Research Group 2

Group Name	**Differential Equation**
Academic Year	**2021**

Basic Information	
Department	**Mathematics**
Location	**Sohag Univesity**

Group Members				
No. of Prof.	**No. of Ass. Prof.**	**No. of Lect.**	**No. of Ass. Lect. & Demonst.**	
1	1	1	2	

Staff members

#	Name	Scientific degree	e-mail	Specializations	C.V
	Emad El-deen Mahmoud	Professor	e.mahmoud@tu.edu.sa	Differential Equations	https://scholar.google.com.eg/citations?hl=en&user=0eRQQk0AAAAJ&view_op=list_works&alert_preview_top_rm=2&sortby=pubdate
1	**Gamal Mohamed Ismail**	Assistant Professor	gamal@science.sohag.edu.eg	Differential Equations	https://scholar.google.com/citations?hl=ar&user=AM5O8RUAAAAJ&view_op=list_works&sortby=pubdate
2	**Ayman Ali Arafa**	Lecturer	ayman_math88@yahoo.com	Differential Equations	https://scholar.google.com.eg/citations?user=-vjiiPIAAAAJ&hl=en

Ass. Lecturers & Demonstrators

#	Name	Scientific degree	e-mail	Specializations	
3	**Maha Mohamed Seddik**	Assistant lecturer	melmoshneb@yahoo.com	Differential Equations	
	Ghada Mahmoud Al-Sayed	Demonstrator	ghada2017088@science.sohag.edu.eg	Differential Equations	

Theses produced by the Lab			
M. Sc Thesis			
#	**Name**	**Title**	**Approval date**
1			
2			
Ph.D. Thesis			
#			
1	Ayman Ali Arafa	On Complex Nonlinear System With Time Delay	27/2/2018
2	Nadia Mohamed Abd-Elrhman	On The Periodic Solution Of Nonlinear Differential Equations	22/1/2020

Articles produced by the Lab		
#	Title	Journal information
1	Dynamical behaviors, control and synchronization of a new chaotic model with complex variables and cubic nonlinear terms	Results in physics, 2017, 7, 1346-1356
2	An analytical coupled homotopy-variational approach for solving strongly nonlinear differential equation	Journal of the Egyptian Mathematical Society, 2017, 25 (4), 434-437 14
3	A novel sort of adaptive complex synchronizations of two indistinguishable chaotic complex nonlinear models with uncertain parameters and its applications in secure communications	Results in physics, 2017, 7, 4174-4182
4	Thermal stresses in thermoelastic half-space without energy dissipation subjected to rotation and magnetic field	Appl. Math. Inf. Sci,2017, 11 (6), 1637-1647
5	Projective synchronization for coupled partially linear complex-variable systems with known parameters	Mathematical Methods in the Applied Sciences,2017, 40 (4), 1214-1222
6	A NOVEL SORT OF COMPLEX SYNCHRONIZATIONS.	Acta Physica Polonica B,2017, 48 (8)
7	A new nonlinear chaotic complex model and its complex antilag synchronization	Complexity, 2017
8	Chaos control of integer and fractional orders of chaotic Burke–Shaw system using time delayed feedback control	Chaos, Solitons & Fractals,2017, 104, 680-692
9	Bifurcations and chaos of time delay Lorenz system with dimension 2n+ 1	The European Physical Journal Plus,2017, 132 (11), 1-20
10	An unusual kind of complex synchronizations and its	The European Physical Journal Plus,2017, 132 (11),

	applications in secure communications	1-14
11	Projective synchronization for coupled partially linear complex-variable systems with known parameters	Mathematical Methods in the Applied Sciences, 2017, 40 (4), 1214-1222
12	Dynamical properties and complex anti synchronization with applications to secure communications for a novel chaotic complex nonlinear model	Chaos, Solitons & Fractals, 2018, 106, 273-284
13	Problem of longitudinal and secondary vertically waves reflection and transmission during two media in the context of three magneto-thermoelastic theories with varies fields	Appl. Math. Inf. Sci, 2018 12 (5), 955-96
14	Complicated dynamics and control of a hyperchaotic complex nonlinear autonomous Lü model with complex parameters	Discrete & Continuous Dynamical Systems-S, 2018, 0
15	High dimensional, four positive Lyapunov exponents and attractors with four scroll during a new hyperchaotic complex nonlinear model	AIP Advances, 2018, 8 (6), 065018
16	Synchronization of time delay systems with non-diagonal complex scaling functions	Chaos, Solitons & Fractals, 2018, 111, 86-95
17	On phase and anti-phase combination synchronization of time delay nonlinear systems	Journal of Computational and Nonlinear Dynamics, 2018, 13 (11)
18	Analytical approximations to nonlinear oscillation of nanoelectro-mechanical resonators	The European Physical Journal Plus, 2019, 134 (1), 1-9
19	Higher-order approximate periodic solution for the oscillator with strong nonlinearity of polynomial type	The European Physical Journal Plus, 2019, 134 (6), 1-10
20	Secure communications via modified complex phase synchronization of two hyperchaotic complex models with identical linear structure and adjusting	Journal of Intelligent & Fuzzy Systems, 2019, 37 (1), 17-25

	in nonlinear terms	
21	A general formula of complex synchronizations with complex scaling diagonal matrix and time lag	**Results in Physics, 2019, 12, 603-614**
22	A phenomenal form of complex synchronization and chaotic masking communication between two identical chaotic complex nonlinear structures with unknown parameters	**Results in Physics, 2019, 14, 102452**
23	Complex anti-synchronization of two indistinguishable chaotic complex nonlinear models	**Measurement and Control, 2019, 52 (7-8), 922-928**
24	A new nine-dimensional chaotic Lorenz system with quaternion Variables: Complicated dynamics, electronic circuit design, anti-anticipating synchronization, and chaotic masking ...	**Mathematics, 2019, 7 (10), 877**
25	A new memristive model with complex variables and its generalized complex synchronizations with time lag	**Results in Physics, 2019, 15, 102619**
26	Importance of 18 F-FDG-PET/CT in Detection of Early Colorectal Cancer Relapse and its Effect on Therapy Plan.	**Egyptian J. Nucl. Med, 2019, 19 (2)**
27	A new chaotic system with line of equilibria: dynamics, passive control and circuit design	**International Journal of Electrical and Computer Engineering (IJECE), 2019, 9 (4 ...**
28	A hyperchaotic detuned laser model with an infinite number of equilibria existing on a plane and its modified complex phase synchronization with time lag	**Chaos, Solitons & Fractals ,2020, 130, 109442**
29	Secure communication and synchronizations in light of the stability theory of the hyperchaotic complex nonlinear systems	**Journal of Intelligent & Fuzzy Systems ,2020, 38 (3), 2569-2583**
30	A grey wolf-based method for mammographic mass	**Applied Sciences, 2020, 10 (23), 8422**

	classification	
31	A Hybrid Semantic Knowledge Integration and Sharing Approach for Distributed Smart Environments	**Sensors, 2020, 20 (20), 5918**
32	A powerful numerical technique for treating twelfth-order boundary value problems	**Open Physics, 2020, 18 (1), 1048-1062**
33	Specialized study to perform complex phase synchronization of two chaotic complex systems including a similar structure of direct terms with modifying in nonlinear terms	**Mathematical Methods in the Applied Sciences, 2020, 43 (4), 1516-1529**
34	Secure communications via complex phase synchronization of pair complex chaotic structures with a similar structure of linear terms with modifying in nonlinear terms	**Alexandria Engineering Journal, 2020, 59 (3), 1107-1116**
35	Complex modified projective phase synchronization of nonlinear chaotic frameworks with complex variables	**Alexandria Engineering Journal, 2020, 59 (3), 1265-1273**
36	Signal flow graph and control of realizable autonomous nonlinear Chen model with quaternion variables	**Alexandria Engineering Journal, 2020, 59 (3), 1287-1305**
37	Quaternion nonlinear Lü model and its novel quaternion complete synchronization	**Alexandria Engineering Journal, 2020, 59 (3), 1391-1403**
38	Circular intensely orthogonal double cover design of balanced complete multipartite graphs	**Symmetry, 2020, 12 (10), 1743**
39	A novel strategy for complete and phase robust synchronizations of chaotic nonlinear systems	**Symmetry, 2020, 12 (11), 1765**
40	Meshless analysis of nonlocal boundary value problems in anisotropic and inhomogeneous media	**Mathematics, 2020, 8 (11), 2045synchronization and The European Physica**
41	A numerical study on fractional differential equation	**Numerical Methods for Partial Differential Equations, 2020**

	with population growth model	
42	Anti-synchronized quad-compound combination among parallel systems of fractional chaotic system with application	**Alexandria Engineering Journal, 2020, 59 (6), 4183-4200**
43	On the interaction between (low & high) frequency of (ion-acoustic & Langmuir) waves in plasma via some recent computational schemes	**Results in Physics, 2020, 19, 103684**
44	Third-Order Neutral Delay Differential Equations: New Iterative Criteria for Oscillation	**Journal of Function Spaces, 2020**
45	Unified Framework of Approximating and Interpolatory Subdivision Schemes for Construction of Class of Binary Subdivision Schemes	**Journal of Function Spaces, 2020**
46	A Proposed ANN-Based Acceleration Control Scheme for Soft Starting Induction Motor	**IEEE Access, 2020, 9, 4253-4265**
47	Product replacement policy in a production inventory model with replacement period-, stock-, and price-dependent demand	**Journal of Mathematics, 2020**
48	Dynamical analysis and chaos control of the fractional chaotic ecological model	**Chaos, Solitons & Fractals, 2020, 141, 110348**
49	Chaos Suppression via Integrative Time Delay Control	**International Journal of Bifurcation and Chaos, 2020, 30 (14), 2050208**
50	Global residue harmonic balance method for obtaining higher-order accurate solution to the stongly nonlinear oscillator	**Thai Journal of Mathematics,2020, 18 (4), 1947-1959**
51	An accurate analytical solution to strongly nonlinear differential equations	**Applied Mathematics and Information Sciences, 2020, 14 (1), 141-149**
52	An analytical solution for fractional oscillator in a resisting medium	**Chaos, Solitons and Fractals, 2020, 130, art. no. 109395**
53	Fractional residual power series method for the analytical and approximate studies of fractional	**Open Physics, 2020, 18 (1), 799-805**

	physical phenomena	
54	A Modified Energy Balance Method to Obtain Higher-order Approximations to the Oscillators with Cubic and Harmonic Restoring Force	**Journal of Applied and Computational Mechanics, 2020, 6 (2), 320-331**
55	A modified harmonic balance method to obtain higher-order approximations to strongly nonlinear oscillators	**Journal of Interdisciplinary Mathematics, 2020, 23 (7), 1325-1345**
56	Analytic approximations to non-linear third order jerk equations via modified global error minimization method	**Journal of King Saud University-Science,2021, 101219**
57	Analytic approximate solutions of diffusion equations arising in oil pollution	**Journal of Ocean Engineering and Science, 2021**
58	Higher order Hamiltonian approach for solving doubly clamped beam type N/MEMS subjected to the van der Waals attraction	**Chinese Journal of Physics, 2021, 72, 69-77**
59	An overtime production inventory model for deteriorating items with nonlinear price and stock dependent demand	**Alexandria Engineering Journal, 2021, 60 (3), 2779-2786**
60	Analytical study of the vibrating double-sided quintic nonlinear nano-torsional actuator using higher-order Hamiltonian approach	**Journal of Low Frequency Noise, Vibration and Active Control, 2021, 14613484211032022**
61	Highly accurate analytical solution for free vibrations of strongly nonlinear Duffing oscillator	**Journal of Low Frequency Noise, Vibration and Active Control, 2021, 14613484211034009**
62	Analytical accurate solutions of nonlinear oscillator systems via coupled homotopy-variational approach	**Alexandria Engineering Journal, 2021**
63	Theoretical and numerical analysis of novel COVID-19 via fractional order mathematical model	**Results in Physics, 2021, 20, 103676**
64	Analysis and control of a fractional chaotic tumour growth and decay model	**Results in Physics, 2021, 20, 103677**

65	**Anti Anticipate Synchronization of Chaotic Complex Non-linear Structures With Secure Communication Applications.**	**Journal of Information Science & Engineering, 2021, 37 (1)**
66	Estimation of generalized fractional integral operators with nonsingular function as a kernel	**AIMS Mathematics 6 (5), 4492-4506**
67	Saddle Point Optimality Criteria of Interval Valued Non-Linear Programming Problem	**COMPUTER SYSTEMS SCIENCE AND ENGINEERING, 2021, 38 (3), 351-364**
68	Problem of p-and SV-waves reflection and transmission during two media under three thermoelastic theories and electromagnetic field with and without gravity	**Waves in Random and Complex Media, 2021, 31 (1), 1-24**
69	Dynamics and Robust Control of a New Realizable Chaotic Nonlinear Model	**Complexity, 2021**
70	Complex Dynamics of a Filippov Three-Species Food Chain Model	**International Journal of Bifurcation and Chaos, 2021, 31 (05), 2150074**
71	Mathematical Modeling on Rotational Magneto-Thermoelastic Phenomenon under Gravity and Laser Pulse considering Four Theories	**Complexity, 2021**
72	On the dissipativity property of negative imaginary systems	**Alexandria Engineering Journal, 2021, 60 (1), 1403-1410**
73	Control and synchronization of the hyperchaotic attractor for a 5-D self-exciting homopolar disc dynamo	**Alexandria Engineering Journal, 2021, 60 (1), 1173-1181**
74	Fractional-order delay differential equations for the dynamics of hepatitis C virus infection with IFN-α treatment	**Alexandria Engineering Journal,2021, 60 (5), 4761-4774**
75	Dynamics analysis of a Filippov pest control model with time delay	**Communications in Nonlinear Science and Numerical Simulation,2021, 101, 105865**
76	**A production inventory model with partial trade**	Alexandria Engineering Journal, 2021, 60 (1), 1325-

	credit policy and reliability	1338
78	**Mathematical analysis of COVID-19 via new mathematical model**	Chaos, Solitons & Fractals, 2021, 143, 110585
79	Quaternion anti-synchronization of a novel realizable fractional chaotic model	Chaos, Solitons & Fractals,2021, 144, 110715
80	Chaos control and analysis of fractional order neural network under electromagnetic radiation	Results in Physics, 2021, 21, 103786
81	Optical solitons in birefringent fibers with quadratic-cubic nonlinearity using three integration architectures	AIP Advances,2021, 11 (2), 025121
82	Second-order neutral differential equations: improved criteria for testing the oscillation	Journal of Mathematics, 2021
83	An efficient approach for fractional nonlinear chaotic model with Mittag-Leffler law	Journal of King Saud University-Science, 2021, 33 (2), 101347
84	Numerical study of fractional order COVID-19 pandemic transmission model in context of ABO blood group	Results in Physics, 2021, 22, 103852
85	Sensitivity analysis and optimal control of COVID-19 dynamics based on SEIQR model	Results in Physics, 2021, 22, 103956
86	Numerical solution of two-dimensional fractional order Volterra integro-differential equation	AIP Advances, 2021, 11 (3), 035232
87	Spectral approximation methods for non equilibrium transport in turbulent channel flows using fADE	Applied Numerical Mathematics,2021, 162, 53-66
88	Numerical solution of 2D-fuzzy Fredholm integral equations using optimal homotopy asymptotic method	Alexandria Engineering Journal, 2021, 60 (2), 2483-2490
89	Bernstein basis functions based algorithm for solving system of third order initial value problems	Alexandria Engineering Journal, 2021, 60 (2), 2395-2404
90	Impact of pangolin bootleg market on the dynamics	Results in Physics. 2021, 23, 103913

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91	Fractional order biological snap oscillator: Analysis and control	Chaos, Solitons & Fractals, 2021, 145, 110763
92	Accurate novel explicit complex wave solutions of the (2+ 1)-dimensional Chiral nonlinear Schrödinger equation	Results in Physics, 2021, 23, 104019
93	Fibonacci wavelet method for solving time-fractional telegraph equations with Dirichlet boundary conditions	Results in Physics, 2021, 24, 104123
94	Chaos control and Penta-compound combination anti-synchronization on a novel fractional chaotic system with analysis and application	Results in Physics, 2021, 24, 104130
95	Accurate spectral algorithm for two-dimensional variable-order fractional percolation equations	Mathematical Methods in the Applied Sciences, 2021, 44 (7), 6228-6238
96	Numerical simulation and exergy analysis of a novel nanofluid-cooled heat sink	Journal of Thermal Analysis and Calorimetry, 2021, 1-10
97	Evaluating the efficiency of pin–fin micro-heat sink considering different shapes of nanoparticle based on exergy analysis	Journal of Thermal Analysis and Calorimetry, 2021, 1-10
98	Investigating the thermal efficiency and pressure drop of a nanofluid within a micro heat sink with anew circular design used to cool electronic equipment	Chemical Engineering Communications, 2021, 1-13
99	Haar wavelets multi-resolution collocation procedures for two-dimensional nonlinear Schrödinger equation	Alexandria Engineering Journal, 2021, 60 (3), 3057-3071
100	Quantum scheme of dissipative two qubits in a squeezed field: Entanglement and Fisher information	lexandria Engineering Journal, 2021, 60 (3), 3411-3417

101	Hybrid price and stock dependent inventory model for perishable goods with advance payment related discount facilities under preservation technology	Alexandria Engineering Journal, 2021, 60 (3), 3455-3465
102	Solution of third order linear and nonlinear boundary value problems of integro-differential equations using Haar Wavelet method	Results in Physics, 2021, 25, 104176
103	Nanoparticles shape effect on the efficiency of microheat sinks with tightly packed pin-fins	Chemical Engineering Communications, 2021, 1-11
104	Fractional chaotic cryptovirology in blockchain-analysis and control	Chaos, Solitons & Fractals, 2021, 148, 110989
105	Numerical evaluation of the effect of nano-additive type on the second-law performance of γ-AlOOH nano-fluid flow in a wavy microchannel	Chemical Engineering Communications, 2021, 1-13
106	Challenging ANN and RSM approaches to forecast β-SiC nanoparticles efficacy on performance of liquid ethylene glycol and propylene glycol	Powder Technology, 2021, 389, 204-214
107	Numerical study of heat transfer and friction drag in MHD viscous flow of a nanofluid subject to the curved surface	Waves in Random and Complex Media, 2021, 1-16
108	A study of a computational BVP for heat transfer and friction drag in magnetohydrodynamics viscous flow of a nanofluid subject to the curved surface	Proceedings of the Institution of Mechanical Engineers, Part E: Journal of...
109	Improvement of the thermal and hydraulic performance of parabolic trough collectors using hybrid nanofluids and novel turbulators with holes and ribs	Sustainable Energy Technologies and Assessments, 2021, 47, 101480
110	FRACTIONAL POWER SERIES APPROACH FOR THE SOLUTION OF FRACTIONAL-ORDER INTEGRO-DIFFERENTIAL EQUATIONS	Fractals, 2021, 2240016
111	Investigation of shape effects of Cu-nanoparticle on	Alexandria Engineering Journal, 2021

	heat transfer of MHD rotating flow over nonlinear stretching sheet	
112	Thermal analysis of a radiative slip flow of an unsteady casson nanofluid toward a stretching surface subject to the convective condition	Journal of Materials Research and Technology , 2021,15, 468-476
113	Effects of Energy Dissipation and Deformation Function on the Entanglement, Photon Statistics and Quantum Fisher Information of Three-Level Atom in Photon-Added Coherent States	Symmetry, 2021, 13 (11), 2188
114	Analysis and control of the fractional chaotic Hopfield neural networ	Advances in Difference Equations, 2021, (1), 1-15
115	Application of triple compound combination anti-synchronization among parallel fractional snap systems & electronic circuit implementation	Advances in Difference Equations ,2021, (1), 1-26
116	Simplified and improved criteria for oscillation of delay differential equations of fourth order	Advances in Difference Equations ,2021, (1), 1-13