. Khader, Application Taylor-Pade technique for obtaining approximate solution for system of linear Fredholm integro-differential equations, *Applications and Applied Mathematics: An International Journal*, 12(1), p.(392–404), 2017.
- [135] M. Adel and M. M. Khader, Approximate solutions for a certain-class-of fractional optimal control problems using Laguerre collocation method, *International Mathematical Forum*, 12(8), p.(379–389), 2017.
- [136] M. M. Khader, and Samy Mziou, Chebyshev spectral method for studying the viscoelastic slip flow due to a permeable stretching surface embedded in a porous medium with viscous dissipation and non-uniform heat generation, *Boundary Value Problems*, 2017(37), p.(1–12), 2017.
- [137] M. M. Khader, Analytical solution for determination the control parameter in the inverse parabolic equation using HAM, *Applications and Applied Mathematics: An International Journal*, 12(2), p.(1072–1087), 2017.
- [138] Mohamed M. Khader and Rubayyi T. Alqahtani, Computation of transient responses of a linear time-invariant system using a hybrid of efficient techniques, *Maejo International Journal of Science and Technology*, 11(3), p.(226–236), 2017.
- [139] M. M. Khader, Aml Shloof and Halima Ali, On the numerical simulation and convergence study for system of non-linear fractional dynamical model of marriage, *New Trends in Mathematical Sciences*, 5(4), p.(130–141), 2017.
- [140] Mohamed Adel and Mohamed M. Khader, Numerical simulation for studying the optimization problem as system of fractional differential equations using GEM,

- Applied Mathematics, 8, p.(1761–1768), 2017.
- [141] M. M. Khader and M. Adel, Introducing the windowed Fourier frames technique for obtaining the approximate solution of the coupled system of differential equations, Journal of Pseudo-Differential Operators and Applications, 10(1), p.(241–256), 2019.
- [142] M. M. Khader, Approximate solutions for the problem of the liquid film flow over an unsteady stretching sheet with thermal radiation and magnetic field, Applied Mathematics and Mechanics, 39(6), p.(867-876), 2018.
- [143] M. M. Khader and M. Adel, Chebyshev wavelet procedure for solving FLDEs, Acta Applicandae Mathematicae, xx, p.(xx–xx), 2018.
- <https://doi.org/10.1007/s10440-018-0171-4>
- [144] M. M. Khader and K. M. Saad, A numerical approach for solving the problem of biological invasion (fractional Fisher equation) using Chebyshev spectral collocation method, Chaos, Solitons & Fractals, 110, p.(169–177), 2018.
- [145] M. M. Khader, The modeling dynamics of HIV and CD4+ T-cells during primary infection in fractional order: Numerical simulation, Mediterranean Journal of Mathematics, 15(139), p.(1–19), 2018.
- [146] M. M. Khader, Numerical study for the BVP of the liquid film flow over an unsteady stretching sheet with thermal radiation and magnetic field, Boundary Value Problems, 77, p.(1–11), 2018.
- [147] M. M. Khader and K. M. Saad, On the numerical evaluation for studying the fractional KdV, KdV-Burger's, and Burger's equations, The European Physical Journal Plus, 33(335), p.(1–13), 2018.
- [148] M. M. Khader, Quasi-linearization method with rational Legendre collocation method for solving MHD flow over a stretching sheet with variable thickness and slip velocity which embedded in a porous medium, Applications and Applied Mathematics: An International Journal, 13(2), p.(925–932), 2018.
- [149] M. M. Khader and K. M. Saad, A numerical study using Chebyshev collocation method for a problem of biological invasion: fractional Fisher equation, International Journal of Biomathematics, 11(8), p.(1–15), 2018.
- [150] M. M. Khader and Khadijah M. Abualnaja, Galerkin-FEM for obtaining the numerical

- solution of the linear fractional Klein-Gordon equation, *Journal of Applied Analysis and Computation*, 9(1), p.(261–270), 2019.
- [151] M. M. Khader and M. Adel, Numerical study of the fractional modeling on SIR equations with constant vaccination rate using GEM, *International Journal of Nonlinear Sciences and Numerical Simulation*, xx, p.(1–7), 2018.
- [152] M. M. Khader, Numerical treatment by using a hybrid efficient technique for the biochemical reaction model, *Differential Equations and Dynamical Systems*, xx, p.(1–7), 2020.
- [153] K. M. Saad, M. M. Khader, J. F. Gómez-Aguilar, and Dumitru Baleanu, Numerical solutions of the fractional Fisher's type equations with Atangana-Baleanu fractional derivative by using spectral collocation methods, *Chaos*, 29, 023116 (2019);
- [154] M. M. Khader, Fourth-order predictor-corrector FDM for the effect of viscous dissipation and Joule heating on the Newtonian fluid flow, *Computers and Fluids*, 182, p.(9–14), 2019.
- [155] M. M. Khader, Fourth-order predictor-corrector FDM for computing the flow of a Newtonian fluid, *Indian Journal of Physics*, 92(2), p.(253–259), 2020.
- [156] M. M. Khader, Studying the chaotic behaviour of a coupled system of fractional differential equations using Hermite collocation technique, *Maejo International Journal of Science and Technology*, p.(xx–yy), 2019.
- [157] M. M. Khader and Sunil Kumar, An efficient computational method for solving a system of FDEs via fractional finite difference method, *Applications and Applied Mathematics: An International Journal*, 13(2), p.(ss–xx), 2019.
- [158] M. M. Khader, The numerical solution for BVP of the liquid film flow over an unsteady stretching sheet with thermal radiation and magnetic field using FEM, *International Journal of Modern Physics C*, xx(yy), p.(ss–xx), 2019.
- [159] M. M. Khader and K. M. Saad, Numerical studies for solving the fractional KdV, KdV–Burger's and Burger's equations, *Proceedings of the National Academy of Sciences, India, Section A: Physical Sciences*, xx(yy), p.(1–8), 2020.
- [160] M. M. Khader, N. H. Sweilam and B. N. Kharrat, Numerical simulation for solving fractional Riccati and Logistic differential equations as a difference equation, *Applications and Applied Mathematics: An International Journal*, 15(1), p.(655–665), 2020.

- [161] M. M. Khader and M. Adel, Numerical approach for solving the Riccati and Logistic equations via QLM-rational Legendre collocation method, *Computational and Applied Mathematics*, xx(yy), p.(1–8), 2020.
- [162] M. M. Khader and Mohammed M. Babatin, Hermite collocation method for obtaining the chaotic behavior of a non-linear coupled system of FDEs, *International Journal of Modern Physics C*, 31(7), p.(1–11), 2020.
- [163] M. M. Khader, M. Adel, Numerical and theoretical treatment based on the compact finite difference and spectral collocation algorithms of the space fractional-order Fisher's equation, *International Journal of Modern Physics C*, xx(yy), p.(1–11), 2020.
- [164] M. M. Khader, M. Adel, Approximate solutions for nonlinear systems of algebraic equations using power series method, *Applications and Applied Mathematics: An International Journal*, 15(2), p.(1267-1274), 2020.
- [165] M. M. Khader, Using the generalized Adams-Bashforth-Moulton method for obtaining the numerical solution of some variable-order fractional dynamical models, *International J. of Nonlinear Sciences and Numerical Simulation*, xx, p.(1–7), 2020.
- [166] H. M. Srivastava, K. M. Saad, and M. M. Khader, An efficient spectral collocation method for the dynamic simulation of the fractional epidemiological model of the Ebola virus, *Chaos, Solitons & Fractals*, 140, p.(1–7), 2020.
- [167] M. M. Khader and Ram Prakash Sharma, Evaluating the unsteady MHD micropolar fluid flow past stretching/shirking sheet with heat source and thermal radiation: Implementing fourth order predictor-corrector FDM, *Mathematics and Computers in Simulation*, xx(yy), p.(1–11), 2021.
- [168] M. M. Khader and Ibrahim AL-Dayel, Highly accurate technique for studying some chaotic models described by ABC-fractional differential equations of variable-order, *International Journal of Modern Physics C*, xx(yy), p.(1–14), 2020.
- [169] M. M. Khader, Numerical solutions for the problem of the boundary layer ow of a Powell-Eyring fluid over an exponential sheet using the spectral relaxation method. *Indian Journal Physics* 94(9) (2020) 1369-1374.
- [170] M. M. Khader and K. M. Saad, Numerical treatment for studying the blood ethanol Concentration systems with different forms of fractional derivatives, *Inter. Journal of*

Modern Physics C, 31(3), 2050044 (2020).

- [171] M. M. Khader, Numerical study of the nanofluid thin film flow past an unsteady stretching sheet with fractional derivatives using the spectral collocation Chebyshev approximation, *International Journal of Modern Physics C*, 32(2), p.(1–14), 2021.
- [172] M. M. Khader, Khaled M. Saad, Zakia Hammouch and Dumitru Baleanu, A spectral collocation method for solving fractional KdV and KdV–Burger's equations with non-singular kernel derivatives, *Applied Numerical Mathematics*, 161, p.(137-146), 2021.
- [173] M. M. Khader, Khaled. M. Saad, Dumitru Baleanu, and Sunil Kumar, A spectral collocation method for fractional chemical clock reactions, *Computational and Applied Mathematics*, xx(yy), p.(1–14), 2021.
- [174] M. M. Khader, Numerical study for unsteady Casson fluid flow with heat flux using a spectral collocation method, *Indian Journal of Physics*, 96(3), p.(777-786), 2022.
- [175] M. M. Khader, Chebyshev collocation-optimization method for studying the Powell-Eyring fluid flow with fractional derivatives in the presence of thermal radiation, *International Journal of Modern Physics C*, 32(11), p.(1-13), 2021.
- [176] M. M. Khader and H. M. Srivastava, Numerical simulation for the treatment of nonlinear predator-prey equations by using the finite element optimization method, *Fractal and Fractional*, 5(56), p.(1–9), 2021.
- [177] M. M. Khader, Mittag-Leffler collocation optimization method for studying a physical problem in fluid flow with fractional derivatives, *Mathematical Methods in the Applied Sciences*, xx(yy), p.(1–xx), 2021.
- [178] M. M. Khader, J. F. Gomez-Aguilar, M. Adel, Numerical study for the fractional RL, RC, and RLC electrical circuits using Legendre pseudo-spectral method, *International Journal of Circuit Theory and Applications*, xx(yy), p.(1–xx), 2021.
- [179] M. M. Khader and M. M. Babatin, An approximate method for solving MHD boundary layer flow over a stretching sheet with Joule heating and convective thermal condition, *International Journal of Modern Physics C*, 33(2), p.(1–10), 2021.
- [180] M. M. Khader and Mustafa Inc, Numerical technique based on the interpolation with Lagrange polynomials to analyze the fractional variable-order mathematical model of the hepatitis C with different types of virus genome, *Chaos, Solitons and Fractals*, 152, p.(1–16), 2021.

- [181] M. A. Bakry, A. Eid and M. M. Khader, Torsion and shear effect on a Big Rip model in a gravitational field, *Astrophysics and Space Science*, 366(97), p.(1–14), 2021.
- [182] M. M. Khader, Generalized fractional-order Legendre polynomials and its treatment for solving system of FDEs, *Indian Journal of Physics*, 96(11), p.(3239–3246), 2022.
- [183] M. Adel, H. M. Srivastava and M. M. Khader, Implementation of an accurate method for the analysis and simulation of electrical R-L circuits, *Mathematical Methods in the Applied Sciences*, xx(yy), p.(1–10), 2022.
- [184] Amr M. S. Mahdy, M. M. Babatin and M. M. Khader, Numerical treatment for processing the effect of convective thermal condition and Joule heating on Casson fluid flow past a stretching sheet, *International Journal of Modern Physics C*, 38(8), p.(1–xx), 2022.
- [185] M. M. Khader, M. M. Babatin, Numerical study for improvement the cooling process through a model of Powell-Eyring fluid flow over a stratified stretching sheet with magnetic field, *Case Studies in Thermal Engineering*, 31 p.(1-12), (2022) 101786.
- [186] M. M. Khader, M. M. Babatin and Ahmed M. Megahed, Numerical study to thermal radiation phenomenon and its influence in amelioration the heat transfer mechanism through MHD non-Newtonian Casson model, *Coatings*, 12(208) p.(1-8), (2022) 1901131.
- [187] M. Zakaria, M. M. Khader, Ibrahim Al-Dayel, and W. Al-Tayeb, Solving fractional generalized Fisher-Kolmogorov-Petrovsky-Piskunov's equation using compact finite different method together with spectral collocation algorithms, *Journal of Mathematics*, 101786, p.(1-9), 2022.
- [188] H. M. Srivastava, Khaled M. Saad, M. M. Khader, H. Singh, Spectral collocation method based upon special functions for fractional partial differential equations, *Handbook of Fractional Calculus for Engineering and Science*, p.(79-101), Publisher Chapman and Hall/CRC, (2022).
- [189] M. A. Bakry, A. Eid, and M. M. Khader, Cosmological models with a varying polynomial deceleration parameter in $f(R)$ and $f(R,T)$ -gravity, *Russian Physics Journal*, 64(10) p.(11813–1844), 2022.
- [190] M. M. Khader, A. Eid and M. Adel, Implementing the Vieta-Lucas collocation optimization method for MHD Casson and Williamson model under the Effects of

- heat generation and viscous dissipation, *Journal of Mathematics*, 2022 p.(1–13), 2022.
- [191] Y. Ibrahim, M. M. Khader, A. Megahed, F. Abdelsalam, M. Adel, An efficient numerical simulation for a fractional Covid-19 model by using the GRK4M together with and the fractional FDM, *Fractal Fract.*, xx p.(xx–yy), 2022.
- [192] M. Adel, N. H. Sweilam, M. M. Khader, S. M. Ahmed, H. Ahmad and, T. Botmart, Numerical simulation using non-standard weighted average FDM for 2Dim variable-order Cable equation, *Results in Physics*, 39, 105682, p.(1–9), 2022.
- [193] M. M. Khader and M. Adel, Modeling and numerical simulation for covering the fractional Covid-19 model using spectral collocation-optimization algorithms, *Fractal and Fractional* 6(363) p.(1–19), 2022.
- [194] M. M. Khader, M. M. Babatin, Ahmed M. Megahed and A. Eid, Implementing the Galerkin method associated with the shifted Vieta-Lucas polynomials for studying numerically the bio nanofluid flow which saturated by gyrotactic microorganisms over a slippery stretching sheet, *Journal of Mathematics*, 2022 p.(xx-yy), 2022.
- [195] M. M. Khader and Ram Prakash Sharma, Evaluating the MHD non-Newtonian fluid motion past a stretching sheet under the influence of non-uniform thickness with Dufour and Soret effects by implementing Chebyshev spectral method, *Applications and Applied Mathematics: An International Journal*, 17(2), p.(421–438), 2022.
- [196] M. Adel, T. A. Assiri, M. M. Khader and M. S. Osman, Numerical simulation by using the spectral collocation optimization method associated with Vieta-Lucas polynomials for a fractional model of non-Newtonian fluid, *Results in Physics*, 41, p.(1-8), 2022.
- [197] A. Eid, M. M. Khader, and Ahmed M. Megahed, Numerical treatments for the MHD flow of a viscous Newtonian fluid due to a porous shrinking sheet, *International Journal of Modern Physics C*, 33(10), 2250136, p.(1-8), 2022.
- [198] M. M. Khader, Mustafa Inc, and Ali Akgul, Numerical appraisal for the unsteady Casson fluid flow via the method of finite-elements, *Scientia Iranica*, xx(yy), p.(xx-yy), 2023.
- [199] M. M. Khader and M. Adel, Implementing the spectral relaxation method for MHD Casson and Williamson model under the effects of heat generation and viscous dissipation, *Mathematical Methods in the Applied Sciences*, xx(yy), p.(xx-yy), 2022.

- [200] M. M. Khader, Mustafa Inc and M. Adel, Numerical solutions to the fractional-order wave equation, *International Journal of Modern Applied Physics C*, 34(5), p.(1-5), 2023.
- [201] Manal Alqhtani, Mohamed M. Khader and Khaled Mohammed Saad, Numerical simulation for a high-dimensional chaotic Lorenz system based on Gegenbauer wavelet polynomials, *Mathematics*, 2(472), p.(1-12), 2023.
- [202] M. M. Khader, Numerical treatment for a nine-dimensional chaotic Lorenz model with the Rabotnov fractional-exponential kernel fractional derivative, *Scientia Iranica*, xx(yy), p.(xx-yy), 2023.
- [203] M. M. Khader, An efficient class of discrete finite difference/element scheme for solving the fractional reaction sub-diffusion equation, *Mathematical Methods in the Applied Sciences*, xx(yy), p.(xx-yy), 2023.
- [204] Y. F. Ibrahim, S. E. Abd El-Bar, M. M. Khader and M. Adel Studying and simulating the fractional Covid-19 model using an efficient spectral collocation approach, *Fractal and Fractional*, 7(307), p.(1-18), 2023.
- [205] A. Eid1, M. M. Khader and Ahmed M. Megahed, Numerical study by imposing the Vieta-Lucas collocation technique for Ohmic dissipation and thermal conductivity impacts on the flow of Casson fluid due to a slippery vertical surface, *Journal of Mathematics*, xx(xx), p.(1-xx), 2023.