Dr. Sachin Kumar
Curriculum Vitae

Associate Professor
Department of Mathematics
University of Delhi, Delhi 110007, India.
 +91-9873508945
✉ sachinambariya@gmail.com

▬▬▬ Education

2011 **Ph.D.**, *Indian Institute of Technology Roorkee, Roorkee-247667, India* (with A-Grade).

2006 **M.Sc.**, *D.N. College Meerut, Ch. Charan Singh University, Meerut*, India
(with M.Sc. Class Topper).

2004 **B.Sc.**, *Meerut College Meerut, Ch. Charan Singh University, Meerut, India* (with First Class).

▬▬▬ Experience/Employment

15th July 2023 to Till Date	**Associate Professor (Level 13A)** Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi (North Campus), Delhi-110007, India.
15th July 2020 to 14th July 2023	**Assistant Professor (Level 12)** Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi (North Campus), Delhi-110007, India.
15th July 2015 to 14th July 2020	**Assistant Professor (Level 11)** Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi (North Campus), Delhi-110007, India.
12th February 2014 to 14th July 2015	**Assistant Professor (Level 10)** Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi (North Campus), Delhi-110007, India.
14th July 2011 to 11th February 2014	**Assistant Professor (Level 10)** Department of Applied Mathematics, Babasaheb Bhimrao Ambedkar University, (A Central University), Lucknow-226025, India.

▬▬▬ Area of specialization/interest

- Differential Equations
- Nonlinear Partial Differential Equations (NPDEs)
- Nonlinear Evolution Equations (NEEs)
- Analytical Methods for the NPDEs

▬▬▬ Research Projects (Major/Minor Grants)

Total Number of Research Projects (Ongoing/Completed): 8

Ongoing Projects

- **Principal Investigator PI:** Lie Symmetry Analysis and Dynamics of Physical Phenomena for Nonlinear Evolution Equations, MTR/2020/000531, (MATRICS) Science & Engineering Research Board (SERB) − DST, Ongoing (2021-2024) (Estimated Cost: Rs. 6,60,000/-).

- **Principal Investigator PI:** Study of the dynamics of exact solutions for the nonlinear evolution equations using Lie symmetry analysis, EEQ/2020/000238 (Empowerment and Equity Opportunities for Excellence in Science) Science & Engineering Research Board (SERB) – DST, Ongoing (2020-2023) (Estimated Cost: Rs. 20,74,660/-).

- **Principal Investigator PI:** Symbolic computational work and potential mathematical analytical methods for solving various forms of nonlinear Schrödinger equations, Ref. No./IoE/2023-24/12/FRP Institution of Eminence University of Delhi under Faculty Research Programme Grant – IoE, Ongoing (2023-2024) (Estimated Cost: Rs. 4,00,000/-).

Completed Projects

- **Principal Investigator PI:** Dynamic behaviour and stability of nonlinear and fractional-order differential systems with various controllers, Ref. No./IoE/2021/12/FRP Institution of Eminence University of Delhi under Faculty Research Programme Grant – IoE, Completed (2022-2023) (Estimated Cost: Rs. 3,00,000/-).

- **Principal Investigator PI:** Studies on analytical solutions and Solitonic Structures for nonlinear evolutionary differential equations, Ref. No./IoE/2021/12/FRP Institution of Eminence University of Delhi under Faculty Research Programme Grant – IoE, Completed (2021-2022) (Estimated Cost: Rs. 1,75,000/-).

- **Principal Investigator PI:** Exact Solutions of Some Non-linear Partial Differential Equations, Funding Agency/Ministry: Research & Development Grant, Delhi University, Completed (2015-16) (Estimated Cost: Rs. 1,50,000/-).

- **Principal Investigator PI:** To Solve the Non-linear Partial Differential Equations by One parameter Lie Group of Transformations, Funding Agency/Ministry: Research & Development Grant, Delhi University, Completed (2016-17) (Estimated Cost: Rs. 1,50,000/-).

- **Principal Investigator PI:** Study for Solve the Nonlinear Partial Differential Equations by Similarity Transformations Method, Funding Agency/Ministry: UGC-BSR Start-Up Grant, Duration of the project: 02 years, Completed (2013-14) (Estimated Cost: Rs. 6,00,000/-).

Awards/Fellowships/Recognition/Travel Grant

- **Ranked among Top 2% World Researchers in the years 2021, 2022, and 2023 in the single year impact in the field of Applied Mathematics**. This survey is done by Stanford University (USA) scientists and Elsevier for the Top 2% of the most distinguished and influential scientists globally.

- **INDIA TOP CITED PAPER AWARD 2023 Credential FROM IOP (Institute of Physics) Publishing for Physica Scripta Journal paper: "**Invariance analysis, optimal system, closed-form solutions and dynamical wave structures of a (2+1)-dimensional dissipative long wave system**"** as "One of the top 1% most-cited papers in IOP Publishing's Physics Journals, Published over the period of 2020–2022".

- **INDIA TOP CITED PAPER AWARD 2023 Credential FROM IOP (Institute of Physics) Publishing for Communications in Theoretical Physics Journal paper: "**Abundant different types of exact soliton solution to the (4+1)-dimensional Fokas and (2+1)-dimensional breaking soliton equations" as "One of the top 1% most-cited papers in IOP Publishing's Physics Journals, Published over the period of 2020–2022".

- **INDIA TOP CITED PAPER AWARD 2021 Credential FROM IOP (Institute of Physics) Publishing for Physica Scripta Journal paper:** "Group invariant solutions of (3+ 1)-dimensional generalized B-type Kadomstsev Petviashvili equation using optimal system of Lie subalgebra" as "One of the top 1% most-cited papers in IOP Publishing's Physics Journals, Published over the period of 2018–2020".

- **NBHM Travel grant** to attend and give invited talk in the "International Conference on Symmetries of Differential & Difference Equations and Their Applications", Stellenbosch, South Africa, October 25-27, 2023.
- **INDO-UAE INSPIRING SCIENTIST AWARD** in the International Conference of Mathematical Sciences–DUBAI 2022, November 16 - 17, 2022, Dubai - United Arab Emirates.
- **Outstanding Paper Award** in the International Conference on Applied Engineering, Architecture, Physics and Mathematical Sciences–Bangkok 2023, February 23-24, 2023, Bangkok - Thailand.
- **Ministry of Human Resource Development (MHRD) Fellowship** from January 2007 to March 2008 for Ph.D. in Indian Institute of Technology Roorkee, India.
- **National Doctoral Fellowship** (NDF) of All India Council for Technical Education (AICTE) from March 2008 to January 2011 for Ph.D. in Indian Institute of Technology Roorkee, India.
- **DST-SERC Travel grant** to attend and paper presented at the "ICMSSC 2010: International Conference on Mathematics,Statistics and Scientific Computing", Penang, Malaysia, February 24-26, 2010.
- **M.Sc. Class Topper in (2006)** in D.N. Degree College, Ch. Charan Singh University, Meerut,(U.P).

Editorial Board Member

- **Associate Editor: Partial Differential Equations in Applied Mathematics**, (Elsevier's Publisher)

Reviewer Assignments

Reviewer for the following Journals:

1. Nonlinear Dynamics, Springer
2. Chaos, Solitons & Fractals, Elsevier
3. The European Physical Journal Plus, Springer
4. International Journal of Computer Mathematics, Taylor & Francis
5. Physica Scripta, IOP Publishing
6. International Journal of Modern Physics B, World Scientific Publishing
7. Pramana-Journal of Physics, Springer
8. Mathematical Methods in the Applied Sciences, Wiley
9. Journal of Physics A: Mathematical and Theoretical, IOP Publishing
10. International Journal of Applied and Computational Mathematics, Springer
11. Journal of Computational and Applied Mathematics, Elsevier
12. Modern Physics Letters B, World Scientific Publishing
13. Physics of Fluids, American Institute of Physics
14. Optical and Quantum Electronics, Springer
15. Journal of Taibah University for Science, Taylor & Francis
16. Computational and Applied Mathematics, Springer
17. AEJ-Alexandria Engineering Journal, Elsevier
18. Waves in Random and Complex Media, Taylor & Francis
19. Symmetry, MDPI
20. Open Physics, De Gruyter
21. Nonlinear Engineering. Modeling and Application

Current Courses taught

Postgraduate level: Differential Equations, Dynamical Systems, Fluid Dynamics.

━━━━ Research Guidance/Supervision

Ph.D. Scholars

1. **Vishakha Jadaun (Degree Awarded, 2019)** Ph.D Thesis Title: Invariant Solutions for Nonlinear Partial Differential Equations using Lie Symmetry Analysis

2. **Harsha Kharbanda (Degree Awarded, 2022)** Ph.D Thesis Title: Modeling and qualitative dynamics in prey-predator interactions

3. **Shikha Jain (Degree Awarded, 2023)** Ph.D Thesis Title: Qualitative Study and Epidemiological Modeling of Certain Complex Realities

4. **Dharmendra Kumar (Degree Awarded, 2022)** Ph.D Thesis Title: Dynamical Structures of Solitary Wave Solutions for the Nonlinear Evaluation Equations using Lie Symmetry Analysis

5. **Amit Kumar (Ph.D. Viva successfully completed, 2023)** Ph.D Thesis Title: Dynamical study and Exact solutions for the higher-dimensional nonlinear evolution equations using various analytical techniques

6. **Ihsanullah Hamid (In 4th year of Ph.D.)**

7. **Monika Niwas (In 3rd year of Ph.D.)**

8. **Nikita (In 3rd year of Ph.D.)**

M.Phil. Scholars

1. **Yogeeta Garg (Degree Awarded, 2016)** Title: Similarity Reductions and Exact Solutions of Some Nonlinear Partial Differential Equations.

2. **Tanvi (Degree Awarded, 2017)** Title: Mathematical Modelling and Stability Analysis of HIV-TB Co-infection.

3. **Nikita (Degree Awarded, 2018)** Title: Stability and Bifurcation Analysis of Prey-predator Models with Harvesting Rates.

4. **Setu Rani (Degree Awarded, 2021)** Title: Group invariant solutions of certain (2+1)-dimensional non-linear evolution equations using Lie symmetry analysis.

5. **Shubham Kumar Dhimann (Degree Awarded, 2023)** Title: Group symmetry reductions and Exact closed-form solutions to some Nonlinear Evolution Equations using Lie symmetry approach

━━━━ Conference Organization/ Presentations (in the last few years)

Paper Presentations/Invited Talks in Conferences: 20

1. Invited talk in the "International Conference on Symmetries of Differential & Difference Equations and Their Applications", Lie symmetries with generalized invariant solutions and dynamics structures and patterns of the (2+1)- and (3+1)-dimensional nonlinear evolution equations, Stellenbosch, Cape-Town, South Africa, October 25 - 27, 2023.

2. Invited talk in the DST-SERB Sponsored One week online National workshop on Mathematical Modellling with Simulation in Applied Sciences, Dynamical analyses of various solutions and generalized invariant solutions for a (2+1)-dimensional modified dispersive water wave system of equations organized by Department of Mathematics, Central University of Haryana, India on May 22 - 26, 2023

3. Seminar Talk on PI-Day, Solutions of higher-dimensional Nonlinear PDEs using the Lie symmetry method organized by Srinivasa Ramanujan Department of Mathematics, Central University of Himachal Pradesh, India on March 14, 2023.

4. Presented a paper in International Conference on Applied Engineering, Architecture, Physics, and Mathematical Sciences – Thailand 2023, Lie symmetry analysis and a different set of exact closed-form solutions for strongly nonlinear evolution equations organized by IMRF Education Group Bangkok-Thailand on February 23 - 24, 2023.

5. Presented a paper in International Conference on Applied Engineering, Architecture, Physics, and Mathematical Sciences - DUBAI 2022, Lie symmetry reductions, analytical solutions, and dynamical behavior of wave profiles for higher-dimensional nonlinear evolutionary equations organized by IMRF Education Group, Dubai - United Arab Emirates on November 16 - 17, 2022.

6. Invited Talk in the International Conference organized by The Society for Dynamical Systems, Delhi (SDSD) and Department of Physics, School of Engineering and Applied Sciences, Bennett University, Noida, India on November 19, 2022.

7. Seminar Talk in IIT Indore, Lie symmetry reductions with exact solutions and dynamical behaviourof extremely nonlinear (3+1)-dimensional generalized BKP-Boussinesq equation organized by Department of Mathematics, IIT Indore, India on September 27, 2022.

8. Invited Talk in the 6th International Virtual Workshop on Nonlinear and Modern Mathematical Physics (NMMP-2022) organized by Florida A&M University, Tallahassee, Florida on June 17 - 19, 2022.

9. Invited Talk in the Recent Techniques for the solutions of Nonlinear Differential Equations, organized by Department of Mathematics, JIIT Noida, October 23, 2021.

10. Invited Talk in the National Conference on Complex systems in Interdisciplinary Sciences, organized by Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia, New Delhi India during March 11-12, 2019.

11. Invited Talk in the Faculty Development Programme Application of MATLAB for Scientific & Engineering Computation on Complex systems in Interdisciplinary Sciences, organized by Department of Mathematics, Faculty of Science and Humaities, Delhi-NCR, Sonepat, India during November 18-23, 2019.

12. Presented a paper in the International Conference on Lie-Symmetry Analysis and Similarity Reductions for the Non-Linear Partial Differential Equations, organized by Vardhaman College, Bijnor, India during February 24-25, 2018.

13. Presented a paper in the International Conference on Lie Symmetry Analysis and Invariant solutionsof Born-Infeld equation, organized by Inderprastha Engineering College, Ghaziabad, India during January 04- 06, 2018.

14. Presented a paper in the International Conference on Symmetry Reductions and Invariant Solutions of (2+1)-Dimensional Zoomeron Equation, organized by KIET Group of Institutions, Ghaziabad, India during December 22-23, 2017.

15. Short Talk in the International Conference on Invariant Solutions of Zabolotskaya-Khokhlov Equation using Similarity Transformation Method, organized by Department of Mathematics, Shaheed Bhagat Singh College, University of Delhi, Delhi during February 08-11, 2017.

16. Invited Talk in the National Conference on Applications of Similarity Transformations Method, organized by Department of Applied Mathematics, BBAU, Lucknow, India during March 30-31, 2016.

17. Presented a paper in the International Conference on New Static Spherically Symmetric Isotropic Solutions for Perfect Fluid Distributions, organized by Department of Mathematics, University of Kerala, Thiruvanathapuram, Kerala, India during November 26-28, 2015.

18. Presented a paper in the International Conference on Similarity Solutions of Einstein's Field equations for Type D Fluid Spheres in 5-Flat Space, organized by Rajkumar Goel Institute of Technology Ghaziabad, Uttar Pradesh, India during December 27-29, 2015.

19. Presented a paper in the National Conference on To Study the Perfect Fluid Distributions of Embedding Class One, organized by Department of Mathematics, CDLU, Sirsa, India during March 17-18, 2015.

20. Invited Talk in the National Conference on Generalized Similarity Solutions of Einstein's Field Equations for Non-conformally Flat Fluid Spheres in 5-Flat Space, organized by Department of Applied Mathematics, BBAU, Lucknow, India during October 30-31, 2014.

Publications Profile

Best Published Papers in highly indexed National / International/Peer-reviewed Journals

(Top-ranked SCI/SCIE Journal):

1. **Sachin Kumar** and Monika Niwas, Analyzing multi-peak and lump solutions of the variable-coefficient Boiti–Leon–Manna–Pempinelli equation: a comparative study of the Lie classical method and unified method with applications, Nonlinear Dynamics, 111, pp. 22457-22475, https://doi.org/10.1007/s11071-023-09012-6 (2023). (SCIE/IF: 5.6) **(Q1)**

2. Monika Niwas and **Sachin Kumar,** Multi-peakons, lumps, and other solitons solutions for the (2+1)-dimensional generalized Benjamin–Ono equation: an inverse (G'/G)-expansion method and real-world applications, Nonlinear Dynamics, 111. pp. 22499-22512, https://doi.org/10.1007/s11071-023-09023-3 (2023). (SCIE/IF: 5.6) **(Q1)**

3. **Sachin Kumar** and Brij Mohan, A novel analysis of Cole-Hopf transformations in different dimensions, solitons and rogue waves for a (2+1)-dimensional shallow water wave equation of ion-acoustic waves in plasmas, Physics of Fluids, doi:10.1063/5.0185772 (2023). (SCIE/IF: 4.6) **(Q1)**

4. **Sachin Kumar**, I. Hamid, M.A. Abdou, Dynamic frameworks of optical soliton solutions and soliton-like formations to Schrödinger–Hirota equation with parabolic law non-linearity using a highly efficient approach, Optical and Quantum Electronics, 55 (14), Art. No. 1236 (2023). (SCIE/IF: 3.0) **(Q2)**

5. Monika Niwas, Shubham Kumar Dhiman and **Sachin Kumar,** Dynamical forms of various optical soliton solutions and other solitons for the new Schrödinger equation in optical fibers using two distinct efficient approaches, Modern Physics B, Art. No. 2450087 (2024). (SCIE/IF: 1.9) **(Q3)**

6. **Sachin Kumar** and Monika Niwas, Exploring lump soliton solutions and wave interactions using new Inverse (G'/G)-expansion approach: applications to the (2+1)-dimensional nonlinear Heisenberg ferromagnetic spin chain equation, Nonlinear Dynamics, 111 (21), pp. 20257–20273 (2023). (SCIE/IF: 5.6) **(Q1)**

7. Brij Mohan, **Sachin Kumar**, Raj Kumar, Higher-order rogue waves and dispersive solitons of a novel P-type (3+1)-D evolution equation in soliton theory and nonlinear waves, Nonlinear Dynamics, 111 (21), pp. 20275-20288 (2023). (SCIE/IF: 5.6) **(Q1)**

8. M.A. Abdou, L. Ouahid, M.M. Alanazi, A.A. Hendi and **Sachin Kumar,** Dynamics of newly created soliton solutions via Atangana–Baleanu Fractional (ABF) for system of (ISALWs) equations, Modern Physics B, Art. No. 2350208 (2023). (SCIE/IF: 1.9) **(Q3)**

9. **Sachin Kumar,** Brij Mohan, Raj Kumar, Newly formed center-controlled rouge wave and lump solutions of a generalized (3+1)-dimensional KdV-BBM equation via symbolic computation approach, Physica Scripta, 97 (8), Art. No. 085237 (2022). (SCIE/IF: 2.9) **(Q2)**

10. M.A. Abdou, L. Ouahid and **Sachin Kumar,** Plenteous specific analytical solutions for new extended deoxyribonucleic acid (DNA) model arising in mathematical biology, Modern Physics B, 37 (34), Art. No. 2350173 (2023). (SCIE/IF: 1.9) **(Q3)**

11. **Sachin Kumar,** Shubham Kumar Dhiman, Astha Chauhan, Analysis of Lie invariance, analytical solutions, conservation laws, and a variety of wave profiles for the (2+1)-dimensional Riemann wave model arising from ocean tsunamis and seismic sea waves, European Physical Journal Plus, 138 (5), Art. No. 622 (2023). (SCIE/IF: 3.758) **(Q1)**

12. **Sachin Kumar,** Brij Mohan, A direct symbolic computation of center-controlled rogue waves to a new Painlevé-integrable (3+1)-D generalized nonlinear evolution equation in plasmas, Nonlinear Dynamics, https://doi.org/10.1007/s11071-023-08683-5,(2023). (SCIE/IF: 3.758) **(Q1)**

13. **Sachin Kumar,** Wen-Xiu Ma, Shubham Kumar Dhiman, Astha Chauhan, Lie group analysis with the optimal system, generalized invariant solutions, and an enormous variety of different wave profiles for the higher-dimensional modified dispersive water wave system of equations, European Physical Journal Plus, 138 (5), Art. No. 434 (2023). (SCIE/IF: 3.758) **(Q1)**

14. Ihsanullah Hamid, **Sachin Kumar**, Symbolic computation and Novel solitons, traveling waves and soliton-like solutions for the highly nonlinear (2+1)-dimensional Schrödinger equation in the anomalous dispersion regime via newly proposed modified approach, Optical and Quantum Electronics, 55 (9), Art. No. 755 (2023). (SCIE/IF: 2.794) **(Q2)**

15. **Sachin Kumar,** Monika Niwas, Optical soliton solutions and dynamical behaviours of Kudryashov's equation employing efficient integrating approach, Pramana - Journal of Physics, 97(3), Art. No. 98 (2023). (SCIE/IF: 2.669) **(Q2)**

16. Setu Rani, **Sachin Kumar,** Nikita Mann, On the dynamics of optical soliton solutions, modulation stability, and various wave structures of a (2+1)-dimensional complex modified Korteweg-de-Vries equation using two integration mathematical methods, Optical and Quantum Electronics, 55 (8), Art. No. 731 (2023). (SCIE/IF: 2.794) **(Q2)**

17. **Sachin Kumar,** Ihsanullah Hamid, M.A. Abdou, Some specific optical wave solutions and combined other solitons to the advanced (3+1)-dimensional Schrödinger equation in nonlinear optical fibers, Optical and Quantum Electronics, 55 (8), Art. No. 728 (2023). (SCIE/IF: 2.794) **(Q2)**

18. **Sachin Kumar,** Nikita Mann, A variety of newly formed soliton solutions and patterns of dynamic waveforms for the generalized complex coupled Schrödinger–Boussinesq equations, Optical and Quantum Electronics, 55 (8), Art. No. 723 (2023). (SCIE/IF: 2.794) **(Q2)**

19. Monika Niwas, Sachin Kumar, New plenteous soliton solutions and other form solutions for a generalized dispersive long-wave system employing two methodological approaches, Optical and Quantum Electronics, 55 (7), Art. No. 630 (2023). (SCIE/IF: 2.794) **(Q2)**

20. **Sachin Kumar**, Amit Kumar, Newly generated optical wave solutions and dynamical behaviors of the highly nonlinear coupled Davey-Stewartson Fokas system in monomode optical fibers, Optical and Quantum Electronics, Optical and Quantum Electronics, 55 (6), Art. No. 566 (2023). (SCIE/IF: 2.794) **(Q2)**

21. **Sachin Kumar**, Nikita Mann, Harsha Kharbanda, Mustafa Inc, Dynamical behavior of analyti- cal soliton solutions, bifurcation analysis, and quasi-periodic solution to the (2+1)- dimensional Konopelchenko–Dubrovsky (KD) system, Analysis and Mathematical Physics, 13 (3), Art. No. 40 (2023). (SCIE/IF: 1.570) **(Q2)**

22. **Sachin Kumar**, Monika Niwas, Abundant soliton solutions and different dynamical behaviors of various waveforms to a new (3+1)-dimensional Schrödinger equation in optical fibers, Optical and Quantum Electronics, 55 (6), Art. No. 531 (2023). (SCIE/IF: 2.794) **(Q2)**

23. S. El-Ganaini, **Sachin Kumar**, Symbolic computation to construct new soliton solutions and dynamical behaviors of various wave structures for two different extended and generalized nonlinear Schrödinger equations using the new improved modified generalized sub-ODE proposed method, Mathematics and Computers in Simulation, 208, pp. 28-56 (2023). (SCIE/IF: 3.601) **(Q1)**

24. M. M. Alanazi, L. Ouahid, J. S. Al Shahrani, M. A. Abdou, **Sachin Kumar**, Novel soliton solutions to the Atangana Baleanu (AB) fractional for ion sound and Langmuir waves (ISALWs) equations, Optical and Quantum Electronics, 55 (5), Art. No. 462 (2023). (SCIE/IF: 2.794) **(Q2)**

25. **Sachin Kumar**, Monika Niwas, New optical soliton solutions and a variety of dynamical wave profiles to the perturbed Chen–Lee–Liu equation in optical fibers, Optical and Quantum Electronics, 55 (5), Art. No. 418 (2023). (SCIE/IF: 2.794) **(Q2)**

26. S. K. Dhiman, **Sachin Kumar**, An optimal system, invariant solutions, conservation laws, and com- plete classification of Lie group symmetries for a generalized (2+1)-dimensional Davey–Stewartson system of equations for the wave propagation in water of finite depth, European Physical Journal Plus, 138 (3), Art. No. 195 (2023). (SCIE/IF: 3.758) **(Q1)**

27. Setu Rani, **Sachin Kumar**, Raj Kumar, Invariance analysis for determining the closed-form solutions, optimal system, and various wave profiles for a (2+1)-dimensional weakly coupled B-Type Kadomtsev-Petviashvili equations, Journal of Ocean Engineering and Science, 8 (2), pp. 133-144 (2023). (SCIE/IF: 4.803) **(Q1)**

28. Amit Kumar, **Sachin Kumar**, Dynamical behaviors with various exact solutions to a (2+1) -dimensional asymmetric Nizhnik-Novikov-Veselov equation using two efficient integral approaches, International Journal of Modern Physics B, Art. No. 2450064 (2023). (SCIE/IF: 1.404) **(Q3)**

29. **Sachin Kumar**, Ihsanullah Hamid, M. A. Abdou, Specific wave profiles and closed-form soliton solutions for generalized nonlinear wave equation in (3+1)-dimensions with gas bubbles in hydrodynamics and fluids, Journal of Ocean Engineering and Science, 8 (1), pp. 91-102 (2023). (SCIE/IF:4.803) **(Q1)**

30. **Sachin Kumar**, Amit Kumar, Brij Mohan, Evolutionary dynamics of solitary wave profiles and abundant analytical solutions to a (3+1)-dimensional burgers system in ocean physics and hydro-dynamics, Journal of Ocean Engineering and Science, 8 (1), pp. 1-14 (2023). (SCIE/IF: 4.803) **(Q1)**

31. **Sachin Kumar**, Brij Mohan, A generalized nonlinear fifth-order KdV-type equation with multiple soliton solutions: Painlevé analysis and Hirota Bilinear technique, Physica Scripta, 97 (12), Art. No. 125214 (2022). (SCIE/IF: 3.081) **(Q2)**

32. **Sachin Kumar**, Monika Niwas, New optical soliton solutions of Biswas–Arshed equation using the generalised exponential rational function approach and Kudryashov's simplest equation approach, Pramana-Journal of Physics, 96 (4), Art. No. 204 (2022). (SCIE/IF: 2.669) **(Q2)**

33. **Sachin Kumar**, Monika Niwas, S. K. Dhiman, Abundant analytical soliton solutions and different wave profiles to the Kudryashov-Sinelshchikov equation in mathematical physics, Journal of Ocean Engineering and Science, 7 (6), pp. 565-577 (2022). (SCIE/IF: 4.803) **(Q1)**

34. M. A. Abdou, L. Ouahid, J. S. Al Shahrani, M. M. Alanazi, A. A. Al-Moneef, **Sachin Kumar**, Abundant exact solutions for the deoxyribonucleic acid (DNA) model, International Journal of Modern Physics B, 36 (28), Art. No. 2250194 (2022). (SCIE/IF: 1.404) **(Q3)**

35. **Sachin Kumar**, Setu Rani, Nikita Mann, Diverse analytical wave solutions and dynamical behaviors of the new (2+1)-dimensional Sakovich equation emerging in fluid dynamics, European Physical Journal Plus, 137 (11), Art. No. 1226 (2022). (SCIE/IF: 3.758) **(Q1)**

36. **Sachin Kumar**, Amit Kumar, Dynamical behaviors and abundant optical soliton solutions of the cold bosonic atoms in a zig-zag optical lattice model using two integral schemes, Mathematics and Computers in Simulation, 201, pp. 254-274 (2022). (SCIE/IF: 3.601) **(Q1)**

37. **Sachin Kumar**, Amit Kumar, A study of nonlinear extended Zakharov-Kuznetsov dynamical equation in (3+1)-dimensions: Abundant closed- form solutions and various dynamical shapes of solitons, Modern Physics Letters B, 36 (25), Art. No. 2250140 (2022). (SCIE/IF: 1.948) **(Q3)**

38. M. S. Osman, H. Almusawa, K. U. Tariq, S. Anwar, **Sachin Kumar**, M. Younis, W. X. Ma, On global behavior for complex soliton solutions of the perturbed nonlinear Schrödinger equation in nonlinear optical fibers, Journal of Ocean Engineering and Science, 7 (5), pp. 431-443 (2022). (SCIE/IF: 4.803) **(Q1)**

39. **Sachin Kumar**, Setu Rani, Study of exact analytical solutions and various wave profiles of a new extended (2+1)-dimensional Boussinesq equation using symmetry analysis, Journal of Ocean Engineering and Science, 7 (5), pp. 475-484 (2022). (SCIE/IF: 4.803) **(Q1)**

40. **Sachin Kumar**, Brij Mohan, Raj Kumar, Lump, soliton, and interaction solutions to a generalized two-mode higher-order nonlinear evolution equation in plasma physics, Nonlinear Dynamics, 110 (1), pp. 693-704 (2022). (SCIE/IF: 5.741) **(Q1)**

41. M. A. Abdou, L. Ouahid, J. S. Al Shahrani, M.M. Alanazi, **Sachin Kumar**, New analytical solutions and efficient methodologies for DNA (Double-Chain Model in mathematical biology, Modern Physics Letters B, 36 (24), Art. No. 2250124 (2022). (SCIE/IF: 1.948) **(Q3)**

42. A. A. Gaber, F. Alsharari, **Sachin Kumar**, Some closed-form solutions, conservation laws, and various solitary waves to the (2+1)-D potential B-K equation via Lie symmetry approach, International Journal of Modern Physics B, 36 (20), Art. No. 2250117 (2022). (SCIE/IF: 1.404) **(Q3)**

43. **Sachin Kumar**, Brij Mohan, A novel and efficient method for obtaining Hirota's bilinear form for the nonlinear evolution equation in (n+1) dimensions, Partial Differential Equations in Applied Mathematics, 5, Art. No. 100274 (2022). (SCOPUS)

44. **Sachin Kumar**, S. K. Dhiman, Astha Chauhan, Symmetry reductions, generalized solutions and dynamics of wave profiles for the (2+1)-dimensional system of Broer–Kaup–Kupershmidt (BKK) equations, Mathematics and Computers in Simulation, 196, pp. 319-335 (2022). (SCIE/IF: 4.6) **(Q1)**

45. Monika Niwas, **Sachin Kumar**, Harsha Kharbanda, Symmetry analysis, closed-form invariant solutions and dynamical wave structures of the generalized (3+1)-dimensional breaking soliton equation using optimal system of Lie subalgebra, Journal of Ocean Engineering and Science, 7 (2), pp. 188-201 (2022). (SCIE/IF: 4.803) **(Q1)**

46. **Sachin Kumar**, Amit Kumar, Abundant closed-form wave solutions and dynamical structures of soliton solutions to the (3+1)-dimensional BLMP equation in mathematical physics, Journal of Ocean Engineering and Science, 7 (2), pp. 178-187 (2022). (SCIE/IF: 4.803) **(Q1)**

47. Amit Kumar, **Sachin Kumar**, Harsha Kharbanda, Closed-form invariant solutions from the Lie symmetry analysis and dynamics of solitonic profiles for (2+1)-dimensional modified Heisenberg ferromagnetic system, Modern Physics Letters B, 36 (7), Art. No. 2150609 (2022). (SCIE/IF: 1.948) **(Q3)**

48. L. Ouahid, M. A. Abdou, **Sachin Kumar**, Analytical soliton solutions for cold bosonic atoms (CBA)in a zigzag optical lattice model employing efficient methods, Modern Physics Letters B, 36 (7), Art. No. 2150603 (2022). (SCIE/IF: 1.948) **(Q3)**

49. **Sachin Kumar**, Setu Rani, Symmetries of optimal system, various closed-form solutions, and propagation of different wave profiles for the Boussinesq-Burgers system in ocean waves, Physics of Fluids, 34 (3), Art. No. 037109 (2022). (SCIE/IF: 4.980) **(Q1)**

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75. **Sachin Kumar**, L. Kaur, Monika Niwas, Some exact invariant solutions and dynamical structures of multiple solitons for the (2+1)-dimensional Bogoyavlensky-Konopelchenko equation with variable coefficients using Lie symmetry analysis, Chinese Journal of Physics, 71, pp. 518-538 (2021). (SCIE/IF: 3.957) **(Q2)**

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100. **Sachin Kumar**, Vishakha Jadaun, Symmetry analysis and some new exact solutions of Born-Infeld equation, International Journal of Geometric Methods in Modern Physics, 15 (11), Art. No. 1850183 (2018). (SCIE/IF: 1.873) **(Q3)**

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107. **Sachin Kumar**, Pratibha, Y. K. Gupta, Invariant solutions of Einstein field equation for nonconformally flat fluid spheres of embedding class one, International Journal of Modern Physics A, 25 (20),pp. 3993-4000 (2010). (SCIE/IF: 1.475) **(Q2)**

108. Y. K. Gupta, Pratibha, **Sachin Kumar**, Some nonconformal accelerating perfect fluid plates of embedding class 1 using similarity transformations, International Journal of Modern Physics A, 25 (9), pp. 1863-1879 (2010). (SCIE/IF: 1.475) **(Q2)**

Published Papers in National/International Conferences Proceedings:

1. Dharmendra Kumar and **Sachin Kumar**, Ultimate Numerical Bound Estimation of Chaotic Dynamical Finance Model, Published in the Modern Mathematical Methods and High Performancein Mathematics & Statistics 171, pp. 71-81 (2016), DOI 10.1007/978-981-10-1454-3-6; Springer Science+Business Media Singapore (SCOPUS)

2. **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, Some Static Isotropic Perfect Fluid Spheres in General Relativity, Proceedings in the International Conference on Mathematics, Statistics and Scientific Computing, Penang, Malaysia, February 24 -26, 2010. (ISSN: 2070), World Academy of Science, Engineering and Technology, 62, pp. 62, pp. 466-470 (2010). (SCOPUS)
   (This Paper is published in the proceedings of Malaysia Conference).

3. **Sachin Kumar**, Y.K. Gupta and Pratibha, Some Similarity Solutions For Plane Symmetric PerfectFluid Distributions in General Relativity, Proceedings in International Transactions in Mathematical Sciences & Computer (ISSN:PRINT-0974-5068, ONLINE-0975-3753) Vol. 2, No. 2. p. 223 –
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4. **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, A Study of Similarity Solutions For Non-Conformal and Non Static Accelerating Perfect Fluid Plates in 5-D Flat Space, Proceedings in the 54th Congress of the Indian Society of Theoretical and Applied Mechanics, (International Meet), New Delhi, January 18 − 21, 2009. p. 186 − 193.

5. **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, On Some Non-Conformally Flat Non-Static Acceler-ating Perfect Fluid Spheres of Embedding Class one, Proceedings in the 13th Annual Conferenceof Vijnana Parishad of India and National Symposium on Recent Developments in Applicable Mathematics, JIET, Guna , December $4-6$, 2009. Vol. 40. p. $1-12$.

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7. **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, On Some Inhomogeneous Non – Conformally FluidPlates of Embedding Class One, Proceedings in the International Conference on Challenges and Apllications of Mathematics in Science and Technology, Rourkela, Orissa, January 11 – 13, 2010.

   (ISBN: 023-032-875-X). p. 923 – 931.

Other Activities

No. of Cultural activities/ Conferences organized by the Department

- Convener, Organizing Diwali Quiz Competition, Mathematical Rangoli, Diya Decorations, Department of Mathematics, University of Delhi, Delhi, during November 10, 2023

- Convener, Organizing a Cultural Event-NOVATO FIESTA, 2023, Department of Mathematics, University of Delhi, Delhi, during November 07, 2023

- Convener, Organizing a Cultural Event-Comienzo, 2023, Department of Mathematics, University of Delhi, Delhi, during February 13, 2023

- Convener, Organizing the National Mathematics Day, Department of Mathematics, University of Delhi, Delhi, during December 22, 2022

- Co-Convener of the Research Scholar Seminar for M.Phil. (Online), Department of Mathematics, University of Delhi, Delhi, during September 28, 2020

- Organizing Secretary of "International Conference on Mathematical Modeling and Numerical Simulation" during July 01-03, 2013.

- Organizing committee member of "International Conference on Radiation Environment Assessment, measurement &Its Impact (RADENVIRON-2012)" during April 12-14, 2012.

- Organizing Secretary of "National Conference on Applied Statistics and its Applications 2013" during March 16-17, 2013.

- Organizing Secretary of "National Conference on Mathematical and Statistical Techniques and their Applications to Science and Engineering" during November 26-27, 2011.

Other Academic Activities in the Department

- Member, Departmental Research Committee (DRC), University of Delhi, Delhi.

- Member, Departmental M.Phil Committee, University of Delhi, Delhi.

- Convener, Cultural Committee, University of Delhi, Delhi.

- Member, Library Committee, University of Delhi, Delhi.

- Member, Committee for M.A./M.Sc. Admissions in the Department, University of Delhi, Delhi.

- Member, Internal Assessment/Optional Allotment Committee, University of Delhi, Delhi.

- Member, Swchhta Committee, University of Delhi, Delhi.

- Member, Research Scholar Seminar Committee, University of Delhi, Delhi.

- Member, Moderation Committee for UG Courses, University of Delhi, Delhi.

- Member, Advisory Committee for Ph.D./M.Phil Scholars, University of Delhi, Delhi.

- Member, North-East Student Welfare Committee, University of Delhi, Delhi.

- Member, Student Redressal Grievance Committee for M.Phil/Ph.D. Scholars, University of Delhi, Delhi.

- Member, Ph.D. Interview Committee, University of Delhi, Delhi.

- Member, Undergraduate Syllabus Revision Committee, University of Delhi, Delhi.

- Member of Committee of Courses for Honours and Post-graduate Studies, University of Delhi, Delhi.

- Member, Anti-ragging Committee, University of Delhi, Delhi.

- Member, Placement Cell, University of Delhi, Delhi.

- Board of Post Graduate Studies (BPGS), DAM, BBAU, Lucknow.

- Member of School Board, School for Physical Science, BBAU, Lucknow.

- Member, Departmental Research Committee (DRC), BBAU, Lucknow.

- Member, Admission Committee, Sessions, BBAU, Lucknow.

- Member of Sport Committee, BBAU, Lucknow.

- Introduced new /modified syllabus at PG level, BBAU, Lucknow.

Attended various Workshops/FDP/Refresher Courses

- Attended Advanced Training School For Mathematics Lecturer, Topic on Measure Theory and Differential Geometry, Department of Mathematics, I.I.T Bombay, Mumbai, from June 8 –June 27, 2009.
- Attended 87th Orientation Programme, UGC- Academic Staff College, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur, from June 2 –June 29, 2012.
- Attended ATM workshop on PDE and Mechanics, Department of Mathematics, JUIT Waknaghat, Solan, fromJun3 03-June15, 2013.
- Attended UGC HRDC Refresher Course in Basic Sciences, Jamia Millia Islamia, New Delhi from May 05- May25, 2015.
- Attended UGC HRDC Refresher Course in Mathematical Sciences, CPDHE, University of Delhi, Delhi from June 06- June 27, 2017.
- Attended Workshop for Development of Test Items in the area of Mathematics, Sciences and Social Sciences, NCERT, New Delhi, from November 27- December 01, 2017.
- Attended UGC HRDC Online Refresher Course in Basic Sciences, Jamia Millia Islamia, New Delhi, from September 10- September 23, 2020.
- Attended Online FDP on Mathematica-A System for Modern Technical Computing, Mahatma Hansraj Faculty Development Centre, Hansraj College, University of Delhi from August 21- August26, 2020.
- Attended One Week Online FDP on ICT ENABLED TEACHING LEARNING, Teaching LearningCentre, Ramanujan College, University of Delhi from September 07- September 13, 2020.
- Attended TEQIP-III Sponsored Two week Online International FDP on Multidisciplinary Research Innovation in Engineering, Science and Technology for Sustainable Development, BTKIT, Dwarahat Almora, India, from October 26- November 7, 2020.
- Attended 5 Days TEQIP-III Sponsored FDP on Mathematical and Computational Modeling, Anand International College of Engineering, India, from December 12- December 22, 2020.
- Attended AICTE sponsored 5-Day Online Faculty Development Program on "Examination Reforms",NIT Mizoram, India, from February 15- February 19, 2021.

Sachin Kumar