

# Professor Dr. Mostak Ahmed

Department of Mathematics Jagannath University Dhaka-1100, Bangladesh. Email: mostak@math.jnu.ac.bd Phone: +880-1724089766 Google Scholar: https://scholar.google.com/citations?u ser=tZHq7O0AAAAJ&hl=en&oi=ao

**Teaching Area:** Calculus, Coordinate Geometry and Vector Analysis, Ordinary/Partial Differential Equations, Linear Algebra, Fourier Analysis and Laplace Transforms, Complex Variables, Numerical Analysis, Advanced Numerical Analysis, Control Theory, etc.

**Computer Literacy:** LaTex, MS Word, MS Excel, Power Point

**Programming Language:** Python, C/C++, Matlab, Mathematica, FORTRAN

Language Proficiency: Bengali is my mother tongue, Medium of instruction of my present institute where I am teaching and the institutes I have completed my Bachelor, Master's and PhD program is English.

Resume

I am a dynamic and ambitious teacher, committed to fostering a positive learning environment for teaching. Ensuring quality education is my top priority. Research is my passion.

# Academic Qualification

**Post-Doctoral (1-Year) (**Under UGC Fellowship) Department of Mathematics, BUET Thesis Title: System Dynamics of COVID-19 Pandemic: Bifurcation Analysis and Optimal Control Thesis Supervisor: Prof. Dr. Md. Manirul Alam Sarker Year and Month of the Completion: June 2023

# PhD in Information Engineering (Under MEXT Scholarship)

Graduate School of Engineering Hiroshima University, Japan Thesis Title:  $H_{\infty}$ -Constrained Dynamic Games for Linear Stochastic Systems with Multiple Decision Makers Thesis Supervisor: Prof. Dr. Hiroaki Mukaidani Passing Year and Month: September 2018

# M.S. (1-Year) in Pure Mathematics

Department of Mathematics, University of Dhaka Group: Thesis (Title: Studies on Numerical Solutions of IVP) Thesis Supervisor: Prof. Dr. Md. Shafiqul Islam Year: 2005 (Held in 2008) Result: 1<sup>st</sup> Class 4<sup>th</sup> Position

# **Bachelor of Science (4-Year Hons) in Mathematics**

Department of Mathematics, University of Dhaka Year of Passing: 2004 (Held in 2006) Result: 1<sup>st</sup> Class 6<sup>th</sup> Position

# Higher Secondary Certificate (Science)

Institute: Mawlana Abdul Hamid Khan Bhashani College, Tangail Year of Passing: 2000 Result: 1<sup>st</sup> Division Board: Dhaka

# Secondary School Certificate (Science)

Institute: Elasin Tarek Zogendra High School, Tangail Year of Passing: 1997 Result: 1<sup>st</sup> Division\* Board: Dhaka

Experiences			
Position	Department	University	<b>Time Period</b>
Professor	Department of Mathematics	Jagannath University Dhaka	31/01/2023 to onwards
Associate Professor	Department of Mathematics	Jagannath University Dhaka	13/12/2018 to 30/01/2023
Assistant Professor	Department of Mathematics	Jagannath University Dhaka	30/05/2012 to 12/12/2018
Lecturer	Department of Mathematics	Jagannath University Dhaka	19/09/2010 to 29/05/2012
Lecturer/Sr. Lecturer	Institute of Natural Sciences	United International University, Dhaka	07/02/2009 to 18/09/2010

# **Research Supervision**

#### PhD:

1. Md. Abdullah Bin Masud, Dynamic Games for Linear Stochastic Systems, Admission Session: 2022 (Jan-Jun). (ongoing)

#### **MPhil:**

- 1. Md. Harun-Or-Rashid, Optimal Control of Epidemic Models, Admission Session: 2022 (Jan-Jun). (ongoing)
- 2. Md. Khalilur Rahman, Bifurcation Analysis of Epidemic Models and Their Optimal Control, Admission Session: 2021-2022. (ongoing)
- 3. Md. Habibur Rahman, Application of Optimal Control in Epidemic Model, Admission Session: 2020-2021. (ongoing)

#### MSc (Thesis):

- 1. Md. Alman Hossain, Studies on Epidemic Models for COVID-19, Session: 2019-2020.
- 2. Nazmul Huda Pavel, Control of COVID-19 Pandemic: Role of Mobile Network Tracking System Session: 2018-2019.
- 3. Md. Mehadi Hasan, Solution Approach of Stiff Systems and Optimal Control of COVID-19 Pandemic, Session: 2017-2018.

# **Member of Learned Society**

- 1. Life member of Bangladesh Mathematical Society, ID: Aa-552
- 2. Founder, life & executive member of Bangladesh Society for Mathematical Biology (BSMB)

# List of Publications

#### **Journal Papers:**

- Mostak Ahmed\*, Md. Harun-Or-Rashid Khan and M.M. Alam Sarker, COVID-19 SIR model: Bifurcation analysis and optimal control, *Results in Control and Optimization*, Elsevier, (100246), 2023. <u>https://doi.org/10.1016/j.rico.2023.100246</u>
- Mostak Ahmed\*, Md. Mehadi Hasan and Md. Abdullah Bin Masud, An Error Attenuating Predictor-Corrector Approach for Stiff Systems of Ordinary Differential Equations, *Journal of Applied Mathematics and Statistical Analysis*, HBRP Publication, Vol. 3, no. 2, pp 1-10, 2022. https://doi.org/10.5281/zenodo.6844855
- Md. Abdullah Bin Masud, Mostak Ahmed\* and Md. Habibur Rahman, Optimal Control for COVID-19 Pandemic with Quarantine and Antiviral Therapy, *Sensors International*, Elsevier, Vol. 2, pp 1-10 (100131), 2021. <u>https://doi.org/10.1016/j.sintl.2021.100131</u>

- 4. H. M. Mahabub Alam and **Mostak Ahmed\***, Challenges of Implementing ICT in College Level Mathematics Teaching, *International Journal of All Research Education and Scientific Methods* (*IJARESM*), Vol. 9, no. 7, pp 628-636, 2021.
- Md. Mehadi Hasan, Mostak Ahmed\* and Suraiya Akter Urmy, Efficacy of Limited Antiviral Treatment, Testing, Hospitalization, and Social Distancing for COVID-19 Pandemic, Sensors International, Elsevier, Vol. 2, pp 1-17 (100112), 2021. <u>https://doi.org/10.1016/j.sintl.2021.100112</u>
- Mostak Ahmed\* and Chengjian Zhang A Multigrid Method with Reduced Phase Error for 2D Damped Helmholtz Equations, *Mathematical Methods in the Applied Sciences*, Wiley, Special issue, 2021. <u>https://doi.org/10.1002/mma.7155</u>
- Mostak Ahmed\* and Md. Abdullah Bin Masud Finite-Time Team-Optimal Strategy with Stochastic H<sub>2</sub>/H<sub>∞</sub> Control, *Dhaka University Journal of Applied Science and Engineering*, Vol. 5, no. 1 & 2, pp. 43-47, 2020.
- Mostak Ahmed\*, Md. Abdullah Bin Masud and Md. Rezaul Karim Team–Optimal Stochastic H<sub>2</sub>/H<sub>∞</sub> Control with Multiple Decision Makers, *Jagannath University Journal of Science*, Vol. 2, no. I & II, pp. 81-91, 2019.
- Mostak Ahmed, Hiroaki Mukaidani\* and Tadashi Shima H<sub>∞</sub> Constraint Pareto Optimal Strategy for Stochastic LPV Systems, *International Game Theory Review*, World Scientific, vol. 20, no. 2, pp. 1750031-1–20, 2018. <u>https://doi.org/10.1142/S0219198917500311</u>
- 10. Mostak Ahmed, Hiroaki Mukaidani\* and Tadashi Shima  $H_{\infty}$ -constrained incentive Stackelberg games for discrete-time stochastic systems with multiple followers, *IET Control Theory & Applications*, Vol. 11(15), pp. 2475-2485, 2017. <u>https://doi.org/10.1049/iet-cta.2017.0105</u>
- Christiaan C. Stolk\*, Mostak Ahmed and Samir K. Bhowmik A Multigrid Method for the Helmholtz Equation with Optimized Coarse Grid Corrections, *Siam Journal on Scientific Computing*, Vol. 36, No. 6, pp. A2819-A2841, 2014. <u>https://doi.org/10.1137/13092349X</u>
- Md. Kazi Salah Uddin, Mostak Ahmed and Samir Kumar Bhowmik\* A Note on Numerical Solution of a Linear Black-Scholes Model, *GANIT: Journal of Bangladesh Mathematics Society* (ISSN: 1606-3694), Vol.: 33, 103-115, February 2013. <u>https://doi.org/10.3329/ganit.v33i0.17664</u>
- Mostak Ahmed\* and Bishnu Pada Ghosh Root of a Transcendental Equation: Geometric View of Taylor's Approximation, *International Journal of Mathematics and Computer Research* (ISSN: 2320-7167), Vol.: 1(5), 138-144, June 2013.
- Mostak Ahmed and Samir Kumar Bhowmik\* Solution of Transcendental Equation Using Clamped Cubic Spline, *Dhaka University Journal of Science* (ISSN: 1022-2502), Vol.: 61(1), pp. 47-52, January 2013. <u>https://doi.org/10.3329/dujs.v61i1.15095</u>
- Mostak Ahmed\* and M. Alamgir Hossain Transcendental Equation in Quadratic Form and Its Solution, *Bangladesh Journal of Scientific and Industrial Research* (ISSN: 0304-9809), Vol.: 47(2), pp. 239-242, 2012. <u>https://doi.org/10.3329/bjsir.v47i2.11460</u>
- Md. Shafiqul Islam\*, Mostak Ahmed, M. Alamgir Hossain Numerical Solutions of IVP Using Finite Element Method with Taylor Series, *GANIT: Journal of Bangladesh Mathematics Society* (ISSN: 1606-3694), Vol.: 30, pp. 51-58, 2010. <u>https://doi.org/10.3329/ganit.v30i0.8503</u>

# **Conference Papers:**

- Mostak Ahmed\*, Md. Harun-Or-Rashid Khan and M. M. Alam Sarker *Bifurcation on Covid-19 SIR Epidemic Model with Controls*, A F Mujibur Rahman-Bangladesh Mathematical Society National Mathematics Conference-2022, Abstract No.: BMS-NC22-CT005, Jahangirnagar University, Dhaka, 13-14 January 2023.
- Rita Akter, Mostak Ahmed\*, Ali Ahmad, K. M. Ariful Kabir and M. M. Alam Sarker COVID-19 Model with a Waning Immunity Vaccination, 1st International Conference on Frontier in Sciences, Faculty of Science, BUET, 11-12 November, 2022.
- Md. Harun-Or-Rashid Khan, Rita Akter and Mostak Ahmed\* Forward and Backward Bifurcation on Covid-19 SIR Model Transmission, 1<sup>st</sup> International Conference of Physical Sciences (ICPS-2022), Abstract ID: MAT-PP-18, Category: Oral Presentation, School of Physical Sciences of Shahjalal University of Science and Technology, pp. 90-91, 21-23 October, 2022.
- 4. Md. Habibur Rahman, Md. Abdullah Bin Masud and **Mostak Ahmed\*** *Discrete Bifurcation Analysis* of SIR Model of COVID-19, 1<sup>st</sup> International Conference of Physical Sciences (ICPS-2022), Abstract

ID: MAT-PP-02, Category: Poster Presentation, School of Physical Sciences of Shahjalal University of Science and Technology, 21-23 October, 2022.

- Md Alman Hossain, Md. Harun-Or-Rashid and Mostak Ahmed\* A Review of Optimal Control for SIRC Epidemic Model, 1<sup>st</sup> International Conference of Physical Sciences (ICPS-2022 Abstract ID: MAT-PP-20, Category: Oral Presentation, School of Physical Sciences of Shahjalal University of Science and Technology, 21-23 October, 2022.
- Md. Khalilur Rahman, Md. Abdullah Bin Masud and Mostak Ahmed\* A Review of Mathematical Model in Diseases Dynamics, 1<sup>st</sup> International Conference of Physical Sciences (ICPS-2022), Abstract ID: MAT-PP-25, Category: Oral Presentation, School of Physical Sciences of Shahjalal University of Science and Technology, 21-23 October, 2022.
- Md. Abdullah Bin Masud and Mostak Ahmed\* Computational Bifurcation Analysis of Multiparameter of SEIR Model of COVID-19, 22nd International Mathematics Conference. (Virtual), Abstract ID: 22BMS-IMC-CT073, Bangladesh Mathematical Society, Dhaka, 10-11, December 2021.
- 8. Md. Habibur Rahman and **Mostak Ahmed\*** *Mathematical Model for COVID-19 and its Stability Analysis*, 22nd International Mathematics Conference. (Virtual), Abstract ID: 22BMS-IMC-CT074, Bangladesh Mathematical Society, Dhaka, Bangladesh, 10-11, December 2021.
- Hiroaki Mukaidani\*, Hua Xu, Tadashi Shima and Mostak Ahmed Multi-leader-follower Incentive Stackelberg game for Infinite-Horizon Markov Jump Linear Stochastic Systems with H<sub>∞</sub> Constraint, IEEE International Conference on Systems, MAN and Cybernetics (IEEE SMC), pp. 3956-3963, Miyazaki, Japan, 7-10 October 2018. <u>https://doi.org/10.1109/SMC.2018.00671</u>
- Mostak Ahmed\*, Hiroaki Mukaidani and Tadashi Shima Infinite-Horizon Multi-Leader-Follower Incentive Stackelberg Games for Linear Stochastic Systems with H<sub>∞</sub> Constraint, SICE Conference 2017, pp. 1202-1207, Kanazawa, Japan, September 19-22, 2017. https://doi.org/10.23919/SICE.2017.8105454
- Hiroaki Mukaidani\*, Mostak Ahmed, Tadashi Shima and Hua xu H<sub>∞</sub> Constraint Incentive Stackelberg Game for Discrete-Time Stochastic Systems, American Control Conference, pp. 5257-5262, Seattle, WA, USA, May 24–26, 2017. <u>https://doi.org/10.23919/ACC.2017.7963771</u>
- Mostak Ahmed and Hiroaki Mukaidani\* H<sub>∞</sub>-Constrained Incentive Stackelberg Game for Discrete-Time Systems with Multiple Non-Cooperative Followers, 6th IFAC Workshop on Distributed Estimation and Control in Networked Systems, IFAC-PapersOnLine, pp. 262-267, vol. 49, no. 22, Elsevier, Tokyo, Japan, September 8-9, 2016. https://doi.org/10.1016/j.ifacol.2016.10.407
- Hiroaki Mukaidani\* and Mostak Ahmed Group Differential Game Approach of H₂/H∞ Control for Large-Scale Linear Stochastic Systems, The 2016 American Control Conference (ACC), pp. 2959-2964, Boston, MA, USA, July 6-8, 2016. <u>https://doi.org/10.1109/ACC.2016.7525369</u>
- Hiroaki Mukaidani\*, Mostak Ahmed and Hua Xu Finite Horizon H<sub>∞</sub> Control for Stochastic Systems with Multiple Decision Makers, 54<sup>th</sup> IEEE Annual Conference on Decision and Control (CDC), pp. 513-518, Osaka, Japan, December 15-18, 2015. <u>https://doi.org/10.1109/CDC.2015.7402280</u>
- Mohammad Alamgir Hossain\* and Mostak Ahmed Application of Gauss Legendre Quadrature Rule for Solving Initial Value Problems, The First International Conference on Applied Sciences, Mathematics and Humanities, Paper ID: ICASMH-MAT012, Universiti Teknologi MARA Negeri Sembilan, Malaysia, 14-15 November 2011.
- Mostak Ahmed\* and M. Alamgir Hossain Solution of Transcendental Equations Using Quadratic False-Position Method, 16<sup>th</sup> Mathematics Conference, Bangladesh Mathematical Society, Paper ID: 16MC09-012, BUET, Dhaka, Bangladesh, 17-19 December 2009.
- Bishnu Pada Ghosh and Mostak Ahmed\* Solution of Transcendental Equations Using Quadratic Equation Approximation, 16<sup>th</sup> Mathematics Conference, Bangladesh Mathematical Society, Paper ID: 16MC09-013, BUET, Dhaka, Bangladesh, 17-19 December 2009.

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