Dr. Dharmendra Kumar

Professor, Department of Mathematics,
Sri Guru Tegh Bahadur Khalsa College,
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Education

- ➢ PhD. in Mathematics, Department of Mathematics, University of Delhi (August 2021**.**)
- ➢ M.Sc. in Mathematics from Indian Institute of Technology Delhi (IIT Delhi), 2002-2004.
- ➢ B.Sc.(H) in Mathematics from Acharya Narendra Dev College, University of Delhi, 1999-2002

Awards, Distinctions and Fellowships

- Junior Research Fellowship (JRF) - University Grants Commission (UGC), 2004
- NET, University Grants Commission (UGC), 2004

Research Interest /Research Profile

- Evolution equations and Lie Symmetry Analysis
- Epidemic Models
- Dynamical System
- Lyapunov Exponent, Bifurcation Theory

Technical Skills:

- MS Office, MS PowerPoint, MS Excel,
- MAPLE, MATLAB, Mathematica,
- LATEX, Beamer

Innovation Projects from University of Delhi: Inter-disciplinary Approach

Investigator in following three Innovation projects funded by University of Delhi:

Year	Project Code	Title	Amount	Duration
2012-2013	SGTB 102	Conceptualizing Women Sports in the context of Sports Economics and Marketing of Professional Sport in India: Performance Study of Gender based athletes in respect of their Advertising & Promotion Value.	10 lakh	One Year
2013-2014	SGTB 205	Role of Team Sponsorship in Promoting Women Sports: A Case Study Approach to Badminton and Hockey in India	3 lakh	One Year
2015-2016	SGTB 306	Sustainable Tourism in India: A Case Of Kerala Tourism	3.5 lakh	One Year

Books: Reviewed a book, "**Basic Applied Mathematics for the Physical Sciences**" Pearson in 2007

Research papers: (21)

1. Exploring soliton patterns and dynamical analysis of the solitary wave form solutions of the (3+1)-dimensional Wazwaz-Benjamin-Bona-Mahony equation, Modern Physics Letters B, (2025) 2550102
    https://doi.org/10.1142/S0217984925501027, ISSN (print): 0217-9849 | ISSN (online): 1793-6640 (SCI, MathSciNet, Scopus, zbMath)

2. Nisha Sharma, Sumit Kumar Bhatia, Shashank Goel, **Dharmendra Kumar**, Economic impact of epidemics: mathematical model and dynamical analysis, Commun. Math. Biol. Neurosci., 2024:118 (2024)
    https://doi.org/10.28919/cmbn/8854 ISSN: 2052-2541 (ESCI, Scopus)

3. Poonam Jorwal, Mohd. Arif, and **Dharmendra Kumar**, An enormous diversity of soliton solutions to the (2+1)-dimensional extended shallow water wave equation using three analytical methods, International Journal of Modern Physics B, Vol. 38, No. 07, 2450104 (2024),
    https://doi.org/10.1142/S0217979224501042 (MathSciNet, SCI, zbMath, Scopus)

4. Praveen Kumar and **Dharmendra Kumar**, Multi-peak soliton solutions of the generalized breaking soliton equation, Physica Scripta, 97, 105203 (2022)
    https://doi.org/10.1088/1402-4896/ac8b3f (MR, SCOPUS, zbMATH)

5. Sachin Kumar and **Dharmendra Kumar**, Generalised exponential rational function method for obtaining numerous exact soliton solutions to a (3+1)-dimensional Jimbo–Miwa equation, Pramana- Journal of Physics, 95, 152 (2021)
    https://doi.org/10.1007/s12043-021-02174-1 (MR, SCOPUS, zbMATH)

6. Sachin Kumar and **Dharmendra Kumar**, Analytical soliton solutions to the generalized (3+1)-dimensional shallow water wave equation, Modern Physics Letters B, 36, 02, 2150540 (2022)
    https://doi.org/10.1142/S0217984921505400 (MR, SCOPUS, zbMATH)

7. Sachin Kumar, **Dharmendra Kumar** and Abdul-Majid Wazwaz, Lie symmetries, optimal system, group-invariant solutions and dynamical behaviors of solitary wave solutions for a (3+1)-dimensional KdV-type equation, European Physical Journal Plus, 136: 531 (2021)
    https://doi.org/10.1140/epjp/s13360-021-01528-3 (MR, SCOPUS, zbMATH)

8. Sachin Kumar, **Dharmendra Kumar** and Amit Kumar, Lie symmetry analysis for obtaining the abundant exact solutions, optimal system and dynamics of solitons for a higher-dimensional Fokas equation, Chaos Soliton Fractals, 142, 110507 (2021)
    https://doi.org/10.1016/j.chaos.2020.110507 (MR, SCOPUS, zbMATH)

9. Ruchi Arora, **Dharmendra Kumar**, Ishita Jhamb and Avina kaur Narang, Mathematical Modeling of Chikungunya Dynamics: Stability and Simulation, CUBO-A Mathematical Journal, 22(2):177-201 (2020). http://revistas.ufro.cl/ojs/index.php/cubo/article/view/2362 (MR, SCOPUS, zbMATH)

10. Sachin Kumar, **Dharmendra Kumar** and Harsha Kharbanda, Lie symmetry analysis, abundant exact solutions and dynamics of multi-solitons to the (2+1)-dimensional KP-BBM equation, Pramana-Journal of Physics, 95, 33 (2021) https://doi.org/10.1142/S0217979220502215 (**SCI, SCOPUS**) **IF: 2.219**

11. Sachin Kumar and **Dharmendra Kumar**, Lie symmetry analysis and dynamical structures of soliton solutions for the (2 + 1)-dimensional modified CBS equation, International Journal of Modern Physics B, 34, 25, 2050221, (2020) https://doi.org/10.1142/S0217979220502215. (**SCI, SCOPUS**) **IF: 1.219**

12. **Dharmendra Kumar** and Sachin Kumar, Some more solutions of Caudrey-Dodd-Gibbon Equation using optimal system of Lie symmetries. International Journal of Applied and Computational Mathematics, 6:125, 2020. https://doi.org/10.1007/s40819-020-00882-7 (**SCOPUS, zbMATH**)

13. **Dharmendra Kumar** and Sachin Kumar, Solitary wave solutions of pZK equation using Lie point symmetries, European Physical Journal Plus, 135:162, 2020. https://doi.org/10.1140/epjp/s13360-020-00218-w). (**SCI, SCOPUS**) **IF: 3.911**

14. Sachin Kumar, Mukesh Kumar and **Dharmendra Kumar,** Computational soliton solutions to (2+1)-dimensional Pavlov equation using Lie symmetry approach, Pramana-Journal of Physics (Springer), 94(28) 1-11, (2019). https://doi.org/10.1007/s12043-019-1894-0 (**SCI, SCOPUS**) **IF: 2.219**

15. Sachin Kumar**,** A.M. Wazwaz, **Dharmendra Kumar** and Amit Kumar, Group invariant solutions of (2+1)-dimensional rdDym equation using optimal system of Lie subalgebra, *Physica Scripta (IOP)* 94 (2019) 115202. https://doi.org/10.1088/1402-4896/ab2d65 (**SCIE, SCOPUS, MathSciNet**) **IF: 2.487 ISSN: 1402-4896**

16. **Dharmendra Kumar** and Sachin Kumar, Some new periodic solitary wave solutions of (3+1)-dimensional generalized shallow water wave equation by Lie symmetry approach, *Computers & Mathematics with Applications* **78**:857-877 (2019) https://doi.org/10.1016/j.camwa.2019.03.007 (**SCI, SCOPUS, Zbmath**) **IF: 3.476 ISSN: 0898-1221**

17. Sachin Kumar and **Dharmendra Kumar**, Solitary wave solutions of (3+1)-dimensional extended Zakharov–Kuznetsov equation by Lie symmetry approach, *Computer & Mathematics with Applications*, Available online on 18 December 2018, 77:2096–2113 (2019). https://doi.org/10.1016/j.camwa.2018.12.009 (**SCI, SCOPUS, Zbmath**) **IF 3.476 ISSN: 0898-1221**

18. Sachin Kumar and **Dharmendra Kumar**, Group invariant solutions of (3+1)-dimensional generalized B-type Kadomstsev Petviashvili equation using optimal system of Lie subalgebra, Physica Scripta, Available online on 4th Jan 2018, 94:065204 (2019).

19. Sachin Kumar and **Dharmendra Kumar**, Lie symmetry analysis, complex and singular solutions of $(2 + 1)$-dimensional combined MCBS–nMCBS equation, *International Journal of Dynamics and Control, Available online on 24th July 2018, International Journal of Dynamics and Control* (2019) 7:496–509.
https://doi.org/10.1007/s40435-018-0463-6, (**SCOPUS, MR**) ISSN: 2195-2698

20. Dharmendra Kumar and Sachin Kumar, Construction of four dimensional chaotic finance model and its applications, International Journal of Pure and Applied Mathematics, 118(22):1171-1187 (2018).
url: http://acadpubl.eu/hub. ISSN: 1314-3395 (on-line version) (**SCOPUS**)

21. Dharmendra Kumar and Sachin Kumar, Ultimate Numerical Bound Estimation of Chaotic Dynamical Finance Model, Modern Mathematical Methods and High Performance Computing in Science and Technology, Springer Proc. in Mathematics and Statistics 171:71-81 (2016)
https://doi.org/10.1007/978-981-10-1454-3_6 (**SCOPUS**)

Conference and Seminar Attended:

1. Two week faculty development programme (16.08.2021 -31.08.2021)Biostatistical & Mathematical Skills with Excel and R, SGTB Khalsa College, University of Delhi.

2. Online Teacher's Enrichment Workshop on "Differential Equations and its Applications" (15.03.2021 – 28.03.2021), Deshbandhu College, University of Delhi.

3. Online workshop on Research Methodology (06.01.2021-12.01.2021), UGC-Sponsored Workshop, University of Delhi.

4. One week FDP on Global economy, Finance, Industry and Business: Emerging Trends and Challenges (24.02.2021 – 03.03.2021)

5. Participated in the Faculty Enrichment Webinar for Mathematics Teachers in Higher Education organized by NRC for education of NIEPA on March 24, 2021.

6. Presented a paper entitled "Solitary wave solutions of combined KdV-nKdV equation" online in the ICIIIE-2020 (28.08.2020 to 30.08.2020)

7. Pedagogy Workshop on how to teach Programming Basics, conducted from 16.12.2020 to 06.01.2021, IIT Bombay.

8. INDIA TOP CITED PAPER AWARD 2021, IOP Publishing

9. Progress Report Ph.D. June 2019.

10. Certificate for Mini Symposium in Mathematics, presented work on **Lie Symmetry analysis on nonlinear Partial Differential equations,** DDU College, University of Delhi.

11. Certificate of presenter in National Conference on Complex Systems in Interdisciplinary Sciences, 11-12th March 2019, Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia, New Delhi-110025

12. Certificate of ILLL Workshop Tier II 11th Jan – 20th Jan 2010.

13. Certificate of Workshop participated in one day workshop on "MATHEMATICA" at South

Campus, University of Delhi. 8th December, 2010

14. 20th to 24th December, 2010 participated in the National Workshop on "Differential Equations, Computing and Modeling", at Department of Mathematics, University of Delhi, Delhi -110007

15. 06th to 10th June, 2011, attended a Training Course on SPSS at Delhi University Computer Center, University of Delhi, Delhi-110007

16. January 9-12, 2008, International Conference on Operator Theory and Related Areas, Department of Mathematics, University of Delhi, Delhi-110007

17. November, 2008, examination for CT3 – Probability and Mathematical Statistics passed organized by Institute of Actuaries of India.

18. Presented a paper on Mathematical tools of Asymmetric Cryptography at International Conference on Recent Trend in Mathematics and its Applications in Jamia Millia Islamia, Delhi

Teaching Experience
- **6 years on July 2024**: Associate Professor in Mathematics, Sri Guru Tegh Bahadur Khalsa College, University of Delhi.
- **12 year on 31st Aug 2018**: Assistant Professor in Mathematics, Sri Guru Tegh Bahadur Khalsa College, University of Delhi (Permanent since 17 July, 2006)

- **82 days**: Lecturer in Mathematics, Dyal Singh College, University of Delhi, New Delhi, (Ad-hoc- 07.02.2006 to 30.04.2006).

- **136 days**: Lecturer in Mathematics, Hindu College, University of Delhi, New Delhi, (Ad-hoc- July, 27.07.2005 to26.11.2005, and 29.11.2005 to 13.12.2005).

References
- Prof. Venugopalan T., SGTB Khalsa College, University of Delhi, New Delhi-110007 venugopalan@sgtbkhalsa.du.ac.in
- Prof. Ayub Khan, Department of Mathematics, Jamia Millia Islamia, A Central University, New Delhi, 110025. khanayubdu@yahoo.co.in, akhan12@jmi.ac.in
- Dr. Sachin Kumar, Department of Mathematics, University of Delhi, Delhi - 110007 sachinambariya@gmail.com