Curriculum Vitae

Dr. Rajesh Kumar Gupta

Associate Professor

Department of Mathematics

School of Basic Sciences

Central University of Haryana,

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Google Scholar: https://scholar.google.co.in/citations?user=wZY_CukAAAAJ&hl=en

Educational Qualifications/ Academic Achievements

- **Ph.D. (Mathematics)** from Jaypee University of Information Technology, Waknaghat, Solan (H.P.) in 2007

  Title of the Thesis: Lie Symmetries and Exact Solutions of Some Nonlinear Partial Differential Equations

  Supervisor: Prof. Karanjeet Singh

- CSIR- UGC Junior Research Fellowship (**JRF**) and Eligibility for Lectureship National Eligibility Test (**NET**) in Mathematical Sciences held on July 1, 2001

- **GATE** (Graduate Aptitude Test in Engineering) examination conducted by Indian Institute of Technology, Kanpur with **88.25** percentile in 2001

- **M.Sc. (Applied Mathematics)** from Guru Jambheshwar University, Hisar, Haryana in 2001 with 64.13 % marks

- **B.Sc. (Non-Medical)** from Maharshi Dayanand University, Rohtak, Haryana in 1999 with 64.07 % marks

- **Senior Secondary (Non-Medical)** from Board of School Education, Haryana in 1996 with 60.25 % marks

- **Matriculation** from Board of School Education, Haryana in 1994 with 73.75% marks

Teaching Experience (Graduate/ Postgraduate)

- Working as an Associate Professor (Mathematics) in Department of Mathematics at **Central University of Haryana**, Mahendergarh since November 01, 2018

- Worked as an Associate Professor (Mathematics) in Centre for Mathematics & Statistics at **Central University of Punjab**, Bathinda since December 28, 2015 to October 31, 2018

- Worked as an Assistant Professor (Mathematics) in School of Mathematics & Computer Applications at **Thapar University**, Patiala since June 13, 2007 to December 28, 2015

- Worked as a Lecturer in Mathematics at **Institute of Technology & Management (ITM),** Gurgaon, since July 15, 2005 to May 31, 2007

Awards/Honors

- **Best Research Award** by Central University of Haryana, Mahendergarh, 2020

- **UGC Research Award** by University Grants Commission (UGC), New Delhi for the period 2016-2018

- Listed in **Marquis Who's Who**, 2014, 2015, 2018

- Selected for official **2018 Albert Nelson Marquis Lifetime Achievement Award** by **Marquis Who's Who**

- *The Cambridge Certificate* for Outstanding Scientific Achievement by International Biographical Centre, Cambridge, England 2016.

- *Great Men and Women of Science* by International Biographical Centre 2015.

- Awarded **PIS** (**Performance Incentive Scheme**) for five consecutive years (2009-2013) at Thapar University, Patiala for the academic excellence (teaching and research)

Sponsored Research Projects (Completed/ Ongoing)

Projects Types: Theoretical research

Number of Completed Research Project: 02

Number of Ongoing Research Project: 01

- **Project Title:** Symmetry Analysis and Exact Solutions of Some Nonlinear Systems from Mathematical Physics

  Grant No. : F. 30-105/2016 (SA-II)

  Duration: 01.06.2016 to 31.05.2018

  Funding Agency: University Grants Commission (UGC), New Delhi

  Project Grant: 3 Lacs Contingency + 2 Years' Salary

  Status: Completed

- **Project Title:** Applications of Group Theoretic Techniques to Some Nonlinear Systems from Mathematical Physics

  Grant No. : 25(0257)/16/EMR-II

  Duration: 01.10.2016 to 31.09.2019

  Funding Agency: Council of Scientific and Industrial Research (CSIR), New Delhi

  Project Grant: 16.96 Lacs

  Status: Completed

- **Project Title:** Lie Symmetry Analysis and Exact Solutions of Some Einstein Field Equations

  Grant No. : 2/48(16)/2016/NBHM (R.P.)/R&D II/14982

  Duration: 10.11.2016 to 09.11.2019

  Funding Agency: National Board for Higher Mathematics (NBHM), Department of Atomic Energy, Mumbai

  Project Grant: 14.14 Lacs

  Status: Ongoing

Other Grants/Financial Assistance (Completed/ Ongoing)

- Received **Financial Assistance from SERB-DST and CSIR for International Conference** on Trends in Computational and Cognitive Engineering (TCCE 2019), jointly organized by School of Engineering and Technology and Department of Mathematics, Central University of Haryana during November 28-30, 2019.

  File No. : SSY/2019/000997

  Funding Agency: Science & Engineering Research Board (SERB), DST, New Delhi

  Grant: 75,000

  File No. : SYM/10383/19-HRD

  Funding Agency: Council of Scientific and Industrial Research (CSIR), New Delhi

  Grant: 50,000

Ph.D. Theses Supervision

Completed: 10

- Dr. Sachin Kumar (July 19, 2012):
  Thesis Title: Symmetries and Exact Solutions of Nonlinear Partial Differential Equations (Jointly guided with Dr. Karanjeet Singh)
  Current Placement: Assistant Professor (Regular), Central University of Punjab, Bhatinda, Punjab

- Dr. Nisha Goyal (October 17, 2012):
  Thesis Title: Symmetries and Exact Solutions of Einstein Vacuum Field Equations and Einstein-Maxwell Equations
  Current Placement: Dr. D.S. Kothari Post-Doctoral Fellow (MA/15-16/0011), Punjab University, Chandigarh

- Dr. Anupma (April 11, 2013):
  Thesis Title: Lie Group Applications to Some Nonlinear Systems
  Current Placement: Assistant Professor (Regular), D.A.V. College for Women, Ferozepur, Punjab.

- Dr. Lakhveer Kaur (November 13, 2013):
  Thesis Title: Group Theoretic Techniques for Solutions of Einstein Equations
  Current Placement: Assistant Professor (Regular, Grade-1), Jaypee Institute of Information Technology, Noida, U.P.

- Dr. Vikas Kumar (November 22, 2014):
  Thesis Title: Exact and Numerical Solutions of Some Nonlinear Partial Differential Equations (Jointly guided with Dr. Ramjiwari)
  Current Placement: Assistant Professor (Regular), D.A.V. College, Pundari, Kaithal, Haryana

- Dr. Rajeev (January 1, 2016):
  Thesis Title: Group Theoretic Techniques and Their Applications to Some Nonlinear Systems (Jointly guided with Dr. S.S. Bhatia)
  Current Placement: Assistant Professor (Regular), Maharishi Markandeshwar University, Mullana, Ambala, Haryana

- Dr. Komal Singla (November 1, 2017):
  Thesis Title: Symmetry Analysis of Nonlinear Fractional Partial Differential Equations
  Current Placement: Research Associate, Thapar University, Patiala, Punjab

- Dr. Manjit Singh (October 26, 2018):
  Thesis Title: Exact Solutions and Painlev´e Analysis of Some Nonlinear Partial Differential Equations
  Current Placement: Associate Professor, Yadavindra College of Engineering, Punjabi University Guru Kashi Campus, Talwandi Sabo, Punjab

- Dr. Ram Paul Hathwal (June 19, 2019)
  Thesis Title: Efficient Algorithms for Image Denoising using Wavelets (Jointly with Dr. Singara Singh)
  Current Placement: Assistant Professor, Department of Computer Science and Engineering, Amity School of Engineering and Technology, Delhi

- Mrs. Bikramjeet Kaur (July 17, 2020)
  Thesis Title: Symmetry Analysis and Conservation Laws for Some Systems of Nonlinear Partial Differential Equations
  Current Placement: Assistant Professor (Ad-hoc), Department of Mathematics, Khalsa College, Amritsar, Punjab

Ongoing: 04

- Ms. Pinki Kumari: Invariant Analysis and Conservation Laws to Some Nonlinear Mathematical Models

- Mr. Manish Kumar, Applications of Group Theoretic Techniques to Some Nonlinear Fractional Differential Equations

- Mr. Manjeet, Exact Solutions and Painlevé Analysis of Some Nonlinear Systems from Mathematical Physics

- Mr. Vikash Yadav, Symmetry Analysis and Conservation Laws of Some Fractional Partial Differential Equations

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List of Research Papers (Journals) (TIF – 124.093)

1. K. Singh and **R. K. Gupta**, On symmetries and invariant solutions of a coupled KdV system with variable coefficients, *International Journal of Mathematics and Mathematical Sciences* 23 (2005) 3711-3726, Scopus

2. K. Singh and **R. K. Gupta**, Lie symmetries and exact solutions of a new generalized Hirota-Satsuma coupled KdV system with variable coefficients, *International Journal of Engineering Science* 44 (2006) 241-255. **(Impact Factor 9.052),** Scopus

3. K. Singh and **R. K. Gupta**, Exact solutions of a variant Boussinesq system, *International Journal of Engineering Science* 44 (2006) 1256-1268. **(Impact Factor 9.052),** Scopus

4. **R. K. Gupta** and K. Singh, Modified Boussinesq system with variable coefficients: classical Lie approach and exact solutions, *Journal of Partial Differential Equations* 22 (2009) 97-110.

5. **R. K. Gupta** and Anupma, The Dullin-Gottwald-Holm Equation: Classical Lie Approach and Exact Solutions, *International Journal of Nonlinear Science* 10(2) (2010) 146 - 152.

6. K. Singh, **R. K. Gupta** and Sachin Kumar, Benjamin-Bona-Mahony (BBM) equation with variable coefficients: similarity reductions and Painlevé analysis, *Applied Mathematics and Computation* 217 (2011) 7021-7027. **(Impact Factor 3.092),** Scopus

7. **R. K. Gupta** and K. Singh, Symmetry analysis and some exact solutions of cylindrically symmetric null fields in general relativity, *Communications in Nonlinear Science and Numerical Simulation* 16 (2011) 4189-4196. **(Impact Factor 3.967),** Scopus

8. K. Singh, **R. K. Gupta** and Sachin Kumar, "Exact Solutions of b-family Equation: Classical Lie Approach and Direct Method", *International Journal of Nonlinear Science* 11 (1) (2011) 59-67.

9. **R.K. Gupta** S.S. Bhatia and Rajeev, "New Exact Traveling Wave Solutions to the Ostrovsky Equations", *International Journal of Applied Mathematics and Mechanics* 2 (1-2) (2011) 27-33.

10. Sachin Kumar, K. Singh and **R. K. Gupta**, Painlevé analysis, Lie symmetries and exact solutions for (2+1) dimensional variable coefficients Broer-Kaup equations, *Communications in Nonlinear Science and Numerical Simulation* 17 (2012) 1529-1541. **(Impact Factor 3.967),** Scopus

11. Nisha Goyal and **R. K. Gupta**, A class of exact solutions of Einstein field equations, *Physica Scripta* 85 (2012) 055011 (6pp). **(Impact Factor 2.151),** Scopus

12. Nisha Goyal and **R. K. Gupta**, New exact solutions of Einstein-Maxwell equations for magnetostatic fields, *Chinese Physics B* 21 (2012) 090401-6. **(Impact Factor 1.293),** Scopus

13. Nisha Goyal and **R. K. Gupta**, "On Symmetries and Exact Solutions of Einstein Vacuum Equations for Axially Symmetric Gravitational Fields", *International Journal of Mathematical, Computational, Physical, Electrical and Computer Engineering* 6(8) (2012) 838-841.

14. Anupma Bansal and **R. K. Gupta,** "On Symmetry Analysis and Exact Wave Solutions of New Modified Novikov Equation", *International Journal of Mathematical, Computational, Physical, Electrical and Computer Engineering*, 6(8) (2012) 1173-1180.

15. Nisha Goyal and **R. K. Gupta**, Traveling wave solutions for the Sawada-Kotera-Kadomtsev-Petviashivili equation and Bogoyavlensky-Konoplechenko equation by (G'/G)-expansion method, *International Journal of Mathematical, Computational, Physical, Electrical and Computer Engineering* 6(8) (2012) 1198-1202.

16. Anupma Bansal and **R. K. Gupta**, "On Certain New Exact Solutions of (2+1)-Dimensional Calogero Degasperis Equation via Symmetry Approach" *International Journal of Nonlinear Science* 13 (4) (2012) 475-481**.**

17. Sachin Kumar, K. Singh and **R. K. Gupta**, Coupled Higgs field equation and Hamiltonian amplitude equation: Lie classical approach and (G'/G)-expansion method, *Pramana-Journal of Physics* 79 (2012) 41-60. **(Impact Factor 1.185),** Scopus

18. Anupma Bansal and **R.K. Gupta,** Lie point symmetries and similarity solutions of the time dependent coefficients Calogero Degasperis equation, *Physica Scripta* 86 (2012) 035005. **(Impact Factor 2.151)**, Scopus

19. Nisha Goyal and **R. K. Gupta**, Symmetries and exact solutions of the nondiagonal Einstein-Rosen metrics, *Physica Scripta* 85 (2012) 015004 (6pp)**. (Impact Factor 2.151),** Scopus

20. Rajeev, **R.K. Gupta** and S. S. Bhatia, The new generalized (G'/G) - expansion method for solving (2+1) dimensional PKP equation, *International Journal of Nonlinear Science* 14 (1) (2012) 48-52.

21. Anupma Bansal and **R. K. Gupta**, Modified (G'/G)-expansion method for finding exact wave solutions of the coupled Klein-Gordon- Schrödinger equation, *Mathematical Methods in the Applied Sciences* 35 (10) (2012) 1175-1187**. (Impact Factor 1.533),** Scopus

22. **R. K. Gupta,** Sachin Kumar and Bhajan Lal, New exact travelling wave solutions of generalised sinh-Gordon and (2 + 1)-dimensional ZK-BBM equations, *Maejo International Journal of Science and Technology* ,6 (2012) 344-355. **(Impact Factor 0.469),** Scopus

23. **R. K. Gupta** and Anupma Bansal, Similarity reductions and exact solutions of generalized Bretherton equation with time dependent coefficients, *Nonlinear Dynamics* 71 (2013) 1-12. **(Impact Factor 4.604),** Scopus

24. Lakhveer Kaur and **R. K. Gupta**, Kawahara equation and modified Kawahara equation with time dependent coefficients: symmetry analysis and generalized G'/G-expansion method, *Mathematical Methods in the Applied Sciences* 36 (2013) 584-600**. (Impact Factor 1.533),** Scopus

25. **R.K. Gupta** and Anupma Bansal, Painlevé analysis, Lie symmetries and invariant solutions of potential Kadomstev Petviashvili equation with time dependent coefficients, *Applied Mathematics and Computation* 219 (2013) 5290-5302. **(Impact Factor 3.092),** Scopus

26. Lakhveer Kaur and **R. K. Gupta**, Painlevé analysis, similarity reductions and exact solutions of the Kuramoto-Sivashinsky equation with variable coefficients, *International Journal of Nonlinear Sciences* 15 (2) (2013) 139-149.

27. Lakhveer Kaur and **R. K. Gupta**, On symmetries and exact solutions of Einstein Maxwell field equations via symmetry approach, *Physica Scripta* 87 (2013) 035003. **(Impact Factor 2.151),** Scopus

28. Vikas Kumar, **R. K. Gupta** and Ram Jiwari, Comparative study of travelling wave and numerical solutions for the coupled short pulse (CSP) equation, *Chinese Physics B* 22(5) (2013) 050201. **(Impact Factor 1.293),** Scopus

29. Lakhveer Kaur and **R. K. Gupta**, Symmetries and exact solutions of Einstein field equations for perfect fluid distribution and pure radiation fields, *Maejo International Journal of Science and Technology* 7 (2013) 133-144. **(Impact Factor 0.469),** Scopus

30. Vikas Kumar, Ram Jiwari and **R. K. Gupta**, Numerical simulation of two dimensional quasilinear hyperbolic equations by polynomial differential quadrature method, *Engineering Computations* 30 (2013) 892-909. **(Impact Factor 1.177),** Scopus

31. Vikas Kumar, **R. K. Gupta** and Ram Jiwari**,** Painlevé analysis, Lie symmetries and exact solutions for variable coefficients Benjamin-Bona-Mahony-Burger (BBMB) equation, *Communications in Theoretical Physics* 60 (2013) 175-182. **(Impact Factor 1.416)**, Scopus

32. Lakhveer Kaur and **R. K. Gupta**, On certain new exact solutions of Einstein equations for axisymmetric rotating fields, *Chinese Physics B* 22 (2013) 100203-100208. **(Impact Factor 1.293)**, Scopus

33. Sachin Kumar, K. Singh and **R. K. Gupta,** Dynamics of internal waves in a stratified ocean modeled by the extended Gardner equation with time-dependent coefficients, *Ocean Engineering* 70 (2013) 81-87. **(Impact Factor 2.730),** Scopus

34. Vikas Kumar, **R. K. Gupta**, and Ram Jiwari, Lie group analysis, numerical and non-traveling wave solutions for the (2+1)-dimensional diffusion–advection equation with variable coefficient, *Chinese Physics B* 23 (2014) 030201. **(Impact Factor 1.293),** Scopus

35. Lakhveer Kaur and **R. K. Gupta**, Some invariant solutions of field equations with axial symmetry for empty space containing an electrostatic field, *Applied Mathematics and Computation* 231 (2014) 560-565. **(Impact Factor 3.092),** Scopus

36. Rajeev, **R.K. Gupta** and S. S. Bhatia, Lie symmetry analysis and exact solutions for a variable coefficient generalized Kuramoto-Sivashinsky equation, *Romanian Reports in Physics* 66 (2014) 923-928. (**Impact Factor 1.940)**

37. Rajeev, **R.K. Gupta** and S. S. Bhatia, Symmetry analysis and some solutions of Gowdy equation, *Romanian Journal of Physics* 60 (2015) 15-21. (**Impact Factor 1.460),** Scopus

38. Ram Jiwari, **R. K. Gupta** and Vikas Kumar, Polynomial differential quadrature method for numerical solutions of the generalized Fitzhugh-Nagumo equation with time-dependent coefficients, *Ain Shams Engineering Journal* 5 (2014) 1343-1350 (**Impact Factor 3.091),** Scopus

39. **R. K. Gupta,** Vikas Kumar, and Ram Jiwari, Exact and numerical solutions of coupled short pulse equation with time dependent coefficients, *Nonlinear Dynamics* 79 (2015) 455-464. (**Impact Factor 4.604),** Scopus

40. Rajeev, **R.K. Gupta** and S. S. Bhatia, Painlevé analysis and some solutions of variable coefficients Benny equation, *Pramana-Journal of Physics* 85 (2015) 1111-1122. (**Impact Factor 1.185),** Scopus

41. Manjit Singh and **R. K. Gupta,** Explicit exact solutions for variable coefficient Broer–Kaup equations**,** *Computational Methods for Differential Equations* 3 (2015) 192-199.

42. Nisha Goyal, A.M. Wazwaz and **R. K. Gupta,** Applications of MAPLE software to derive exact solutions of generalized fifth – order Korteweg – de Vries equation with time- dependent coefficients, *Romanian Reports in Physics* 68 (2016) 99-111. (**Impact Factor 1.940)**

43. Ram Paul Hathwal, **Rajesh Kumar Gupta** and Singara Singh Kasana, Performance analysis of impulse denoising techniques in magnetic resonance imaging, *International Journal of Computer Applications* 136 (2016) 17-22.

44. Rajeev, **R.K. Gupta** and S. S. Bhatia, Invariant solutions of variable coefficients generalized Gardner equation, *Nonlinear Dynamics* 83 (2016) 2103-2111. (**Impact Factor 4.604),** Scopus

45. Manjit Singh and **R. K. Gupta**, Bäcklund transformations, Lax system, conservation laws and multisoliton solutions for Jimbo–Miwa equation with bell-polynomials, *Communications in Nonlinear Science and Numerical Simulation* 37 (2016) 362-373. (**Impact Factor 3.967),** Scopus

46. Manjit Singh and **R. K. Gupta**, Exact solutions for nonlinear evolution equations using novel test function, *Nonlinear Dynamics* 86 (2016) 1171-1182. **(Impact Factor 4.604),** Scopus

47. Komal Singla and **R. K. Gupta**, On invariant analysis of some time fractional nonlinear systems of partial differential equations. I, *Journal of Mathematical Physics* 57 (2016) 101504 (1-14). **(Impact Factor 1.355)**

48. **R. K. Gupta** and Manjit Singh, Nonclassical symmetries and similarity solutions of variable coefficient coupled KdV system using compatibility method, *Nonlinear Dynamics* 87 (2017) 1543-1552. **(Impact Factor 4.604)** , Scopus

49. Manjit Singh and **R. K. Gupta,** Soliton and quasi-periodic wave solutions for B-type Kadomtsev-Petviashvili equation, *Indian Journal of Physics*, 91 (2017) 1345-1354 **(Impact Factor 1.242),** Scopus

50. Komal Singla and **R. K. Gupta,** Space-time fractional partial differential equations: symmetry analysis and conservation laws, *Nonlinear Dynamics,* 89 (2017) 321-331. **(Impact Factor 4.604)**

51. **R. K. Gupta** and Manjit Singh**,** On group classification and nonlocal conservation laws for a multi phase flow model, *International Journal of Applied and Computational Mathematics*, 3 (2017) 3925-3935**.**

52. Komal Singla and **R. K. Gupta**, On invariant analysis of space-time fractional partial differential equations. II, *Journal of Mathematical Physics*, 58 (2017) 051503 (1-11). **(Impact Factor 1.355)**

53. Komal Singla and **R. K. Gupta**, Generalized Lie symmetry approach for nonlinear systems of fractional differential equations. III, *Journal of Mathematical Physics*, 58 (2017) 061501 (1-14). **(Impact Factor 1.355)**

54. Komal Singla and **R. K. Gupta**, Comments on "Lie symmetries and group classification of a class of time fractional evolution systems", *Journal of Mathematical Physics*, 58 (2017) 054101 (1-5) **(Impact Factor 1.355)**

55. Komal Singla and **R. K. Gupta**, Conservation laws for certain time fractional nonlinear systems of partial differential equations, *Communications in Nonlinear Science and Numerical Simulation* 53 (2017) 10-21. **(Impact Factor 3.964),** Scopus

56. Manjit Singh and **R. K. Gupta,** On Painlevé analysis, symmetry group and conservation laws of Date–Jimbo–Kashiwara–Miwa equation, *International Journal of Applied and Computational Mathematics*, 4 (2018) 88-102**,** Scopus

57. **R. K. Gupta** and Komal Singla, Symmetry analysis of variable coefficient time fractional systems of partial differential equations, *Theoretical and Mathematical Physics*, 197 (2018) 1737-1754. (**Impact Factor 0.901),** Scopus

58. Ram Paul, Singara Singh Kasana and **Rajesh Kumar Gupta,** An edge-preserving adaptive image denoising using discrete wavelet transform, *International Journal of Imaging and Robotics* 18 (2018) 155-164 (Scopus Indexed).

59. Bikramjeet Kaur and **R. K. Gupta**, Invariance properties, conservation laws and soliton solutions of the time fractional (2+1)-dimensional new coupled ZK system in magnetized dusty plasmas, *Computational and Applied Mathematics* 37 (2018) 5981-6004. (**Impact Factor 1.260)**

60. Manjit Singh and **R. K. Gupta**, Explicit exact solutions for variable coefficient Gardner equation: An application of Riccati equation mapping method, *International Journal of Applied and Computational Mathematics*, 4 (2018) 114-120**,** Scopus

61. Ram Paul, Singara Singh Kasana, and **Rajesh Kumar Gupta**, Performance analysis of adaptive image denoising techniques for different levels of wavelet decompositions using orthogonal and compactly supported wavelet families, *International Journal of Engineering and Applied Sciences,* 5 (2018) 51-58

62. Ram Paul, Singara Singh Kasana, and **Rajesh Kumar Gupta**, Efficient edge-preserving adaptive image denoising using morphological operations in wavelet domain, *International Journal of Applied Engineering Research* 13 (2018) 12941-12949. (Scopus indexed)

63. Manjit Singh and **R. K. Gupta,** Group classification, conservation laws and Painleve analysis for Klein-Gordon-Zakharov equations in (3+1)-dimension, *Pramana-Journal of Physics* 92 (2019) 1 -11 (**Impact Factor 1.185),** Scopus

64. **R. K. Gupta** and Manjit Singh**,** On invariant analysis and conservation laws for degenerate coupled multi-KdV equations for multiplicity $l = 3$, *Pramana-Journal of Physics* 92 (2019) 70-79 (**Impact Factor 1.185),** Scopus

65. Bikramjeet Kaur and **R. K. Gupta**, Dispersion analysis and improved F-expansion method for space-time fractional differential equations, *Nonlinear Dynamics* 96 (2019) 837- 852 (**Impact Factor 4.604),** Scopus

66. Bikramjeet Kaur and **R. K. Gupta**, Multiple types of exact solutions and conservation laws of new coupled (2+1)-dimensional Zakharov–Kuznetsov system with time

dependent coefficients, *Pramana-Journal of Physics* 93 (2019) 59 **(Impact Factor 1.185),** Scopus

67. **Rajesh Kumar Gupta** and Jaskiran Kaur, On explicit exact solutions of variable coefficient time fractional generalized fifth-order Korteweg-de Vries equation, *The European Physical Journal* Plus 134 (2019) 291 **(Impact Factor 2.612),** Scopus

68. Bikramjeet Kaur and **R. K. Gupta,** Time fractional (2+1)-dimensional Wu–Zhang system: Dispersion analysis, similarity reductions, conservation laws, and exact solutions, *Computers & Mathematics with Applications* 79 (2020) 1031 - 1048 **(Impact Factor 2.811)**

69. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, Abundant solutions of certain nonlinear evolution equations arising in shallow water waves, *Advances in Mathematics: Scientific Journal* 9(4) (2020) 1795–1801

70. Jaskiran Kaur, **Rajesh Kumar Gupta** and Sachin Kumar, Comment on "on the conservation laws and invariant analysis for time-fractional coupled Fitzhugh-Nagumo equations using the Lie symmetry analysis" by S. Sahoo and S. S. Ray, *The European Physical Journal* Plus 135 (2020) 166 **(Impact Factor 2.612),** Scopus

71. Jaskiran Kaur, **Rajesh Kumar Gupta** and Sachin Kumar, On explicit exact solutions and conservation laws for time fractional variable - coefficient coupled Burger's equations, *Communications in Nonlinear Science and Numerical Simulation* 83 (2020) 105108 **(Impact Factor 3.967),** Scopus

72. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, On new symmetry, series solution and conservation laws of nonlinear coupled Higgs field equation, *The European Physical Journal* Plus 135 (2020) 476 **(Impact Factor 2.612),** Scopus

73. Divya Jyoti, Sachin Kumar and **Rajesh Kumar Gupta**, Exact solutions of Einstein field equations in perfect fluid distribution using Lie symmetry method, *The European Physical Journal* Plus 135 (2020) 604 **(Impact Factor 2.612),** Scopus

74. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, The time fractional D(m,n) system: Invariant analysis, explicit solution, conservation laws and optical soliton, *Waves in Random and Complex Media* 17455030 (2020) 1821122 **(Impact Factor 3.330),** Scopus

75. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, Symmetry reductions and conservation laws of Rosenau Hyman equation with arbitrary constant coefficients, *AIP Conference Proceedings* 2253 (2020) 020002 **(Impact Factor 0.40),** Scopus

76. Pinki Kumari, **R. K. Gupta** and Sachin Kumar and Maysaa Mohamed Al Qurashi, Erratum to "Conserved vectors with conformable derivative for certain systems of partial differential equations with physical applications", *Open Physics* 18 (2020) 1108–1110 **(Impact Factor 0.963),** Scopus

77. Komal Singla and **R. K. Gupta**, Symmetry Classification and Exact Solutions of (3+1)-dimensional Fractional Nonlinear Incompressible Non-Hydrostatic Coupled Boussinesq Equations, *Journal of Mathematical Physics* 62 (2021) 011504, **(Impact Factor 1.355)**

78. Manjit Singh and **R. K. Gupta,** A note on optimal systems of certain low dimensional Lie algebras, *International Journal of Nonlinear Sciences and Numerical Simulation (IJNSNS)* 22 (2021) 135-144 **(Impact Factor 1.467),** Scopus

79. Bikramjeet Kaur and **R. K. Gupta,** Dispersion and fractional Lie group analysis of time fractional equation from Burgers hierarchy, *Journal of Applied Analysis and Computation* 11 (2021) 1 - 22 **(Impact Factor 1.573)**

80. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, Non-auto-Bäcklund transformation and novel abundant explicit exact solutions of the variable coefficients Burger equation, *Chaos, Solitons and Fractals* 145 (2021) 110775 - 110778 (**Impact Factor 3.764),** Scopus

81. Sachin Kumar, **R. K. Gupta** and Pinki Kumari, A new Painleve integrable Broer-Kaup system: Symmetry analysis, analytic solutions and conservation laws, *International Journal of Numerical Methods for Heat and Fluid Flow* **Accepted** (**Impact Factor 2.871),** Scopus

82. Jaskiran Kaur, R. K. Gupta & Sachin Kumar, Conservation laws and series solutions of variable coefficient time fractional Kawahara equation, Waves in Random and Complex Media, DOI: 10.1080/17455030.2021.1912850 **Accepted (Impact Factor 3.330),** Scopus

83. Radhika, **R. K. Gupta** and Sachin Kumar, On New Symmetries and Exact Solutions of Einstein's Field Equation for Perfect Fluid Distribution, *Pramana-Journal of Physics* **Accepted (Impact Factor 1.185),** Scopus

84. Balzider Kaur, R. K. Gupta & Sachin Kumar, Dispersion analysis and soliton solution of space- time fractional Bi-Hamiltonian Boussinesq system, Chinese Journal of Physics **Accepted (Impact Factor 3.237),** Scopus

85. Bikramjeet Kaur and **R. K. Gupta**, On symmetries and conservation laws of Einstein-Maxwell equations for non-static cylindrical symmetric metric, *International Journal of Applied and Computational Mathematics*, **Accepted,** Scopus

86.

Research Papers (International Conference)

1. K. Singh and **R. K. Gupta,** Explicit exact solutions of a non-evolution equation, *Interdisciplinary Mathematics on Interdisciplinary Mathematical and Techniques (IMST 2009 – FIM XVIII)*, August 2-4, 2009, Department of Mathematics, Jaypee University of Information Technology, Waknaghat, Solan (H.P.).

2. **R. K. Gupta** and Sachin Kumar, Modified *b*-equation: classical Lie approach and exact solution, *Interdisciplinary Mathematics on Interdisciplinary Mathematical and Techniques (IMST 2009 – FIM XVIII)*, August 2-4, 2009. Department of Mathematics, Jaypee University of Information Technology, Waknaghat, Solan (H.P.).

3. K. Singh, **R. K. Gupta**, Sachin Kumar, and Anupma, Symmetry reductions and exact solutions of modified b-family, *Satellite Conference of International Congress of Mathematicians 2010 on Mathematics in Science & Technology*, August 14-17, 2010. Published in *Indian Journal of Industrial and Applied Mathematics* 4 (2013) 52-60.

4. **R. K. Gupta**, Sachin Kumar, and Anupma, Symmetries and exact solutions of third order partial differential equations arising in the impulsive motion of flat plate, *Satellite Conference of International Congress of Mathematicians 2010 on Mathematics in Science & Technology*, August 14-17, 2010. Published in *Indian Journal of Industrial and Applied Mathematics*, 3 (2012) 13-21.

5. Nisha Goyal and **R. K. Gupta**, Similarity analysis and new exact solutions of the Einstein-Maxwell equations for the non-static Einstein and Rosen metrics, *Proceedings of International Conference on Mathematics and Statistics-2012 (ICOMAS-2012)*, May 15-18, 2012, Department of Mathematics, University of Memphis, Memphis, TN, USA

6. Nisha Goyal and **R. K. Gupta,** Traveling wave solutions for the Kadomtsev-Petviashivili-Benjamin-Bona-Mahony equation and the Ito equations by (G'/G)-expansion method, *Proceedings of International Conference on Emerging Trends in*

Engineering and Management (ICETEM-2012), Satpriya Group of Institutions, Rohtak (Haryana), June 23-24, 2012, pp. 423-428. ISBN: 978-981-07-2631-7 doi:10.3850/978-981-07-2631-7 P059

7. Anupma and **R. K. Gupta**, Construction of new traveling wave solutions of Ostrovsky-Benjamin-Bona-Mahony equation using modified extended tanh-function method, *Proceedings of the International Conference on Emerging Trends in Engineering and Management* (ICETEM-2012), Satpriya Group of Institutions, Rohtak (Haryana), June 23-24, 2012, pp. 420-423. ISBN: 978-981-07-2631-7 doi:10.3850/978-981-07-2631-7 P059

8. Bikramjeet Kaur and **R. K. Gupta**, Explicit exact solutions and conservation laws of generalized seventh order KdV equation with time dependent coefficients, *Proceeding of International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019)*, November 28-30, 2019, School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana). Published in *Advances in Intelligent Systems and Computing,* Volume 1169, pp 245-256

9. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, On invariant analysis, symmetry reduction and conservation laws of nonlinear Buckmaster model, *Proceeding of International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019)*, November 28-30, 2019, School of Engineering & Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana). Published in *Advances in Intelligent Systems and Computing,* Volume 1169, pp 129-138

10. Jaskiran Kaur, **Rajesh Kumar Gupta** and Sachin Kumar, Invariant analysis for space time fractional three-field Kaup-Boussinesq equations, *Proceeding of International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019)*, November 28-30, 2019, School of Engineering & Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana). Published in *Advances in Intelligent Systems and Computing,* Volume 1169, pp 335-344

11. Radhika, **R. K. Gupta** and Sachin Kumar, Conservation Laws of Einstein's Field Equations for Pure Radiation Fields, *Proceeding of International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019)*, November 28-30, 2019, School of Engineering & Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana). Published in *Advances in Intelligent Systems and Computing,* Volume 1169, pp 327-334

12. Komal Singla and **R. K. Gupta**, Exact series solutions and conservation laws of time fractional three coupled KdV system, *Proceeding of International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019)*, November 28-30, 2019, School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana). Published in *Advances in Intelligent Systems and Computing,* Volume 1169, pp 15-26

13. Pinki Kumari, **R. K. Gupta** and Sachin Kumar, Painlevé integrability and multisoliton solutions of a generalized KdV system, *International Conference on Applied Mathematics and Numerical Methods (ICAMNM) – 3rd edition*, October 29-31, 2020, Craiova, Romania organized (**online**) by the Department of Applied Mathematics, Published in ITM Web of Conferences 34, 03008 (2020).

14. 14.

Books/Chapters & Lab Manuals

▪ **Rajesh Kumar Gupta,** *Numerical Methods: Fundamentals and Applications,* 1st edition, Cambridge University Press, 2019.

   ISBN-13: 978-1-108-71600-0

▪ R Kumar, A Bansal and **R K Gupta**, Some Solutions of Generalised Variable Coefficients KdV Equation by Classical Lie Approach, pp 309-319, In: Applied Analysis in Biological and Physical Sciences, Springer, December 2016, ISBN 978-81-322-3640-5

▪ **Rajesh Gupta**, "Symmetries and Exact Solutions for Nonlinear Systems: Variable Coefficients KdV and Boussinesq Systems", Lambert Academic Publishing, April 2012, ISBN 978-3-8484-2756-7

▪ **Rajesh Gupta,** "Applied Numerical Methods Lab Manual" published through Department of Applied Sciences and Humanities, ITM, Gurgaon, 2006

▪ **Rajesh Gupta** and Naveen Adalakha, "Numerical Techniques Lab Manual" published through Department of Applied Sciences and Humanities, ITM, Gurgaon, 2006

Edited Proceeding Book

- Phool Singh, **Rajesh Kumar Gupta**, Kanad Ray and Anirban Bandyopadhyay, *Proceedings of International Conference on Trends in Computational and Cognitive Engineering*, Advances in Intelligent Systems and Computing, Springer Singapore, 2021

  DOI: 10.1007/978-981-15-5414-8

Organizing Events

- **Convener**, **International Conference** on "Trends in Computational and Cognitive Engineering (TCCE 2019)", jointly organized by School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana) on November 28-30, 2019.

- **Organizing Secretary**, **National Conference** on "Bharat ka Vigyan mein Yogdan" organized by Department of Bio-Chemistry, Central University of Haryana, Mahendergarh (Haryana) on March 05, 2020.

- **Convener**, One Week Online **National Workshop** on "Applications of Mathematical and Statistical Tools (NWAMST)" jointly organized by Department of Mathematics, Department of Statistics, and School of Education under PMMMNMT of Central University of Haryana for the faculty of Colleges/Institutes/Universities from March 20-24, 2021.

-

Invited Talks

1. Deliver two Expert Lectures on the Topic of "Differential Equations" for Faculty Development Program on "Engineering Mathematics" organized by the Rayat Bahra Institute of Engineering & Bio-Technology, Mohali from July 14 – 18th, 2014.

2. Deliver an expert talk (October 18, 2013) on the Topic of "Numerical Solutions of PDEs" in TEQIP sponsored Short Term Training Program on "Hands on Training on Computational Fluid Dynamics" (CFD-2013) organized by Mechanical Engineering Department, Thapar University, Patiala held on 18-20 October 2013.

3. Deliver an expert lecture on the Topic of "Graphing in MATLAB" in one day workshop titled "Introduction to MATLAB" organized by Institution of Engineers (India) Thapar University Chapter on 26 October 2013.

4. Deliver a plenary talk on the topic of "Application of Maple Software to Mathematical Problems" in International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019), jointly organized by School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana) on November 28-30, 2019.

5. Presented a talk on the topic "Bharat Ke Mahan Ganitagye" in the National Conference on "Bharat ka Vigyan mein Yogdan" organized by Department of Bio-Chemistry, Central University of Haryana, Mahendergarh (Haryana) on March 05, 2020.

6. Online Resource Person for one session i.e. from 09.45 am to 11.15 am on 20.01.2021 in the UGC Sponsored Two Weeks Online Subject Refresher Course on "Mathematics & Statistics" being organized by Human Resource Development Centre, Guru Jambheshwar University of Science & Technology, Hisar w.e.f. 14.01.2021 to 27.01.2021.

7.

Workshops / Short Term Courses / FDP Attended

1. **Faculty Development Program** on "Effective Lecture Design and Delivery" organized by the Center for Academic Excellence & Planning, ITM University (Formerly Institute of Technology and Management), Gurgaon from July 6-19, 2006 (4-days).

2. SPSS 17.0 **FDP** organized by SPSS South Asia and L M Thapar School of Management, Thapar University, Patiala on January 30-31, 2009.

3. **Prof. Summit** on "Embedded System Design using Atmel XMEGA XPLD A1 and ARM-based SAM 4L" organized by Atmel India University Program at Thapar University, Patiala from July 15-16, 2013.

4. **Workshop** on "Applications of MATLAB in Engineering" in the Department of Electronic and Communication Engineering, Thapar University, Patiala on August 24-25, 2013.

5. TEQIP sponsored **Short Term Training Program** on "Basics and Application of Computational Fluid Dynamics" (BCFD-2013) organized by Mechanical Engineering Department, Thapar University, Patiala held on August 30-31, 2013.

6. TEQIP sponsored **Short Term Training Program** on "Hands on Training on Computational Fluid Dynamics" (CFD-2013) organized by Mechanical Engineering Department, Thapar University, Patiala held on October 18-20, 2013.

7. **Workshop** on "Introduction to MATLAB" organized by Institution of Engineers (India) and Thapar University, Patiala on October 26-27, 2013

8. **NCM Workshop** on "Conservation Laws with Applications to Continuum Mechanics" organized by National Center for Mathematics and Department of Mathematics, Punjab University, Chandigarh on December 2-7, 2014.

9. **Short Term Course** on "Dynamical Systems and Control" organized by IIT, Roorkee from June 29, 2015 to July 10, 2015.

10. **NCM Workshop** on "Partial Differential Equations of Fractional Order" organized by National Center for Mathematics and TIFR Centre for Applicable Mathematics, Bangalore on July 6-18, 2015.

11. **Faculty Development Program** on "Maple Software" conducted at Central University of Punjab in collaboration with Maplesoft and Binary Semantics on June 15, 2017

12. **Chairperson of the Session** in International Conference on Trends in Computational and Cognitive Engineering (TCCE 2019), jointly organized by School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana) on November 28-30, 2019.

13. **International Conference** on Trends in Computational and Cognitive Engineering (TCCE 2019), jointly organized by School of Engineering and Technology and Department of Mathematics, Central University of Haryana, Mahendergarh (Haryana) on November 28-30, 2019.

14. **National Conference** on "Bharat ka Vigyan mein Yogdan" organized by Department of Bio-Chemistry, Central University of Haryana, Mahendergarh (Haryana) on March 05, 2020.

15. **Online Faculty Development Program** on "Development and Delivery of MOOCs and E-Content" conducted at Central University of Haryana and Deshbandhu College, New Delhi from June 26, 2020 to July 01, 2020.

16. **Webinar** on "Numerical Simulation using Maple-2020, NSUM-2020" conducted by Maplesoft and Binary Semantics on September 19, 2020.

17. **Online Faculty Development Program** on "Recent trends in PDEs: Theory & Computations" conducted by Department of Mathematics, School of Sciences, National Institute of Technology, Andhra Pradesh, on November 2-6, 2020.

18. **Technical Session Chair** in 3rd International conference on Frontiers in Industrial and Applied Mathematics (FIAM 2020) is scheduled to be held during December 21 - 22, 2020 at NIT Jamshedpur through online/virtual mode using MS Teams platform

19. One Week Online **National Workshop** on "Applications of Mathematical and Statistical Tools (NWAMST)" jointly organized by Department of Mathematics, Department of Statistics, and School of Education under PMMMNMT of Central University of Haryana for the faculty of Colleges/Institutes/Universities from March 20-24, 2021.

M.Sc. Theses Supervision (Completed)

1. Symmetries and Exact Solutions of Some Systems of Nonlinear Partial Differential Equations by Lie Classical Method, Ms. Ritika Garg (2014)

2. Symmetries and Exact Solutions of Some Nonlinear Partial Differential Equations by Symmetry Reduction Method, Ms. Kimandeep Kaur (2014)

3. Classical Method for Some Nonlinear Systems, Ms. Anu Punj (2012)

4. Symmetry Reduction Method for Nonlinear Partial Differential Equations, Ms. Seema Kumari (2012)

5. Exact Travelling Wave Solutions for Some Nonlinear Partial Differential Equations, Mr. Bhajan Lal (2011)

6. Study of Two-Unit Cold Standby Systems with Regenerative Point Technique, Ms. Neetu Rani (2011) (Jointly guided with Dr. Jitender Kumar)

7. Symmetry Reduction Method for Exact Solutions of Some Nonlinear Systems, Ms. Bikramjeet (2010)

8. Exact Solutions of Nonlinear Partial Differential Equations (PDEs), Ms. Shivali (2010)

9. Lie Classical Symmetries for Some Nonlinear PDEs, Ms. Payal (2010)

10. Geometry of Generic Submanifolds, Ms. Jagdeep (2009) (Jointly guided with Dr. M.A. Khan)

11. Geometry of CR-Submanifolds, Ms. Manjot (2009) (Jointly guided with Dr. M.A. Khan)

12. Fault Tree Analysis of Different Systems, Mr. Ankush (2009) (Jointly guided with Dr. Amit Kumar)

M.Sc. Project Work Supervision (Completed)

MAT.600 M.Sc. Project Work (2017) Students

1. Deepak Kumar, Regd. No. 15msmath01

2. Diksha Garg, Regd. No. 15msmath02

3. Sudhir, Regd. No. 15msmath03

M.Sc. Project Work (2018) Students

1. Sujeeta Kumari, Regd. No. 16msmath03

2. Vijeta Jakhar, Regd. No. 16msmath02

3. Garima Garg, Regd. No. 16msmath14

Membership of Professional Bodies

- Official Ambassador of Faculty Development Program on "Maple Software" conducted at Central University of Punjab in collaboration with Maplesoft and Binary Semantics on June 15, 2017

- Membership of International Association of Mathematical Physics for the year 2017.

- Life membership of Indian Mathematical Society (Membership No. **L/2014/099**)

- Editorial Board member of Journal *Waves in Engineering, Science and Technology* (WEST) by American Scientific Publishers

- Associate Editor of *International Journal of Advances in Mathematics.*

Administrative Works

- HoD, Department of Mathematics, School of Physical and Mathematical Sciences, Central University of Haryana from November 26, 2018

- Member of Academic Council and Court of Central University of Haryana

- Chairperson of Working Group II – Basic Sciences of Granth Academy at Central University of Haryana (24.03.2021 onwards)

- Organizing Secretary of National Science Day celebration on 28.02.2021 at Central University of Haryana

- Member of Committee for preparing a roadmap for implementation of National Education Policy (NEP), 2020 at Central University of Haryana (17.11.2020 onwards)

- Organizing Secretary of National Science Day celebration on 28.02.2020 at Central University of Haryana

- Member of Committee for empanelment of Hospitals/Clinics/Diagnostic Centres on CGHS schemes at Central University of Haryana (16.01.2020 onwards)

- Dy. Superintendent for the Term End Examination, December 2019 of Academic Block – I center, Central University of Haryana

- Member of Committee for creating Central Computing Facility and Central Instrumentation Centre at Central University of Haryana (20.11.2019 onwards)

- Member of Space Allotment Committee at Central University of Haryana (06.11.2019 onwards)

- Teacher In-charge, Department of Computer Science and Information Technology, Central University of Haryana from 06.11.2019 to 22.05.2020

- Deputy Dean Student Welfare, Central University of Haryana from August 09, 2019 to 24.04.2020

- Member of Standing committee of academic matter of academic council from 10.07.2019 to 07.07.2020

- Superintendent of spot evaluation camp for June, 2019 Final Examination at Central University of Haryana

- Center Superintendent for CUCET-2019 at center Mahendergarh – I, New Academic Block-I, Central University of Haryana held on May 25-26, 2019

- Chairman, Board of Studies (17.12.2018 and 21.09.2019) and Member, School Board (14.02.2019, 28.03.2019) at Central University of Haryana

- Dy. Superintendent for the Term End Examination, May-June 2019 of Academic Block – I center, Central University of Haryana

- Superintendent of spot evaluation camp for December, 2018 Final Examination at Central University of Haryana

- Organizing Secretary of Science Day celebration on 28.02.2019 at Central University of Haryana

- Member of committee for publication of Information bulletin of Central University of Haryana for the session 2019-20

- Member of committee for bringing quality improvement in M.Phil./PhD programme at Central University of Haryana from March 12, 2019.

- Coordinator of Centre, Centre for Mathematics and Statistics, Central University of Punjab, Bathinda from January 04, 2016 to July 11, 2016

- Chairman, Board of Studies, Centre for Mathematics and Statistics held on May 18, 2016

- Chairman, Academic and Administrative Committee, Centre for Mathematics and Statistics from January 04, 2016 to July 11, 2016

- Member, School Board, School of Basic and Applied Sciences for 2016-17

- Ph.D. Coordinator of School of Mathematics from July 2015 to December 2015

- Coordinator of School Information/ Profile, Annual Report, News Caster and Other related activities at SMCA, Thapar University (2013-2014).

- Coordinator for School Information/ Profile, Annual Report, News Caster and Other related activities at SMCA, Thapar University (2012-13)

- Member Secretary of SPPC (School Planning and Policy Committee) of SMCA, Thapar University (2014-15)

- Finance Secretary of Senior Staff Club at Thapar University (2011-2014)

- Member, Board of Studies of SMCA held on January 18, 2012 for M.Sc. Integrated Programme in Mathematics and Computing

- Student Counselor of SMCA, Thapar University (2011-12) (2012-13)

- ISO-Coordinator of SMCA, Thapar University (2010-11).

- Successfully organized the cultural fests Saturnalia-2010 and Saturnalia-2011 (Among Largest Cultural Fest of North India) at Thapar University as Faculty Advisor.

- Vice President of Mudra Society at Thapar University from 2011-13.

- Timetable Coordinator of SMCA, Thapar University (2011-12).

Computer Skills

- Mathematical Software- MAPLE and MATHEMATICA: Currently using these software for research (graphs, solutions of differential equations, integrations and implement some method in MAPLE etc.).

- Knowledge of C-language (programming in C-language for various numerical methods), MS-Office (Power Point, Word, Excel) etc.

Teaching Interest

- Basic and Advanced Courses on Numerical Methods with C-Programming Labs

- Ordinary and Partial Differential Equations

- Courses on Engineering Mathematics

- Complex Analysis

- Linear and Abstract Algebra

Research Fields

- Nonlinear Partial Differential Equations

- Lie Group Theory, Exact Solutions & Symmetries for Nonlinear Systems

- Einstein Field Equations & Equations from Mathematical Physics

- Conservation Laws for Nonlinear Systems

- Fractional Order Partial Differential Equations

Referees

- **Dr. Karanjeet Singh** (Supervisor, Ph.D.)

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Personal Profile

Father's Name:	Sh. Murari Lal
Mother's Name:	Smt. Santosh Devi
Date of Birth:	12. 02. 1979
Sex:	Male
Marital Status:	Married to Usha Rani Gupta (PhD, English Literature);
	Daughter: Aaradhya Gupta, Son: Reyansh Gupta

Permanent Address : Rajesh Gupta S/o Sh. Murari Lal

Shiv Saree Center, V.P.O. - Ateli Mandi

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Dr. RAJESH KUMAR GUPTA

Date:

Place:

Summary

Rajesh Kumar Gupta has teaching & research experience of 14 years. At present, he is working as an Associate Professor (Mathematics) at Central University of Haryana since November 2018. He has been on lien from Central University of Punjab, where he has worked as an Associate Professor (Mathematics) since December 2015. He has worked as an Assistant Professor in School of Mathematics at Thapar University, Patiala from June 2007 to December 2015. He has been on the post of Lecturer at ITM University, Gurgaon from July 2005 to May 2007.

He has supervised 9 Ph.D. theses and 12 M.Sc. theses. He has published 65 research papers in refereed journals; 47 research papers are SCI listed with total impact factor more than 100. He is principal investigator of two major ongoing research projects funded by CSIR and NBHM.

His research interests revolve around the applications of symmetry analysis to nonlinear partial differential equations governing important physical phenomena. He has worked on several nonlinear systems including variable coefficients KdV, Boussinesq, BBM and Broer-Kaup equations, Coupled Higgs field equation, Hamiltonian amplitude equation, Coupled Klein-Gordon- Schrödinger. Some highly nonlinear Einstein field equations are also studied with the aim of deriving certain exact solutions.

He has been selected for prestigious UGC Research Award for the period 2016-18, and completed the award on May, 2018. Thapar University has awarded PIS (Performance Incentive Scheme) for five consecutive years (2009-2013) for his academic excellence (teaching and research).

Contribution to Mathematics

Nonlinear partial differential equations (PDEs) are used for modeling of physical phenomena in many fields of engineering and sciences. My research work primarily deals with symmetries and exact solutions of various physically relevant nonlinear systems of PDEs from mathematical physics. An initiative to compute symmetries of systems of variable coefficient PDEs was successful, and many important nonlinear physical systems have been investigated. Some new ansatz were considered for solutions of nonlinear systems and implemented on mathematical software. Symmetry method has also been developed to solve systems of fractional PDEs. Non-classical symmetries, Painlevé analysis and conservation laws are also discussed for few nonlinear phenomena.

Some important outputs from the research work are as follows:

1. The symmetries and exact solutions of a coupled Korteweg de Vries (KdV) system [1]

$$u_t + \alpha(t)\, uu_x + q(t)\, vv_x + p_1(t)\, u_{xxx} = 0$$
$$v_t + \beta(t)\, vu_x + \delta(t)uv_x + p_2(t)\, v_{xxx} = 0 \, ,$$

with variable coefficients have been investigated. The infinitesimals of the group of transformations which leaves the KdV system invariant and the admissible forms of the coefficients are obtained using symmetry reduction method. An optimal system of conjugacy inequivalent subgroups is then identified with the adjoint action of the symmetry group. For each basic vector field in the optimal system, the KdV system is

reduced to a system of ordinary differential equations (ODEs), which is further studied with the aim of deriving certain exact solutions.

Contribution: A successful attempt has been made for the study of the variable coefficient nonlinear system of partial differential equations using Lie symmetries. The infinitesimals and the admissible forms of the coefficients under invariance conditions are obtained for this system, and subsequetly many other physically important variable coefficients nonlinear systems are discussed. To the best of my knowledge, this study is first of its kind, in which a variable coefficients system is investigated with Lie symmetry method and symmetries and admissible forms of the coefficients are obtained.

2. Symmetries and exact solutions including soliton solutions were successfully investigated for some physically relevant nonlinear systems of PDEs from mathematical physics, and in some study, Painlevé analysis has also been performed to check the integrability. The studied nonlinear systems include generalized Hirota-Satsuma coupled KdV [2], variant and modified Boussinesq [3-4], Benjamin-Bona-Mahony [5], Broer-Kaup [6], coupled Klein-Gordon-Schrödinger [7], Kawahara and modified Kawahara [8], coupled Higgs and Hamiltonian amplitude [9], Calogero Degasperis [10], generalized Bretherton [11], potential Kadomstev Petviashvili [12], Kuramoto-Sivashinsky [13], Benjamin-Bona-Mahony-Burger [14], extended Gardner [15], generalized Kuramoto-Sivashinsky [16], Benny [17], B-type Kadomtsev-Petviashvili equation [18] and coupled multi-KdV equations [19] etc. The exact solutions obtained for these nonlinear systems well described various aspects of the physical phenomena. Many new physically relevant solutions including periodic solutions, traveling wave solutions, singular solutions, solitons etc. are obtained. Some nonlinear systems [20-23] have also been studied for the numerical results.

Contribution: Some new ansatzes are successfully implemented on the software Maple for the exact solutions of nonlinear ODEs systems. These ansatzes include rational functions in polynomials, trigonometric and hyperbolic functions. Also, during the study of the nonlinear systems, we have faced different kinds of challenges like solutions of determining equations/characteristics equations, solutions of reduced ODEs and much more; these challenges motivated us to come with new ideas and their implementation.

3. The Einstein field equations for vacuum [24]

$$u_{\rho\rho} + \rho^{-1}u_{\rho} - u_{tt} = \frac{1}{2}\rho^{-2}e^{4u}(v_{\rho}^2 - v_t^2)$$

$$v_{\rho\rho} - \rho^{-1}v_{\rho} - v_{tt} = 4(v\,\mu_{\,t} - v\,u_x)$$

have been discussed for symmetries and exact solutions. Einstein field equations and Einstein–Maxwell equations have their applications and implications in many fields including astrophysics and cosmology. Various physically relevant solutions are obtained during study of some of these equations [25-31].

Contribution: Some highly nonlinear Einstein field equations and Einstein-Maxwell equations including nonlinearity of exponential order were examined successfully.

4. Lie group analysis has been successfully extended to obtain symmetries and reductions of nonlinear systems of fractional order PDEs [32-35]. Conservation laws are also obtained for certain time fractional FPDEs [36-37]. Symmetries of variable coefficient time fractional systems of PDEs are obtained [38]. The work has also been extended to Bäcklund transformations, Lax system, nonclassical symmetries, and (3+1) dimensional system etc. [39-42]. Recently, improved F-expansion method is proposed for space-time fractional differential equations [43]. The future research work is focused on certain generalization of conservation laws, nonclassical and generalized symmetries, and implementation of symmetry methods for fractional PDEs on mathematical software.

    Contribution: The symmetry approach has been successfully generalized for systems of fractional order PDEs.

References:

1. K. Singh and **R. K. Gupta**, On symmetries and invariant solutions of a coupled KdV system with variable coefficients, *International Journal of Mathematics and Mathematical Sciences* 23 (2005) 3711-3726.

2. K. Singh and **R. K. Gupta**, Lie symmetries and exact solutions of a new generalized Hirota-Satsuma coupled KdV system with variable coefficients, *International Journal of Engineering Science* 44 (2006) 241-255.

3. K. Singh and **R. K. Gupta**, Exact solutions of a variant Boussinesq system, *International Journal of Engineering Science* 44 (2006) 1256-1268.

4. **R. K. Gupta** and K. Singh, Modified Boussinesq system with variable coefficients: classical Lie approach and exact solutions, *Journal of Partial Differential Equations* 22 (2009) 97-110.

5. K. Singh, **R. K. Gupta** and Sachin Kumar, Benjamin-Bona-Mahony (BBM) equation with variable coefficients: similarity reductions and Painlevé analysis, *Applied Mathematics and Computation* 217 (2011) 7021-7027.

6. Sachin Kumar, K. Singh and **R. K. Gupta**, Painlevé analysis, Lie symmetries and exact solutions for (2+1) dimensional variable coefficients Broer-Kaup equations, *Communications in Nonlinear Science and Numerical Simulation* 17 (2012) 1529-1541.

7. Anupma Bansal and **R. K. Gupta**, Modified (G'/G)-expansion method for finding exact wave solutions of the coupled Klein-Gordon-Schrödinger equation, *Mathematical Methods in the Applied Sciences* 35 (10) (2012) 1175-1187.

8. Lakhveer Kaur and **R. K. Gupta**, Kawahara equation and modified Kawahara equation with time dependent coefficients: symmetry analysis and generalized G'/G-expansion method, *Mathematical Methods in the Applied Sciences* 36 (2013) 584-600.

9. Sachin Kumar, K. Singh and **R. K. Gupta**, Coupled Higgs field equation and Hamiltonian amplitude equation: Lie classical approach and (G'/G)-expansion method, *Pramana-Journal of Physics* 79 (2012) 41-60.

10. Anupma Bansal and **R.K. Gupta,** Lie point symmetries and similarity solutions of the time dependent coefficients Calogero Degasperis equation, *Physica Scripta* 86 (2012) 035005.

11. **R. K. Gupta** and Anupma Bansal, Similarity reductions and exact solutions of generalized Bretherton equation with time dependent coefficients, *Nonlinear Dynamics* 71 (2013) 1-12.

12. **R.K. Gupta** and Anupma Bansal, Painlevé analysis, Lie symmetries and invariant solutions of potential Kadomstev Petviashvili equation with time dependent coefficients, *Applied Mathematics and Computation* 219 (2013) 5290-5302.

13. Lakhveer Kaur and **R. K. Gupta**, Painlevé analysis, similarity reductions and exact solutions of the Kuramoto-Sivashinsky equation with variable coefficients, *International Journal of Nonlinear Sciences* 15 (2013) 139-149.

14. Vikas Kumar, **R. K. Gupta** and Ram Jiwari**,** Painlevé analysis, Lie symmetries and exact solutions for variable coefficients Benjamin-Bona-Mahony-Burger (BBMB) equation**,** *Communications in Theoretical Physics* 60 (2013) 175-182.

15. Sachin Kumar, K. Singh and **R. K. Gupta,** Dynamics of internal waves in a stratified ocean modeled by the extended Gardner equation with time-dependent coefficients, *Ocean Engineering* 70 (2013) 81-87.

16. Rajeev, **R.K. Gupta** and S. S. Bhatia, Lie symmetry analysis and exact solutions for a variable coefficient generalized Kuramoto-Sivashinsky equation, *Romanian Reports in Physics* 66 (2014) 923- 928.

17. Rajeev, **R.K. Gupta** and S. S. Bhatia, Painlevé analysis and some solutions of variable coefficients Benny equation, *Pramana-Journal of Physics* 85 (2015) 1111-1122.

18. Manjit Singh and **R. K. Gupta,** Soliton and quasi-periodic wave solutions for B-type Kadomtsev-Petviashvili equation, *Indian Journal of Physics*, 91 (2017) 1345-1354 **(Impact Factor 0.967)**

19. **R. K. Gupta** and Manjit Singh**,** On invariant analysis and conservation laws for degenerate coupled multi-KdV equations for multiplicity l = 3, *Pramana-Journal of Physics* 92 (2019) 70-79 **(Impact Factor 0.699)**

20. Vikas Kumar, **R. K. Gupta** and Ram Jiwari, Comparative study of travelling wave and numerical solutions for the coupled short pulse (CSP) equation, *Chinese Physics B* 22(5) (2013) 050201.

21. Vikas Kumar, Ram Jiwari and **R. K. Gupta**, Numerical simulation of two dimensional quasilinear hyperbolic equations by polynomial differential quadrature method, *Engineering Computations* 30 (2013) 892-909.

22. Ram Jiwari, **R. K. Gupta** and Vikas Kumar, Polynomial differential quadrature method for numerical solutions of the generalized Fitzhugh-Nagumo equation with time-dependent coefficients, Ain Shams Engineering Journal 5 (2014) 1343-1350.

23. **R. K. Gupta,** Vikas Kumar, and Ram Jiwari, Exact and numerical solutions of coupled short pulse equation with time dependent coefficients, *Nonlinear Dynamics* 79 (2015) 455-464.

24. **R. K. Gupta** and K. Singh, Symmetry analysis and some exact solutions of cylindrically symmetric null fields in general relativity, *Communications in Nonlinear Science and Numerical Simulation* 16 (2011) 4189-4196.

25. Nisha Goyal and **R. K. Gupta**, Symmetries and exact solutions of the nondiagonal Einstein-Rosen metrics, *Physica Scripta* 85 (2012) 015004 (6pp)**.**

26. Nisha Goyal and **R. K. Gupta**, A class of exact solutions of Einstein field equations, *Physica Scripta* 85 (2012) 055011 (6pp).

27. Nisha Goyal and **R. K. Gupta**, New exact solutions of Einstein-Maxwell equations for magnetostatic fields, *Chinese Physics B* 21 (2012) 090401-6.

28. Lakhveer Kaur and **R. K. Gupta**, On symmetries and exact solutions of Einstein Maxwell field equations via symmetry approach, *Physica Scripta* 87 (2013) 035003.

29. Lakhveer Kaur and **R. K. Gupta**, On certain new exact solutions of Einstein equations for axisymmetric rotating fields, *Chinese Physics B* 22 (2013) 100203-100208.

30. Lakhveer Kaur and R. K. Gupta, Some invariant solutions of field equations with axial symmetry for empty space containing an electrostatic field, *Applied Mathematics and Computation* 231 (2014) 560–565.

31. Rajeev, **R.K. Gupta** and S. S. Bhatia, Symmetry analysis and some solutions of Gowdy equation, *Romanian Journal of Physics* 60 (2015) 15- 21.

32. Komal Singla and **R. K. Gupta**, On invariant analysis of some time fractional nonlinear systems of partial differential equations. I, *Journal of Mathematical Physics* 57 (2016) 101504 (1-14).

33. Komal Singla and **R. K. Gupta**, On invariant analysis of some nonlinear systems of space-time fractional partial differential equations. II, *Journal of Mathematical Physics*, 58 (2017) 051503 (1-11).

34. Komal Singla and **R. K. Gupta**, Generalized Lie symmetry approach for nonlinear systems of fractional differential equations. III, *Journal of Mathematical Physics*, 58 (2017) 061501 (1-14).

35. Komal Singla and **R. K. Gupta,** Space-time fractional partial differential equations: symmetry analysis and conservation laws, *Nonlinear Dynamics,* DOI 10.1007/s11071-017-3456-7

36. Komal Singla and **R. K. Gupta**, Conservation laws for certain time fractional nonlinear systems of partial differential equations, Communications in Nonlinear Science and Numerical Simulation 53 (2017) 10-21.

37. Bikramjeet Kaur and **R. K. Gupta**, Invariance properties, conservation laws and soliton solutions of the time fractional (2+1)-dimensional new coupled ZK system in magnetized dusty plasmas, *Computational and Applied Mathematics* 37 (2018) 5981-6004. (**Impact Factor 0.863**)

38. **R. K. Gupta** and Komal Singla, Symmetry analysis of variable coefficient time fractional systems of partial differential equations, *Theoretical and Mathematical Physics*, 197 (2018) 1737-1754.

39. Manjit Singh and **R. K. Gupta**, Bäcklund transformations, Lax system, conservation laws and multisoliton solutions for Jimbo–Miwa equation with bell-polynomials, *Communications in Nonlinear Science and Numerical Simulation* 37 (2016) 362-373.

40. Manjit Singh and **R. K. Gupta**, Exact solutions for nonlinear evolution equations using novel test function, *Nonlinear Dynamics* 86 (2016) 1171-1182.

41. **R. K. Gupta** and Manjit Singh, Nonclassical symmetries and similarity solutions of variable coefficient coupled KdV system using compatibility method, *Nonlinear Dynamics* 87 (2017) 1543-1552.

42. Manjit Singh and **R. K. Gupta,** Group classification, conservation laws and Painleve analysis for Klein-Gordon-Zakharov equations in (3+1)-dimension, *Pramana-Journal of Physics* 92 (2019) 1 -11.

43. Bikramjeet Kaur and **R. K. Gupta**, Dispersion analysis and improved F-expansion method for space-time fractional differential equations, *Nonlinear Dynamics,* 96 (2019) 837- 852.