

# MD. SAZZAD HOSSIEN CHOWDHURY



- KULLIYAH OF ENGINEERING
- IIUM Gombak Campus
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## ACADEMIC QUALIFICATION

- Mathematics
- Mathematics
- Mathematics

## TEACHING RESPONSIBILITIES

COMPLEX ANALYSIS AND NUMERICAL METHODS	2016/2017 2017/2018 2018/2019 2019/2020 2020/2021
COMPLEX ANALYSIS AND PART. DIFF. EQUATION	2008/2009 2009/2010 2010/2011 2011/2012 2012/2013 2013/2014 2014/2015 2015/2016 2016/2017 2017/2018 2018/2019 2019/2020
DIFFERENTIAL EQUATIONS	2017/2018 2018/2019 2019/2020 2020/2021
DIFFERENTIAL EQUATIONS & STATISTICS	2018/2019 2019/2020 2020/2021
DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	2009/2010 2010/2011
ENGINEERING CALCULUS I	2008/2009 2009/2010 2011/2012 2012/2013 2013/2014 2014/2015 2015/2016 2016/2017 2017/2018 2018/2019
ENGINEERING MATHEMATICS I	2015/2016 2018/2019
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	2010/2011
PARTIAL DIFFERENTIAL EQUATIONS	2011/2012

## RESEARCH PROJECTS

### In Progress

- 2019 - Present** - Photothermal analysis of nanofluid for an improved thermal efficiency solar thermal collector using Haar wavelet method
- 2017 - Present** - A numerical method using Haar wavelet for solving heat conduction equation in IC Chip.
- 2014 - Present** - A Powerful Efficient Modification of Harmonic Balance Method for Solving Nonlinear Oscillatory Problems in Dynamical Systems

## Completed

- 2017 - 2020** A numerical method using Haar wavelet for solving heat conduction equation in IC Chip.
- 2015 - 2018** Boundary Layer Flow of non-Newtonian Fluid with Newtonian Heating.
- 2014 - 2018** A Powerful Efficient Modification of Harmonic Balance Method for Solving Nonlinear Oscillatory Problems in Dynamical Systems
- 2013 - 2016** Numerical Study of Boundary Layer Flow for Jeffrey Fluid
- 2012 - 2016** Modelling of Vibration and System Parameters for Stability in Micro End Milling: A Noble Approach
- 2012 - 2015** A New Reliable Analytical Treatment for Improving the Solution on Nonlinear Initial and Boundary Value Problems
- 2011 - 2013** RU 2011: Estimation and Stimulation of Decoy State Parameters for Practical Quantum Key Distribution
- 2011 - 2015** A New Modification of Homotopy Perturbation Method to Solve Linear and Nonlinear Stiff IVPs and Stiff Systems of Ordinary Differential Equations
- 2011 - 2013** An Accurate Solution To The Nonlinear Lotka-Volterra equations by modified homotopy perturbation method
- 2011 - 2012** Calculus With Single Variable (KVC Project 2011)
- 2009 - 2012** A New Reliable Numeric-Analytic Technique to Solve Nonlinear Problems Arising in Engineering and Science
- 2009 - 2011** A New Reliable Numeric-Analytic Solution for the initial value problems (IVPs) Using Multistage Homotopy Perturbation Method
- 2008 - 2009** Gesture Recognition Using Muscle Signals for Human Computer Interaction
- 2006 - 2009** Intelligent Wheelchair for Disabled People Using Brain Signal As Control

## PUBLICATIONS

### Article

- 2021** [A novel iterative method for solving chemical kinetics system.](#) Journal of Low Frequency Noise, Vibration & Active Control , xx (xx) pp.1-13
- 2020** [Investigation of vibration in micromilling with MQL: S/N ratio analysis.](#) TEST Engineering & Management , 83 (May-June) pp.1026-1032
- 2020** [A modified harmonic balance method to obtain higher-order approximations to strongly nonlinear oscillators.](#) Journal of Interdisciplinary Mathematics , 23 (7) pp.1325-1345
- 2019** [A numerical solution for nonlinear heat transfer of fin problems using the Haar wavelet quasilinearization method.](#) Results in Physics , 14 pp.1-8

- 2019** [Accurate approximations of the nonlinear vibration of couple-mass-spring systems with linear and nonlinear stiffnesses.](#) Journal of Low Frequency Noise, Vibration & Active Control
- 2018** [An analytical technique to obtain higher-order approximate periods for the nonlinear oscillator.](#) IIUM Engineering Journal , 19 (2) pp.182-191
- 2018** [Generalized Haar wavelet operational matrix method for solving hyperbolic heat conduction in thin surface layers.](#) Results in Physics , 11 pp.243-252
- 2017** [An analytical approximation technique for the duffing oscillator based on the energy balance method.](#) Italian Journal of Pure and Applied Mathematics , 37 pp.455-466
- 2017** [Effect of extraction process parameters on antifungal peptides from Supermeal worm, Zophobas morio \(Fabricius\).](#) International Food Research Journal (IFRJ) , 24 (Suppl.) pp.463-467
- 2017** [High-order approximate solutions of strongly nonlinear cubic-quintic Duffing oscillator based on the harmonic balance method.](#) Results in Physics , 7 pp.3962-3967
- 2017** [Solving linear and non-linear stiff system of ordinary differential equations by multi stage homotopy perturbation method.](#) International Journal of Management and Applied Science , 3 (2) pp.59-62
- 2016** [A novel analytical approximation technique for highly nonlinear oscillators based on the energy balance method.](#) Results in Physics , 6 pp.496-504
- 2016** [A comparison study on the harmonic balance method and rational harmonic balance method for the Duffing-harmonic oscillator .](#) Global Journal of Pure and Applied Mathematics , 12 (3) pp.2721-2732
- 2016** [Solutions of higher order boundary value problems by homotopy perturbation method.](#) Malaysian Journal of Mathematical Sciences , 10 (Special Issue) pp.373-387
- 2016** [Solution of nonlinear cubic-quintic duffing oscillators using harmonic balance method..](#) Malaysian journal of Mathematical sciences , 10 (Special Issue) pp.181-192
- 2016** [Solution of cubic-quintic duffing oscillators using harmonic balance method.](#) Malaysian Journal of Mathematical Sciences , 10 pp.181-192
- 2015** [The multistage homotopy perturbation method for solving chaotic and hyperchaotic Lü system.](#) Abstract and Applied Analysis , 2015 pp.398027-1
- 2015** [Analytical approximate solutions for the Helmholtz-Duffing oscillator.](#) ARPN Journal of Engineering and Applied Sciences , 10 (23) pp.17363-17369
- 2015** [Investigation of surface roughness and material removal rate for high speed micro end milling on PMMA.](#) Advanced Materials Research , 1115 pp.12-15
- 2015** [Solution for a conservative nonlinear singular oscillator in plasma physics using harmonic balance method.](#) Wulfenia Journal , 22 (3) pp.416-424
- 2015** [A new reliable analytical solution for strongly nonlinear oscillator with cubic and harmonic restoring force.](#) Results in Physics , 5 pp.111-114

- 2015** [A new analytical technique based on harmonic balance method to determine approximate periods for Duffing-harmonic oscillator.](#) Alexandria Engineering Journal , 54 (2) pp.233-239
- 2015** [Soliton solutions to phi-four and strain wave equation through the exp -expansion method.](#) Ciencia e Tecnica Vitivinicola' , 30 (3) pp.108-123
- 2014** [Density functional study of spin polarization on a carbon material with a hexagonal structure induced by iron atoms.](#) Journal of Computational and Theoretical Nanoscience , 11 (1) pp.58-61
- 2013** [Tool vibration due to high speed micro end milling parameters.](#) Applied Mechanics and Materials , 372 pp.364-368
- 2013** [An accurate analytic solution for differential and integral equations by modified homotopy perturbation method.](#) Middle East Journal of Scientific Research (MEJSR) , 13 pp. 50-58
- 2013** [The multistage Adomian Decomposition Method for solving chaotic Lü System.](#) Middle-East Journal of Scientific Research , 13 pp.43-49
- 2013** [Enhancement of multicast network security.](#) Wulfenia Journal , 20 (3) pp.378-391
- 2012** [Theoretical study for magnetic effect in dissociative adsorption of oxygen to a platinum monolayer on Ni\(110\) surface.](#) Current Applied Physics , 12 (3) pp.794-797
- 2012** [Theoretical study of atomic level understanding of the reactive ion etching \(RIE\).](#) Journal of Computational and Theoretical Nanoscience , 9 (8) pp.1067-1069
- 2012** [Theoretical investigation of a benzene-vanadium multiple-decked sandwich chain on a gold surface.](#) Journal of Computational and Theoretical Nanoscience , 9 (8) pp.1063-1066
- 2012** [Application of multistage homotopy perturbation method to the chaotic Genesis System.](#) Abstract and Applied Analysis , 2012 (974293) pp.1-10
- 2012** [Practical SARG04 quantum key distribution.](#) Optical and Quantum Electronics , 44 pp.471-482
- 2012** [A new application of multistage homotopy perturbation method to the chaotic Rössler system.](#) AIP Conference Proceedings , 1482 pp.507-511
- 2012** [An accurate solution to the Lotka-Volterra equations by modified Homotopy perturbation method.](#) International Journal of Modern Physics: Conference Series , 9 pp.326-333
- 2012** [Quantum key distribution in real life.](#) World Applied Sciences Journal , 4 (10) pp.29-34
- 2011** [A new reliable algorithm based on homotopy-perturbation method for power-law fin-type problems.](#) Australian Journal of Basic and Applied Sciences , 5 (4) pp.44-50
- 2011** [Solving Nonlinear Algebraic Problem Using Newton Homotopy Differential Equation.](#) Australian Journal of Basic and Applied Sciences , 5 (4) pp.56-59

- 2011** [A comparison between the modified homotopy perturbation method and adomian decomposition method for solving nonlinear heat transfer equations](#) . Journal of Applied Sciences , 11 (7) pp.1416-1420
- 2011** [Theoretical study for magnetic effect in dissociative adsorption of oxygen to a platinum monolayer on Ni\(110\) surface](#). Current Applied Physics
- 2011** [Theoretical investigation of a benzene-vanadium multiple-decked sandwich chain on a gold surface](#). Journal of Computational and Theoretical Nanoscience
- 2011** [Theoretical study of atomic level understanding of the reactive ion etching \(RIE\)](#). Journal of Computational and Theoretical Nanoscience
- 2011** [Exact solution for linear and nonlinear systems of PDEs by homotopy-perturbation method](#). Australian Journal of Basic and Applied Sciences , 5 (12) pp.3295-3305
- 2010** [A new application of homotopy perturbation method to the reaction-diffusion Brusselator model](#). Procedia Social and Behavioral Sciences , 8 pp.648-653
- 2010** [Direct solutions of nth-order IVPs by homotopy perturbation method](#). International Journal of Computer Mathematics , 87 (4) pp.756-762
- 2010** [Analytical solution for cauchy reaction-diffusion problems by homotopy perturbation method](#). Sains Malaysiana , 39 (3) pp.495-504
- 2010** [Hardware prototyping of an efficient encryption engine](#). International Journal of Electrical and Electronics Engineering , 4 (4) pp.258-264
- 2009** [Solutions of Emden-Fowler equations by homotopy-perturbation methods](#). Nonlinear Analysis: Real World Applications , 10 (1) pp.104-115
- 2009** [The multistage homotopy-perturbation method: a powerful scheme for handling the Lorenz system](#). Chaos, Solitons and Fractals , 40 (4) pp.1929-1937
- 2009** [Solution of prey-predator problem by numeric-analytic technique](#). Communications in Nonlinear Science and Numerical Simulation , 14 pp.1008-1012
- 2009** [Application of homotopy-perturbation method to Klein-Gordon and sine-Gordon equations](#). Chaos, Solitons and Fractals , 39 pp.1928-1935
- 2009** [Application of multistage homotopy-perturbation method for the solutions of the Chen system](#). Nonlinear Analysis: Real World Applications , 10 (1) pp.381-391
- 2009** [Comparison of homotopy analysis method and homotopy-perturbation method for purely nonlinear fin-type problems](#). Communications in Nonlinear Science and Numerical Simulation , 14 (2) pp.371-378
- 2009** [Direct solution of second-order BVPs by homotopy-perturbation method \(Penyelesaian Secara Langsung MNS Berperingkat-Dua Melalui Kaedah Homotopi-usikan\)](#) . Sains Malaysiana , 38 (5) pp.717-721
- 2008** [On multistage homotopy-perturbation method applied to nonlinear biochemical reaction model](#). Chaos, Solitons and Fractals , 36 pp.823-827
- 2008** [Simulation of the predator-prey problem by the homotopy-perturbation method revised](#). Topological Methods in Nonlinear Science , 31 (2) pp.263-270

- 2008 [Solving variational problems by homotopy-perturbation method.](#) International Journal For Numerical Methods In Engineering , 75 pp.7709-721
- 2008 [Adaptation of homotopy-perturbation method for numeric-analytic solution of system of ODEs.](#) Physics Letters A , 372 pp.470-481
- 2008 [Analytical solutions to heat transfer equations by homotopy-perturbation method revisited.](#) Physics Letters A , 372 pp.1240-1243
- 2007 [Solution of prey-predator problem by numeric-analytic technique.](#) Communications in Nonlinear Science and Numerical Simulation , 14 pp.1008-1012
- 2007 [Solutions of a class of singular second-order IVPs by homotopy-perturbation method.](#) Physics Letters A , 365 pp.439-447
- 2007 [Solutions of time-dependent Emden-Fowler type equations by homotopy-perturbation method.](#) Physics Letters A , 368 pp.305-313
- 2007 [Wavelet based noise removal from EMG signals.](#) Informacije MIDEM: Journal of Microelectronics, Electronic Components and Materials , 37 (2) pp.94-97
- 2007 [FPGA implementation of RSA encryption engine with flexible key size.](#) International Journal of Communications , 1 (3) pp.107-113
- 2007 [EEG signal analysis and characterization for the aid of disabled people.](#) WIT Transactions on Biomedicine and Health , 12 pp.287-294
- 2007 [A modified homotopy perturbation method for purely nonlinear fin-type problems.](#) JP Journal of heat and mass transfer , 1 (3) pp.285-296
- 2007 [Application of homotopy-perturbation method to nonlinear population dynamics models.](#) Physics Letters A , 368 pp.251-258
- 2007 [Assessment of decomposition method for linear and nonlinear fractional differential equations.](#) Far East Journal of Applied Mathematical Sciences (FJAMS) , 28 (1) pp.95-112

#### **Conference or Workshop Item**

- 2020 [An analytical numerical procedure for the measurement of pollution in a system of interconnecting lakes.](#) In: **Kulliyah of Engineering Research, Innovation and Commercialization Exhibition (KERICE) 2020: 10 steps to build an IOT company.**
- 2020 [New iterative method for solving chemistry problem.](#) In: **The Uzbekistan-Malaysia international online conference on Computational Models and Technologies (CMT2020)**
- 2020 [Numerical solution for the chemotaxis model by finite difference method.](#) In: **5th International Conference on Mathematical Applications in Engineering 2019**
- 2018 [Application of homotopy perturbation method for numeric-analytic solution of system of hyperchaotic ODEs.](#) In: **14th World Conference on Applied Science, Engineering and Technology (WCASET-18)**
- 2018 [Comparing numerical methods for solving Chaotic and Stiff Initial Value Problems \(IVPs\).](#) In: **Kolokium Pusat Penyelidikan Pengkomputeran Matematik**

- 2018 [A new analytical technique for solving nonlinear non-smooth oscillators based on the rational harmonic balance method.](#) In: **Second International Conference on the Future of ASEAN (ICoFA) 2017**
- 2018 [Analytical approximations for the oscillators with anti-symmetric quadratic nonlinearity.](#) In: **4th International Conference on Mathematical Applications in Engineering 2017 (ICMAE'17)**
- 2018 [Finite volume method for a Keller-Segel problem.](#) In: **4th International Conference on Mathematical Applications in Engineering 2017 (ICMAE'17)**
- 2018 [The multistage homotopy perturbation method for solving hyperchaotic Chen system.](#) In: **4th International Conference on Mathematical Applications in Engineering 2017, ICMAE 2017**
- 2017 [Higher-order analytical solutions for the equation of motion of a particle on a rotating parabola.](#) In: **4th International Conference on Mathematical Sciences - Mathematical Sciences: Championing the Way in a Problem Based and Data Driven Society, ICMS 2016**
- 2017 [Flow and heat transfer of nanofluid over a stretching sheet with non-linear velocity in the presence of thermal radiation and chemical reaction.](#) In: **4th International Conference on Mathematical Sciences - Mathematical Sciences: Championing the Way in a Problem Based and Data Driven Society, ICMS 2016;**
- 2017 [Higher-order analytical solutions for the equation of motion of a particle on a rotating parabola.](#) In: **4th International Conference on Mathematical Sciences**
- 2016 [Solving linear and non-linear stiff system of ordinary differential equations by multi stage homotopy perturbation method.](#) In: **ISERD International Conference**
- 2015 [Homotopy-perturbation method for solving linear and nonlinear differential equation.](#) In: **2nd International Conference on Mathematical Sciences & Computer Engineering**
- 2015 [Approximate solutions for strongly nonlinear oscillators by using Harmonic Balance Method.](#) In: **2nd International Conference on Mathematical Sciences & Computer Engineering (ICMSCE 2015)**
- 2015 [Solving linear and non-linear stiff system of ordinary differential equations by multistage adomian decomposition method.](#) In: **The Third Intl. Conf. On Advances in Applied Science and Environmental Technology -ASET 2015**
- 2015 [Analytical approximate solutions of the duffing-relativistic oscillator.](#) In: **The Third Intl. Conf. On Advances in Computing, Control and Networking-ACCN 2015**
- 2015 [A reliable numeric analytic technique for improving the solution of nonlinear chaotic and hyperchaotic problems.](#) In: **Kolokium Race (Research Acculturation Collaborative Effort) "RACE 2015"**
- 2014 [Solution of cubic-quintic Duffing oscillators using harmonic balance method.](#) In: **3rd International Conference on Mathematical Applications in Engineering (ICMAE'14)**

- 2014 [Solutions of higher order boundary value problems by homotopy perturbation method.](#) In: **3rd International Conference on Mathematical Applications in Engineering (ICMAE'14)**
- 2014 [Homotopy perturbation method for solving perturbation problems.](#) In: **3rd International Conference on Mathematical Applications in Engineering (ICMAE'14)**
- 2013 [A new reliable algorithm for analytical treatment of differential and integral equations.](#) In: **IUM Research, Innovation & Invention Exhibition (IRIIE 2013)**
- 2013 [Hybrid numeric-analytic method for solving chaotic system.](#) In: **IUM Research, Invention and Innovation Exhibition (IRIIE) 2013**
- 2012 [Analytic treatment of differential equations by modified homotopy perturbation method.](#) In: **Proceedings of the 2nd International Conference on Mathematical Applications in Engineering (ICMAE2012)**
- 2012 [Spatial sectoring: A innovative extension of Simpson's rule for determining area of irregular close shape.](#) In: **IUM Research, Invention and Innovation Exhibition, IRIIE 2012**
- 2012 [A powerful Numeric-analytic Technique for handling prey-predator problems.](#) In: **IUM Research, Invention and Innovation Exhibition IRIIE 2012**
- 2012 [The modified Adomian decomposition method for solving Chaotic Lü system.](#) In: **International Conference on Mathematical Application in Engineering (ICMAE 2012)**
- 2012 [Fiber based practical QKD system.](#) In: **International Conference on Mathematical Applications in Engineering (ICMAE2012)**
- 2012 [Formulation of hybrid 3D image segmentation algorithm based partial differential equation.](#) In: **International Conference on Mathematical Application in Engineering (ICMAE2012)**
- 2012 [A reliable modification of the homotopy perturbation method for differential and integral equations.](#) In: **2nd Regional Conference on Applied and Engineering Mathematics (RCAEM-II) 2012**
- 2011 [On the numerical solution of linear stiff IVPs by modified homotopy perturbation method.](#) In: **The 7th IMT-GT International Conference on Mathematics, Statistics and its Applications**
- 2011 [An accurate solution to the Lotka-Volterra equations by modified homotopy perturbation method.](#) In: **The International Conference on Mathematical and Computational Biology 2011 (ICMCB2011)**
- 2010 [Analytical treatment of system of linear and nonlinear PDEs by Homotopy-Perturbation method.](#) In: **World Congress on Engineering (WCE) 2010**
- 2010 [Taylor-newton homotopy method for computing the depth of flow rate for a channel.](#) In: **Global Conference on Power Control and Optimization**
- 2010 [A modified algorithm for the homotopy perturbation method with applications to Lotka-Volterra systems.](#) In: **6th IMT-GT Conference on Mathematics, Statistics and its Applications (ICMSA2010)**



- 2010 [First principles study on influence of magnetic materials on the dissociative adsorption of oxygen.](#) In: **IUM Research, Innovation & Invention Exhibition (IRIIE 2010)**
- 2010 [Taylor -Fixed point homotopy for solving nonlinear algebraic problems.](#) In: **International Conference on Mathematical Applications in Engineering (ICMAE'10)**
- 2010 [The multistage homotopy-perturbation method: A powerful scheme for handling the Chaotic Lorenz system .](#) In: **IUM Research, Invention and Innovation Exhibition (IRIIE 2010)**
- 2010 [Homotopy-perturbation method for heat transfer equations .](#) In: **IUM Research, Innovation & Invention Exhibition (IRIIE 2010)**
- 2009 [Solving linear system of partial differential equations by homotopy-perturbation method.](#) In: **4th International Conference on Research and Education in Mathematics**
- 2009 [Comparing numerical methods for the solution of Cauchy reaction-diffusion problems.](#) In: **4th International Conference on Mathematics and Statistics 2009**
- 2009 [A new reliable numeric-analytic technique to solve nonlinear system of ordinary differential equations .](#) In: **Kulliyah of Engineering Research and Innovation Exhibition ( KERIE 2009)**
- 2007 [Analytical solution of the fin problem by extended homotopy perturbation method.](#) In: **Kolokium Siswazah Ke-7**
- 2007 [Application of homotopy-perturbation method to the time-dependent singular initial value problems.](#) In: **International Conference on Mathematical Sciences 2007**
- 2007 [Homotopy-perturbation method applied to system of ordinary differential equations \(ODEs\).](#) In: **3rd International Conference on Research and Education in Mathematics**
- 2007 [Homotopy-perturbation method for direct solution of nonlinear initial value problem.](#) In: **The 3rd IMT-GT 2007 Regional Conference on Mathematics, Statistics and Applications**
- 2007 [Homotopy-perturbation method for power-law fin-type problems.](#) In: **Asian Symposium on Computer Mathematics**
- 2007 [Homotopy-perturbation solution of the isothermal gas sphetres.](#) In: **Symposium Kebangsaan Sains Matematik ke-15 (SKSM15)**
- 2007 [Solution of classical Lane-Emden equation by homotopy-perturbation method.](#) In: **3rd International Conference on Research and Education in Mathematics**
- 2007 [Solution of predator-prey problem by multistage Adomian decomposition method.](#) In: **International Conference on Mathematical Biology 2007**
- 2006 [Numerical solution of fin problem using decomposition method.](#) In: **Symposium Kebangsaan Sains Matematik ke-14 (SKSM14)**

**2006** [On decomposition solutions of fins with temperature dependent surface 232 heat flux: Multi-boiling heat transfer.](#) In: **The 2nd IMT-GT 2006 Regional Conference on Mathematics, Statistics and Applications**

**Book**

**2011** [Calculus with single variable.](#) IUM Press . ISBN 9789674181956

**Book Section**

**2011** [Integration techniques.](#) In: **Calculus with single variable** IUM Press . ISBN 9789674181956 , pp.201-245

**2011** [Integration.](#) In: **Calculus with single variable** IUM Press . ISBN 9789674181956 , pp.137-168