

## DR. RAMJIWARI

Associate Professor  
Indian Institute of Technology Roorkee  
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### Research Interests:

Numerical Analysis & Computing  
Computational Modeling & Simulation of PDEs, Differential Quadrature Methods, Wavelets  
Analysis, Radial Basis Functions, Finite Element Methods, Discontinuous Galerkin Methods

### ACADEMIC AND RESEARCH BACKGROUND

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1. **Post Doc Fellow** (2013 to 2014)      **Institute of Industrial Mathematics,  
Federal University do Paraná, Brazil**
2. **Ph.D** (July 2010)      **Thesis Title:** Numerical Treatment of Some Partial Differential  
Equations using Differential Quadrature Method  
**Department of Mathematics, IIT Roorkee**
3. **M.Sc.** (2003-2005)      Kurukshetra University, Kurukshetra, India

### PH.D. STUDENTS

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|--------------------------------|--|
| 1. <b>Mr. Vikas Kumar</b>      | <b>Awarded 2014, Thapar University</b> |
| 2. <b>Ms. Anjali Verma</b>     | <b>Awarded 2015, Thapar University</b> |
| 3. <b>Mr. Om Prakash Yadav</b> | <b>Awarded 2019, IIT Roorkee</b>       |
| 4. <b>Mr. Sanjay Kumar</b>     | <b>Awarded 2021, IIT Roorkee</b>       |
| 5. <b>Mr. Sudhir Kumar</b>     | <b>Awarded 2021, IIT Roorkee</b>       |
| 6. <b>Mr. Jasbir Singh</b>     | Work under progress since July, 2018   |
| 7. <b>Mr. Ankur</b>            | Work under progress since July, 2019   |
| 8. <b>Mr Ajeet Singh</b>       | Work under progress since Dec, 2021    |
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**Master Thesis Supervised: 30**

### LIST OF PUBLICATIONS

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□□ **Articles published/accepted in refereed journals**

1. **Ram Jiwari**, Local radial basis function-finite difference based algorithms for singularly perturbed Burgers' model, **Mathematics and Computers in Simulation**, 198, (2022) 106-126. **(IF: 2.463)**
2. K Harish Kumar and **Ram Jiwari**, A hybrid approach based on Legendre wavelet for numerical simulation of Helmholtz equation with complex solution, **International**

**Journal of Computer Mathematics**, (2022) doi.org/10.1080/00207160.2022.2041193. (IF: 1.931)

3. **Ram Jiwari**, Sukhveer Singh, Paramjeet Singh, Local RBF-FD-Based Mesh-free Scheme for Singularly Perturbed Convection-Diffusion-Reaction Models with Variable Coefficients, **Journal of Mathematics**, (2022), Article ID 3119482, doi.org/10.1155/2022/3119482. (IF: 0.97)
4. Sanjay Kumar, **Ram Jiwari**, RC Mittal, Radial basis functions based meshfree schemes for the simulation of non-linear extended Fisher-Kolmogorov model, **Wave Motion**, (2022)102863. (IF: 2.020)
5. K. H. Kumar and **Ram Jiwari**, A note on numerical solution of classical Darboux problem, **Mathematical Methods in the Applied Sciences** (2021), Doi.org/10.1002/mma.7602. (IF: 2.321)
6. Sanjay Kumar, **Ram Jiwari**, R. C. Mittal and Jan Awrejcewicz, Dark and bright soliton solutions and computational modeling of non-linear regularized long wave model, **Nonlinear Dynamics**, (2021) Doi:10.1007/s11071-021-06291-9.(IF: 5.022)
7. R. C. Mittal, Sudhir Kumar and **Ram Jiwari**, A cubic B-spline quasi-interpolation algorithm to capture the pattern formation of coupled reaction diffusion models, **Engineering with Computers**, (2021) doi.org/10.1007/s00366-020-01278-3. (IF: 7.963)
8. **Ram Jiwari** and Alf Gerisch, A local radial basis function differential quadrature semidiscretisation technique for the simulation of time-dependent reaction-diffusion problems, **Engineering Computations**, (2021) DOI 10.1108/EC-05-2020-0291. (IF: 1.593)
9. **Ram Jiwari**, Barycentric rational interpolation and local radial basis functions based numerical algorithms for multidimensional sine-Gordon equation, **Numerical Methods for Partial Differential Equations**, (2021) (37) 1965–1992. (IF: 3.009)
10. **Ram Jiwari**, Vikas Kumar and Sukhveer Singh, Lie group analysis, exact solutions and conservation laws to compressible isentropic Navier-Stokes equation, **Engineering with Computers**, (2020) doi.org/10.1007/s00366-020-01175-9. (IF: 7.963)
11. K. H. Kumar and **Ram Jiwari**, Legendre wavelets based numerical algorithm for simulation of multidimensional Benjamin-Bona-Mahony-Burgers and Sobolev equations, **Computers and Mathematics with Applications**, 80 (3) (2020) 417-433. (IF: 3.476)
12. R C Mittal, S Kumar, **Ram Jiwari**, A cubic B-spline quasi-interpolation method for solving two-dimensional unsteady advection diffusion equations, **International Journal of Numerical Methods for Heat & Fluid Flow**, (2020) DOI 10.1108/HFF-07-2019-0597. (IF: 4.17)
13. **Ram Jiwari**, Sanjay Kumar and Jan Awrejcewicz, A meshfree algorithm for simulation of multidimensional Schrödinger equations, **Computational and Applied Mathematics**, (2020) doi.org/10.1007/s40314-020-1113-0. (IF: 2.239)
14. Sapna Pandit, **Ram Jiwari** and M. E. Koksai, A class of numerical algorithms based on cubic trigonometric B-spline functions for numerical simulation of nonlinear parabolic problems, **Computational and Applied Mathematics**, (2019) doi.org/10.1007/s40314-019-0918-1. (IF: 2.239)

15. Om Prakash Yadav and **Ram Jiwari**, A finite element approach for analysis and computational modelling of coupled reaction diffusion models, **Numerical Methods for Partial Differential Equations**, 35 (2) (2019) 830-850. (IF: 3.009)
16. Om Prakash Yadav and **Ram Jiwari**, Some soliton-type analytical solutions and numerical simulation of nonlinear Schrödinger equation, **Nonlinear Dynamics**, 95 (2019) 2825-2836. (IF: 5.022)
17. Sanjay Kumar, **Ram Jiwari** and R. C. Mittal, Meshfree algorithms based on radial basis functions for numerical simulation and to capture shocks behavior of Burgers' types problems, **Engineering Computations**, 36(4) (2019) 1142-1168. (IF: 1.593)
18. Sanjay Kumar, **Ram Jiwari** and R. C. Mittal, Numerical simulation for computational modelling of reaction-diffusion Brusselator model arising in chemical processes, **Journal of Mathematical Chemistry**, 57 (2019) 149-179. (IF: 2.357)
19. Om Prakash Yadav and **Ram Jiwari**, A finite element approach to capture Turing patterns of autocatalytic Brusselator model, **Journal of Mathematical Chemistry**, 57 (3) (2019) 769-789. (IF: 2.357)
20. **Ram Jiwari**, Stefania Tomasiello and Francesco Tornabene, A numerical algorithm for computational modelling of coupled advection-diffusion-reaction systems, **Engineering Computations**, 35 (3) (2018) 1383-1401. (IF: 1.593)
21. **Ram Jiwari**, H. S. Shukla, M Tamsir and V. K. Srivastava, A numerical algorithm for computation modeling of 3D nonlinear wave equations based on exponential modified cubic B-spline differential quadrature method, **International Journal of Computer Mathematics**, 95 (4) (2018) 752-766. (IF: 1.931)
22. **Ram Jiwari**, Sukhveer Singh and Ajay Kumar, Numerical simulation to capture the pattern formation of coupled reaction-diffusion models, **Chaos, Solitons & Fractals**, 103 (2017) 422-439. (IF: 5.944)
23. **Ram Jiwari**, Vikas Kumar, Ram Karan and A. S. Alshomrani, Haar wavelet quasilinearization approach for MHD Falkner–Skan flow over permeable wall via Lie group method, **International Journal of Numerical Methods for Heat & Fluid Flow**, 27 (6) (2017) 1332-1350. (IF: 4.17)
24. Sapna Pandit, **Ram Jiwari**, K Bedi and M. E. Koksai, Haar wavelets operational matrix based algorithm for computational modelling of hyperbolic type wave equations, **Engineering Computations**, 34 (8) (2017) 793-814. (IF: 1.593)
25. A. Alshomrani, Sapna Pandit, A. K. Alzahrani, M. S. Alghamdi, **Ram Jiwari**, A numerical algorithm based on modified cubic trigonometric B-spline functions for computational modelling of hyperbolic type wave equations, **Engineering Computations**, 34 (4) (2017) 1257-1276. (IF: 1.593)
26. Om Prakash Yadav and **Ram Jiwari**, Finite element analysis and approximation of Burgers'-Fisher equation, **Numerical Methods for Partial Differential Equations**, 33 (5) (2017) 1652-1677. (IF: 3.009)
27. Maria A. De Rosaa, Maria Lippiello, **Ram Jiwari**, Stefania Tomasiello, A differential quadrature based procedure for parameter identification, **Applied Mathematics and Computation**, 290 (2016) 460-466. (IF: 4.091)
28. M. Tamsir, V. K. Srivastava, **Ram Jiwari**, An algorithm based on exponential modified cubic B-spline differential quadrature method for nonlinear Burgers' equation, **Applied Mathematics and Computation**, 290 (2016) 111-124. (IF: 4.091)

29. S. Garhwal and **Ram Jiwari**, Conversion of fuzzy automata into fuzzy regular expressions using transitive closure, **Journal of Intelligent & Fuzzy Systems**, 30 (6) (2016) 3123-3129. (IF: 1.851)
30. **Ram Jiwari** and A. S. Alshomrani, A new algorithm based on modified trigonometric cubic B-splines functions for nonlinear Burgers'-type equations, **International Journal of Numerical Methods for Heat & Fluid Flow**, 27 (8) (2017) 1638-1661. (IF: 4.17)
31. S. Garhwal and **Ram Jiwari**, Parallel fuzzy regular expression and its conversion to epsilon-free fuzzy automaton, **The Computer Journal**, 59(9) (2016) 1383-1391. (IF: 1.494)
32. A. Verma and **Ram Jiwari**, Cosine expansion based differential quadrature algorithm for numerical simulation of two dimensional hyperbolic equations with variable coefficients, **International Journal of Numerical Methods for Heat & Fluid Flow**, 25 (7) (2015) 1574-1589. (IF: 4.17)
33. **Ram Jiwari**, Lagrange interpolation and modified cubic B-spline differential quadrature methods for solving hyperbolic partial differential equations with Dirichlet and Neumann boundary conditions, **Computer Physics Communications**, 193 (2015) 55-65. (IF: 4.39)
34. **Ram Jiwari**, A hybrid numerical scheme for the numerical solution of the Burgers' equation, **Computer Physics Communications**, 188 (2015) 59-67. (IF: 4.39)
35. Vikas Kumar, **Ram Jiwari** and R K Gupta, Exact and numerical solutions of coupled short pulse equation with time-dependent coefficients, **Nonlinear Dynamics**, 79 (1)(2015) 455-464. (IF: 5.022)
36. Anjali Verma, **Ram Jiwari** and M. E. Koksai, Analytic and numerical solutions of nonlinear diffusion equations via symmetry reductions, **Advances in Difference Equations**, DOI:10.1186/1687-1847-2014-229 (2014). (IF: 2.803)
37. **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. (IF: 3.18)
38. Anjali Verma, **Ram Jiwari** and Satish Kumar, A numerical scheme based on differential quadrature method for numerical simulation of nonlinear Klein-Gordon equation, **International Journal of Numerical Methods for Heat and Fluid Flow**, 24 (7) (2014) 1390-1404. (IF: 4.17)
39. **Ram Jiwari** and Jinyun Yuan, A computational modeling of two dimensional reaction-diffusion Brusselator system arising in chemical processes, **Journal of Mathematical Chemistry**, 52 (2014) 1535-1551. (IF: 2.357)
40. Vikas Kumar, **Ram Jiwari** and R K Gupta, Lie Group analysis, numerical and non-traveling wave solutions for the (2+1)-dimensional Diffusion-Advection equation with variable coefficient, **Chinese Physics B**, 23 (3) (2014) 030201. (IF: 1.494)
41. **Ram Jiwari**, R.C. Mittal and K K Sharma, A numerical scheme based on weighted average differential quadrature method for the numerical solution of Burgers' equation, **Applied Mathematics and Computation**, 219 (2014) 6680-6691. (IF: 4.091)
42. Vikas Kumar, **Ram Jiwari** and R K Gupta, Numerical Simulation of Two Dimensional Quasilinear Hyperbolic Equations by Polynomial Differential Quadrature Method, **Engineering Computations**, 30 (7) 2013, 892-909. (IF: 1.593)

43. Vikas Kumar, **Ram Jiwari** and R K Gupta, Painlevé Analysis, Lie Symmetries and Exact Solutions for Variable Coefficients Benjamin-Bona-Mahony-Burger (BBMB) Equation, **Communications in Theoretical Physics**, **60** (2013) 175–182. (IF: 1.968)
44. Vikas Kumar, **Ram Jiwari** and R K Gupta, Comparative Study of Travelling Wave and Numerical Solutions for the Coupled Short Pulse (CSP) Equation, **Chinese Physics B**, **22** (5) (2013) 050201. (IF: 1.494)
45. R C Mittal, **Ram Jiwari** and K K Sharma, A numerical scheme based on differential quadrature method to solve time dependent Burgers' equation, **Engineering Computations**, **30** (1) (2013) 117-131. (IF: 1.593)
46. **Ram Jiwari**, Haar wavelet quasilinearization approach for numerical simulation of Burgers' equation, **Computer Physics Communications**, **183** (2012) 2413-2423. (IF: 4.39)
47. R.C. Mittal and **Ram Jiwari**, A differential quadrature method for solving Burgers'-type equation, **International Journal of Numerical Methods for Heat and Fluid Flow**, **22** (7), (2012), 880-895. (IF: 4.17)
48. **Ram Jiwari**, S. Pandit and R C Mittal, Numerical simulation of two-dimensional sine-Gordon solitons by differential quadrature method, **Computer Physics Communications**, **183** (2012) 600-616. (IF: 4.39)
49. **Ram Jiwari**, S. Pandit and R C Mittal, A Differential quadrature algorithm to solve the two dimensional linear hyperbolic telegraph equation with Diriclet and Neumann boundary conditions, **Applied Mathematics and Computation**, **218** (2012) 7279–7294. (IF: 4.091)
50. R.C. Mittal and **Ram Jiwari**, Differential quadrature method for Numerical Solution of coupled viscous Burgers' equations, **Int. J. for Comput. Methods in Eng. Science and Mech**, **13** (2012), 1-5.
51. D. Sharma, **Ram Jiwari**, and Sheo Kumar, A comparative study of Modal matrix and finite elements methods for two point boundary value problems, **Int. J. of Appl. Math. and Mech.** **8** (13) (2012), 29-45. (IF: 2.866)
52. **Ram Jiwari**, Sapna Pandit and R C Mittal, A differential quadrature algorithm for the numerical solution of the second-order one dimensional hyperbolic telegraph equation, **Int J of Nonlinear Sciences**, **13** (3) (2012), 259-266.
53. **Ram Jiwari**, Dinkar Shrma and Sheo Kumar, Numerical solutions of two point boundary value problems using Galerkin-Finite element method, **Int J of Nonlinear Sciences**, **13** (2)(2012), 204-210.
54. R.C. Mittal and **Ram Jiwari**, A Numerical Scheme for singularly perturbed Burger-Huxley Equation, **J. Appl. Math. & Informatics**, **29** (2011), No. 3-4, 813-829.
55. R.C. Mittal and **Ram Jiwari**, A Numerical scheme for some nonlinear differential equations models in Biology, **Int. J. for Comput. Methods in Eng. Science and Mech.**, **12** (3), (2011), 134-140.
56. R.C. Mittal and **Ram Jiwari**, Numerical study of two-Dimensional reaction-diffusion Brusselator system, **Applied Mathematics and Computation**, **217** (12) (2011), 5404-5415. (IF: 4.091)
57. **Ram Jiwari**, Dinkar Shrma and Sheo Kumar, Galerkin-finite element method for the numerical solution of advection-diffusion equation, **IJPAM**, **70** (3) (2011), 389-399.
58. R.C. Mittal and **Ram Jiwari**, Numerical study of Burger-Huxley equation by differential quadrature method, **Int. J. of Appl. Math. and Mech.**, **5**(8) (2009), 1-9. (IF: 2.866)

59. R.C. Mittal and **Ram Jiwari**, Differential quadrature method for two dimensional Burgers' equations, **Int. J. for Comput. Methods in Eng. Science and Mech**, **10 (2009)**, 450-459.
60. R.C. Mittal and **Ram Jiwari**, A Spectral method for suspension bridge model, **Int. J. of Appl. Math. and Mech.**, **5(5) (2009)**, 66-75. (IF. 2.866)
61. R.C. Mittal and **Ram Jiwari**, Numerical study of Fisher's equation by using differential quadrature method, **Int. J. Information and systems Sciences**, **5(1)(2008)**, 143-160.
62. **Ram Jiwari**, A Spectral method for the solution of a fourth order integro-differential equation, **IX International Scientific Conference "Science and Education" (28-29 March, 2012) Kemerovo State University, Belovo Institute, Russia**, pp. 119-124.

#### □□ RESEARCH PROJECTS

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1. **Ram, Jiwari (Principal Investigator)**, Fast and Robust Numerical Algorithms for 2D Unsteady-state Convection Dominated Singularly Perturbed Parabolic Models: Theoretical Analysis and Computational Modeling, **SERB 2022, Cost 6.6 Lacs**
2. **Ram, Jiwari (Principal Investigator)**, Theoretical Analysis and Simulation to Capture Complex Patterns of Nonlinear Reaction-Diffusion Models, **NBHM 2021, Cost 16 Lacs**
3. **Ram, Jiwari (Principal Investigator)**, Lie Symmetry Analysis, Simulation and Lyapunov Stability Analysis of the Hyperbolic Systems, **Indo-Uzbek International Project (DST) 2021, Cost 32 Lac Appx.**
4. **Ram, Jiwari (Principal Investigator)**, Theoretical Analysis and Numerical Simulation of Unsteady-State Singularly Perturbed Parabolic Model, **CSIR 2019, Cost 20 Lacs (Appx.)**.
5. **Ram, Jiwari (Principal Investigator)**, Numerical Analysis and Computational Modeling of Nonlinear Parabolic Mathematical Models with Singular and Variable Coefficients, **Young Scientist (SERB 2016), Cost 18.06 Lacs (Appx.)**
6. **Ram Jiwari (Principal Investigator)**, Numerical Analysis and Computational Modeling of Hyperbolic Partial Differential Equations, **FIG (IIT Roorkee 2014), Cost 6.5 Lacs.**

#### AWARDS

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1. **Haryana Yuva Vigyan Ratna Awards 2020, DST, Haryana Govt.**
2. **DAAD Bilateral Wissenschaftler Austausch at Technische Universität Darmstadt, Germany, 2017**
3. **Post Doc Fellow, Institute of Industrial Mathematics, Federal University do Paraná, Brazil, 2013.**
4. **Fundação para a Ciência e a Tecnologia (FCT), Fellowship of Portugal, 2011**
5. Graduate Aptitude Test in Engineering (GATE-AIR-38), 2011, India
6. **Senior Research Fellowship, CSIR, 2008**
7. National Eligibility Test (NET) & Junior Research Fellowship (JRF), CSIR, India, 2005.

## **TEACHING /RESEARCH EXPERIENCE**

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1. **Associate Professor, Indian Institute of Technology Roorkee, India** (10 Aug 2020 Ongoing)
2. **Assistant Professor, Indian Institute of Technology Roorkee, India** (03-06-2014 to 09-08-2020)
3. **Assistant Professor, Thapar University Patiala, India** (April, 2014 to 02 June, 2014)
4. **Post Doc Fellow, Federal University do Paraná, Brazil** (9<sup>th</sup> Sept. 2013 to March, 2014)
5. **Thapar University Patiala** (19 May, 2011 to 8 Sept, 2013)
6. **Dr B R Ambedkar National Institute of Technology Jalandhar, India** (July, 2010 to 18 May, 2011)

## **WORKSHOP ORGANIZED**

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1. **Applications of Computational Techniques in Engineering using MATLAB**, 02-07 June, 2019 at QIP IIT Roorkee, Funded by AICTE.
2. **Advanced Computational Techniques for Differential Equations with MATLAB**, (ACTDEM 2018), 18- 22 Sep, 2018 at Department of Mathematics, IIT Roorkee, Funded by NBHM, CSIR.
3. **Computational Techniques for Differential Equations with MATLAB** (CTDE 2015), 02-06 July, 2015 at Department of Mathematics, IIT Roorkee, Funded by DST, UCOST.

## **INVITED TALKS/WORKSHOP/CONFERENCES ATTENDED**

1. SIAM Conference on Analysis of Partial Differential Equations, **University of California (Dec, 2019)**
2. **Technische Universität (TU) Darmstadt, Germany (June, 2017), Invited Talk**
3. **Universidade Federal do Paraná, Brazil (2014), Invited Talk on Finite Element Methods**
4. New Frontiers in Numerical Analysis and Scientific Computing (17-18 April, 2013) Conference held at **Kent State University, USA (Paper Presented)**.
5. NUMDIFF-13 (Sept 2012) Conference & Symposium held at **Martin-Luther University, Halle, GERMANY**.
6. Workshop on **FEM** held at **TIFR CAM Bangalore** from 2 July to 13 July, 2012
7. Workshop **WMMFA on wavelets** held at **IIT Bombay** March 2012
8. Workshop on **Differential Equations and Mathematical Modelling**, held at **Delhi University**, 9 to 11 Feb, 2012.
9. **Symposium** held at **TIFR CAM Bangalore** Jan 2011.
10. One month School organized by **NBHM at Panjab University Chandigarh** Dec 2008.
11. **Symposium** held at **IISC Bangalore** 2008.

12. NUMDIFF-12 (2009) Conference & Symposium held at **Martin-Luther University, Halle, GERMANY.**
13. IAWS-CFD Workshop and Conference held at **IIT Roorkee, Roorkee, 2006**

#### **REVIEWER OF REFERED JOURNALS**

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1. **Computer Physics Communications (Elsevier)**
2. **Mathematical Methods in the Applied Sciences ( Wiley Publication )**
3. **Applied Mathematical Modelling (Elsevier)**
4. **Applied Mathematical and Computation (Elsevier)**
5. **Computers and Mathematics with Applications (Elsevier)**
6. **Neural Computing and Applications (Springer)**
7. **Nonlinear Dynamics (Springer)**
8. **Engineering Computations (Emerald)**
9. **International Journal of Numerical Methods for Heat and Fluid Flow (Emerald)**
10. **International Journal of Nonlinear Science**

#### **REFERENCES**

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2. **Dr. Kapil Kumar Sharma**  
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South Asian University, Akbar Bhawan,  
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