Aditi Mahavidyalaya

Faculty Details

Title	Dr.	First Name	Suruchi	Last Name	Singh	Photograph
Designation		Professor				
Department		Mathematics				
Address		Aditi Mahavidyalaya, Bawana, Delhi, India				
Phone number						
Email		suruchi@aditi.du.ac.in				

Educational Qualifications		
Degree	Institution	Year
B.A.(Hons.) Mathematics	Lakshmibai College, University of Delhi	1995
M.A. Mathematics	Ramjas College, University of Delhi	1997
M.Phil.	University of Delhi	1999
Ph.D.	University of Delhi	2012

Career Profile

(July,2018 –till date) Professor, Department of Mathematics, Aditi Mahavidyalaya, University of Delhi.

(August, 2011 - July, 2018) Associate Professor, Department of Mathematics, Aditi Mahavidyalaya, University of Delhi.

(August, 2008 - August, 2011) Lecturer in selection grade (Reader grade), Department of Mathematics, Aditi Mahavidyalaya, University of Delhi.

(August, 2003 - August, 2008) Lecturer in Senior Scale (Assistant Professor), Department of Mathematics, Aditi Mahavidyalaya, University of Delhi.

(December, 1999 - August, 2003) Lecturer (Permanent), Department of Mathematics, Aditi Mahavidyalaya, University of Delhi.

(August, 1998 - December, 1999) Lecturer (Temporary), Department of Mathematics, Sri Ram College of Commerce, University of Delhi, Delhi, INDIA.

Administrative Assignments

- Bursar (2003-04)
- Teacher Representative in Governing Body of the College (2001-02)
- Teacher In-charge of Mathematics Department (2002-till now)

- Convenor Admission Committee (2000-01)
- Convenor Purchase Committee (2004-05)
- Convenor Attendance Committee (2005-06)
- Co-Convenor Prize Distribution Committee (2012-13)
- Convenor Decoration Committee (2013-14)
- Convenor Fee Concession Committee (2014-15)
- Convenor Provident Fund Committee
- Appointed as NCC in-charge for one year
- Co-Convenor Environmental Committee (2015-16)
- Convenor Garden Committee (2018-19)
- Coordinator of AECC and SEC Evaluation (2020-21)
- Coordinator of short-term courses as a member of IQAC committee (2021-26)
- Convenor of IT committee (2021-23)
- Coordinator Practical exams (2021-22)
- Convenor of Scholarship committee (2024-25)
- Co-convenor of Admission committee (2025-26)
- Member of various committees such as Workload committee, Timetable committee, Library committee, BA (prog) committee, Examination committee etc.

Areas of Interest / Specialization

Numerical Analysis and Scientific Computing, Computational Methods for Differential Equations.

Subjects Taught

Undergraduate Level: Mathematica, Latex, Calculus, Differential Equations, Probability and Mathematical Statistics, Real Analysis, Coordinate Geometry, Algebra, Research Methodology, Numerical methods

Post graduate Level: Numerics of partial differential equations.

Research Guidance

Awarded 1 PhD degree, Department of Mathematics, University of Delhi, Delhi.

Supervising 2 Ph.D. students at the Department of Mathematics, University of Delhi, Delhi.

Research Papers (Web link to the paper, if online available, or pdf of the paper)

[1] R.K. MOHANTY and **SURUCHI SINGH**, "High Accuracy Numerov Type Discretization for the Solution of One Space Dimensional Non-Linear Wave Equation with Variable Coefficients", *Journal of Advanced Research in Scientific Computing*, Vol. 03,pp.53-66(2011), Peer Reviewed

https://www.researchgate.net/publication/263212798_High_accuracy_Numerov_type_discretization_for_the_solution_of_one-space_dimensional_non-linear_wave_equations_with_variable_coefficients.

[2] R.K. MOHANTYand **SURUCHI SINGH**, "A New High Order Approximation for the Solution of Two-Space Dimensional Quasi-Linear Hyperbolic Equations", *Advances in Mathematical Physics*, Vol. 2011, Article ID 420608, 22 pages, (2011), doi:10.1155/2011/420608. **Web of Sciences**

[3] R.K. MOHANTY and **SURUCHI SINGH**, "High Order Variable Mesh Approximation for the Solution of 1D Quasi-Linear Hyperbolic Equations", *International Journal of Nonlinear Science*, Vol. 14(No.2), pp. 220-227 (2012).Peer Reviewedhttp://internonlinearscience.org/upload/papers/IJNS%20Vol%2014%20No%202%20Paper%2012%20High%20Order%20Variable%20Mesh%20Approximation%20for%20the.pdf

[4] **SURUCHI SINGH**, SWARN SINGH and R.K. MOHANTY, "High Accuracy Cubic Spline Approximation on a Geometric Mesh for the Solution of 1D Non-linear Wave Equations", *Journal of Mathematical and Computational Science*, Vol. 2, No.4, pp. 1126-1143(2012).**UGC care**
https://www.researchgate.net/publication/277811938_High_accuracy_cubic_spline_approximation_on_a_geometric_mesh_for_the_solution_of_1D_non-linear_wave_equations

[5] R.K. MOHANTY, M.K. JAIN and **SURUCHI SINGH**, "A New Three- Level Implicit Cubic Spline Method for the Solution of 1D Quasi-Linear Hyperbolic Equations", *Computational Mathematics and Modeling*, Vol. 24(No.3), pp. 452-470 (2013). DOI: 10.1007/s10598-013-9190-1 **Scopus**

[6] SWARN SINGH, **SURUCHI SINGH**, and R.K. MOHANTY, "A New High Accuracy Off-Step Discretization for the Solution of 2D Non-linear Triharmonic Equations", *East Asian Journal on Applied Mathematics*, Vol. 3(No. 3), pp. 228-246 (2013). DOI: 10.4208/eajam.140713.130813a **Web of Sciences**

[7] R.K. MOHANTY, **SURUCHI SINGH** andSWARN SINGH, "A New High Order Space Derivative Discretization for 3D Quasi-linear Hyperbolic Partial Differential Equations", *Applied Mathematics and Computation*, Vol. 232, pp. 529-541 (2014). DOI: 10.1016/j.amc.2014.01.064 **Web of Sciences**

[8] RAJNI ARORA, **SURUCHI SINGH** andSWARN SINGH, "Exponential B-spline Collocation for the Numerical Solution of One Space Dimensional Non-linear Wave

Equation with Strong Stability Preserving Time Integration", *International Journal of Advanced Research in Science and Technology*, Vol. 4, Issue 11 pp. 102-113(2015).http://data.conferenceworld.in/ICRISEM2/P700-711.pdf

[9] NEHA SHARMA, SWARN SINGH and **SURUCHI SINGH**, "Optimizing the Power Required in Hyperthermia Treatment using Magnetic Nanoparticles", *International Journal of Control and Automation*, Vol. 9, Issue 9, pp. 181-188, 10.14257/ijca.2016.9.9.18(2016). **Scopus**

[10] SWARN SINGH, **SURUCHI SINGH** and RAJNI ARORA, "New Highly Accurate Stable Schemes for the Solution of Telegraphic Equation with Neumann Boundary Conditions", *Neural Parallel and Scientific Computations*, Vol. 24, pp. 1-14(2016).https://www.researchgate.net/publication/367053308_Neural_Parallel_and_Scientific_Computations_24_2016_1-14_NEW_HIGHLY_ACCURATE_STABLE_SCHEMES_FOR_THE_SOLUTION_OF_TELEGRAPHIC_EQUATION_WITH_NEUMANN_BOUNDARY_CONDITIONS **Scopus**

[11] SWARN SINGH, **SURUCHI SINGH** and RAJNI ARORA, "Numerical Solution of Second- order One- Dimensional Hyperbolic Equation by Exponential B-spline Collocation Method", *Numerical Analysis and Applications*, Vol. 10, Issue 2, pp. 164-176(2017).https://link.springer.com/article/10.1134/S1995423917020070 **Scopus**

[12] **SURUCHI SINGH**, SWARN SINGH and ZHILIN LI, "A High Order Compact Scheme for a Thermal Wave Model of Bio- Heat Transfer with an Interface", *Numerical Mathematics: Theory Methods and Applications*, Vol. 11, Issue 2, pp. 321-337 (2018).DOI: 10.4208/nmtma.OA-2017-0048 **Web of Sciences**

[13] **SURUCHI SINGH**, KAZUFUMI ITO, SWARN SINGH and ZHILIN LI, "A fourth order compact scheme for transport equation with discontinuous coefficients", *Numerical Mathematics: Theory Methods and Applications*, Vol. 11, Issue 4, pp. 782-794 (2018). DOI: 10.4208/nmtma.2018.s06**Web of Sciences**

[14] SWARN SINGH, **SURUCHI SINGH**, RAJNI ARORA and PING LIN, "Unconditionally stable modified methods for the solution of two and three dimensional telegraphic equation with Robin boundary conditions", *Numerical Methods for Partial Differential Equations*, Vol. 35, Issue 1, pp. 246-266 (2019). DOI: 10.1002/num.22299 **Web of Sciences**

[15] SWARN SINGH, **SURUCHI SINGH** and RAJNI ARORA, "An Unconditionally Stable Numerical Method for the Solution of two-Dimensional Second Order Hyperbolic Equation", *East Asian Journal on Applied Mathematics*, Vol. 9, Issue 1, pp. 195-211 (2019). DOI: 10.4208/eajam.280118.100518 **Web of Sciences**

[16] **SURUCHI SINGH** and SWARN SINGH, "High order convergent modified nodal bi-cubic spline collocation method for elliptic partial differential equation", *Numerical Methods for Partial Differential Equations*, Vol. 36, Issue 5, pp. 1028-1043(2020).DOI: 10.1002/num.22463 **Web of Sciences**

[17] RAJNI ARORA, SWARN SINGH and **SURUCHI SINGH**, "Numerical solution of second-order two-dimensional hyperbolic equation by bi-cubic B-spline collocation method*", Math Sci*, Vol. 14, pp. 201-213(2020).DOI: 10.1007/s40096-020-00331-y**Web of Sciences**

[18] SWARN SINGH, SANDEEP BHATT and **SURUCHI SINGH**, Cubic B-spline collocation method on non-uniform mesh for solving nonlinear parabolic partial differential equations, Computational Methods for Differential Equation, (2020) doi:10.22034/CMDE.2020.39472.1726**UGC care+ESCI**

[19] SWARN SINGH, **SURUCHI SINGH** and SANDEEP BHATT, Optimal cubic spline method for convection diffusion equation, Journal of Mathematics and Computer Science, 11 (2021), No. 4, 4351-4368, https://doi.org/10.28919/jmcs/5659 **UGC care**

[20] **SINGH, S.,** SINGH, S. & AGGARWAL, A. Fourth-order cubic B-spline collocation method for hyperbolic telegraph equation, Mathematical Sciences (2021), https://doi.org/10.1007/s40096-021-00428-y **Web of Sciences**

[21] SWARN SINGH, **SURUCHI SINGH** and SANDEEP BHATT, High order compact cubic B-spline collocation method for the solution of Fisher's Equation, International Journal of Applied and Computational Mathematics,7 , 217(2021),DOI: 10.1007/s40819-021-01157-5. **Scopus**

[22] SWARN SINGH, **SURUCHI SINGH** and ZHILIN LI, "A new patch up technique for elliptic partial differential equation with irregularities", Journal of Computational and Applied Mathematics, http://dx.doi.org/10.1016/j.cam.2021.113975(2021). **Scopus**

[23] **SURUCHI SINGH**, SWARN SINGH and ANU AGGARWAL, "Cubic B-spline method for non-linear sine-Gordon equation", Computational and Applied Mathematics (Nov 2022) 41(382):1-20.https://doi.org/10.1007/s40314-022-02092-x **Scopus**

[24] **SINGH SURUCHI**, SINGH S, AGGARWAL A., "A new spline technique for the time fractional diffusion-wave equation". MethodsX. 2023 Jan 4;10:102007. doi: https://doi.org/10.1016/j.mex.2023.102007 PMID: 36660341; PMCID: PMC9842859. **Scopus**

[25] **SURUCHI SINGH**, ANU AGGARWAL and SWARN SINGH, "Alternating Direction Implicit Bi-Cubic Spine Technique for Two- Dimensional Hyperbolic Equation", Palestine Journal of Mathematics **Scopus**

[26] SANDEEP BHATT, SWARN SINGHand**SURUCHI SINGH**, "Approximate Solution of Fourth Order Parabolic Equation using Splines", Palestine Journal of Mathematics **Scopus**

[27]Rashi, Harendra Pal Singh, **Suruchi Singh**, "Effect of fear with saturated fear cost and harvesting on aquatic food chain model (plankton–fish model) in the presence of nanoparticles",Mathematics

and Computers in Simulation,Volume 226,2024,283-305,ISSN 0378-4754,https://doi.org/10.1016/j.matcom.2024.07.010.**Scopus**

[28] Rashi, **Suruchi Singh**, Anuj Kumar Umrao, Harendra Pal Singh, Prashant K. Srivastava,"Cooperation and harvesting-induced delays in a predator–prey model with prey fear response: A crossing curves approach",Chaos, Solitons & Fractals,Volume 194,2025,116-132,ISSN 0960-0779,https://doi.org/10.1016/j.chaos.2025.116132.**Scopus**

Books Published

- Co-authored a book "Solid State Geometry" published by Macmillan India Ltd. in January 2006.
- Co-authored a book "Concepts of Mathematics for senior secondary class Level 1", published by Unistar Books Pvt. Ltd. in 2014.
- Co-authored a book "Concepts of Mathematics for senior secondary class Level 2", published by Unistar Books Pvt. Ltd. in 2014.

Conference Organization/ Presentations

(a) Delivered a talk on "Exponential B-Spline Collocation Method for Hyperbolic Partial Differential Equations" at Department of Mathematics, North Carolina University, Greensboro, USA on February 22, 2017.

(b) Attended DEMARC-NSF (Differential Equations Model and Resource Creators funded by National Science Foundation, USA) workshop from July 15, 2018 to July 21, 2018 at Manhattan College, Riverdale, New York, USA. Also, produced teaching material.

(c) Attended the Fall Meeting of the MD-DC-VA section of the MAA (Mathematical Association of America, Maryland-District of Columbia- Virginia Section) held at Johns Hopkins University, Baltimore, USA from November 4-5, 2016.

(d) Attended the Fall Southeastern Sectional Meeting of AMC (American Mathematical Society) held at North Carolina State University, Raleigh, USA from November 12-13, 2016.

(e) Attended the JOINT MATHEMATICS MEETING organized by American Mathematical Society and Mathematics Association of America at Atlanta, GA, USA during January 4-7, 2017.

(f) Invited as a resource person for the online Refresher Course in Mathematics held by Ramanujan College, University of Delhi, Delhi held from 16-03-2021to 30-03-2021. Delivered a lecture on Mathematica: An Introduction Part -1.

(g) Resource person for a Refresher Course in Mathematics held by Ramanujan College, University of Delhi, Delhi. Delivered a lecture on Mathematica: An Introduction Part -2.

(h) Resource person for the online Refresher Course in Mathematics held by Ramanujan College, University of Delhi, Delhi. Delivered a lecture on Mathematica: An Introduction

Part -3.

(i) Resource person for the two-week Refresher Course in "Applicable Mathematics" held by Ramanujan College in collaboration with Deshbandhu College under the aegis of Pandit Madan Mohan Malaviya National mission on teachers and teaching, University of Delhi, Delhi held from 15-12-2021to 29-12-2021.

(j) Resource person in one week faculty development programme on "Data Analytics & Mathematical Software Tools" during February 25 - March 03, 2022, held by TLC, Ramanujan College, University of Delhi in collaboration with Jamal Mohamed College.

Research Projects (Major Grants/Research Collaboration)

- Carried out advanced Research in 'Computational Methods for Differential Equations', in collaboration Prof Zhilin Li and Prof. Kazufumi Ito, North Carolina State University, Raleigh, NC, USA under the Raman Fellowship.

Awards and Distinctions

- Received **Shrimati Sivakamamma Radhakrishnan Medal**from the Vice President of India, for being the best women candidate in M.A. Examinations in University of Delhi.
- **Professor Ram Bihari Medal** for being the best candidate in M.A./M.Sc. (Mathematics) Examinations in University of Delhi.
- **J.N. Mitra Memorial Medal** for being the best candidate in M.A./M.Sc. Examinations in Mathematics, Statistics, Physics (taken together) in University of Delhi.
- **Shri Ram Chandra Memorial Medal** for being the best candidate in M.A./M.Sc. (All Subjects) Examinations in University of Delhi.
- **Junior Research Fellowship** from U.G.C./C.S.I.R during M.Phil.
- Awarded **RAMAN FELLOWSHIP** to carry out advanced Research in 'Computational Methods for Differential Equations', by UGC. Visited North Carolina State University, Raleigh, NC, USA under this fellowship.

Association With Professional Bodies

Member of the following:

- American Mathematical Society
- Ramanujan Mathematical Society
- Indian Mathematical Society
- Faculty of Mathematical Sciences, University of Delhi

Other Activities

- One of the judgesfor the undergraduate student poster presentations of the Mathematical Association of America (MAA) on January 6, 2017 at the Joint Mathematics Meetings,

Atlanta, GA, USA.

- I was one of the judges for SCUDEM LITE competition March, 2020 organized by Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations, U.S.A. Student teams from all over the world submitted 10-minute videos on Mathematical Models based on COVID for faculty judging.
- I was one of the judges for Simiode Challenge Using Differential Equations Modelling-V, U.S.A. held on 14 November 2020. From all over the world, 130 teams submitted video presentations of their modelling efforts.
- I mentored a team from South Asian University for the competition Simiode Challenge Using Differential Equations Modelling (SCUDEM)–VI, U.S.A, 2021.
- Produced teaching material:

SURUCHI SINGH, "Skin Burn Model Numerical Methods" (2018), 9-001-Text-S-Skin Burn Model Numerical Methods," https://simiode.org/resources/5019.