Prof Rathish Kumar B.V.

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Expertise

Applied Mathematics

Numerical Methods for Partial Differential Equations, Bio-Fluid Mechanics, Parallel Numerical Algorithms and High, Performance Computation, Mathematical Modeling and Simulation, Biomedical Imaging, AI/ML/DL Methods for and Applications, Cardiac Electric Activity, Convection in Porous Media, Numerical Linear Algebra,

Work experience

1. Indian Institute of Technology Kanpur 2015 — Present

   Professor (HAG)
   Kanpur Nagar

Education

1. Ph.D -

Honours and Awards

Fellow of Indian Association of Mathematical Modelling and

1. ### Simulation - 2018

   ISMMACS

2. ### Fellow of National Academy of Sciences (FNaSc) - 2009

   Natioan Academy of Sciences, Allahabad

3. ### FNR Visiting Scientist - 2006

   Luxembourg National Research Fund

4. ### Chandna Award for Applied Mathematics - 2004

   Canadian World Education Foundation

5. ### Erasmus Mundus Fellowship - 2004

   EMA

6. ### FNR Visiting Scientist - 2004

   Luxembourg National Research Fund

7. ### Visiting Professor - 2003

   EPFL, Switzerland

8. ### RIKEN Visiting Scientitst - 2001

   RIKEN, Japan

9. ### RIKEN Visiting Scientitst - 2000

   RIKEN, Japan

10. ### University Gold Medal for Mathematics - 1987

    SSSIHL, Prasanthinilayam, AP

11. ### University Academic UG-Proficiency Award for Sciences - 1985

    SSSIHL, Prasanthinilayam, AP

12. ### AP State HSS MERIT SCHOLARTOP for ranking in top 50 - 1982

    APSCBOE

13. ### AP Board State Merit Scholarship ranking in top 25 - 1980

    AP SSBOE

14. ### Best Student Award - 1980

    BZHS, Chittoor, AP

Publication

1. Mixed convection in a partially and differentially heated cavity − a finite volume complete flux analysis

   Rathish Kumar B.V.;Pandey C.
   International Journal of Numerical Methods for Heat and Fluid Flow, Volume , Year 2025

2. Punctured window based multiscale line detector for efficient segmentation of retinal blood vessels

   Makkar V.;Tewary A.;Rathish Kumar B.V.;Pandey R.K.
   Computers in Biology and Medicine, Volume 191, Year 2025

3. Novel Finite-Volume Complete Flux Approximation Schemes for the Incompressible Navier–Stokes Equations

   Pandey C.;ten Thije Boonkkamp J.H.M.;Rathish Kumar B.V.
   International Journal for Numerical Methods in Fluids, Volume 97, Year 2025, Pages 409-425

4. Superconvergent scheme for a system of green Fredholm integral equations

   Kumar R.;Kant K.;Kumar B.V.R.
   Applied Numerical Mathematics, Volume 207, Year 2025, Pages 254-271

5. Fractional nanofluid flow dynamics of thermal transport and entropy generation in a wavy porous enclosure containing a hot circular cylinder

   Deepika Parmar;S. V. S. S. N. V. G. Krishna Murthy;Kambiz Vafai;Khalil Khanafer;B. V. Rathish Kumar;Sumant Kumar
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6. A variational multiscale stabilized finite element method for double diffusive incompressible flow with application to mixed convection in a heated staggered cavity under magnetic field

   Sahoo D.K.;Rathish Kumar B.V.
   International Journal for Computational Methods in Engineering Science and Mechanics, Volume 26, Year 2025, Pages 140-154

7. A colour image segmentation method and its application to medical images

   Halim A.;Kumar B.V.R.;Niranjan A.;Nigam A.;Schneider W.;Ahuja C.K.;Pathak S.K.
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8. Effect of rheological models on pulsatile hemodynamics in a multiply afflicted descending human aortic network

   Kumar S.;Kumar B.V.R.;Rai S.K.;Shankar O.
   Computer Methods in Biomechanics and Biomedical Engineering, Volume 27, Year 2024, Pages 116-143

9. Multi-physics study on double-diffusion convective flow in an inverted T-

shaped porous enclosure: ANN-based parametric estimation

Kumar S.;Murthy S.V.S.S.N.V.G.K.;Kumar B.V.R.;Parmar D.
Physics Letters, Section A: General, Atomic and Solid State Physics, Volume 518, Year 2024

10. Thermo-magnetic radiative flow in porous enclosure with deep-learning parameter estimation

Kumar S.;Murthy S.V.S.S.N.V.G.K.;Kumar B.V.R.;Parmar D.
International Journal of Mechanical Sciences, Volume 276, Year 2024

11. Tertiary wake mode in flows past elliptic cylinders

Kumar D.;Kumar B.
European Journal of Mechanics, B/Fluids, Volume 106, Year 2024, Pages 130-136

12. A comprehensive review on CFD simulations of left ventricle hemodynamics: numerical methods, experimental validation techniques, and emerging trends

Soni P.;Kumar S.;Kumar B.V.R.;Rai S.K.;Verma A.;Shankar O.
Journal of the Brazilian Society of Mechanical Sciences and Engineering, Volume 46, Year 2024

13. Computational study of aspect ratio and undulation effect on natural convection in an inverted T-shaped porous enclosure

Kumar S.;Krishna Murthy S.V.S.S.N.V.G.;Kumar B.V.R.
Numerical Heat Transfer; Part A: Applications, Volume , Year 2024

14. Superconvergent scheme for a system of Green nonlinear Fredholm integral equations

Kumar R.;Rathish Kumar B.V.
Applied Mathematics and Computation, Volume 479, Year 2024

15. Finite element analysis of a thermal non-equilibrium hybrid nanofluid model for natural convection in a complex porous enclosure

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Computers and Mathematics with Applications, Volume 169, Year 2024, Pages 177-194

16. Entropy generation in a partially heated hybrid nanofluid saturated wavy porous cavity

Barman, P. and Pentyala, S. R. and Rathish Kumar, B. V.
International Journal of Numerical Methods for Heat and Fluid Flow, Volume 34, Year 2024, Pages 1060–1086

17. Convective Heat Transport Analysis of Hybrid Nanofluid in an Inverted T-Shaped Porous Enclosure Under Various Locations of Circular Cylinder

Sumant and B. V. Rathish Kumar and S. K. Murthy and Deepika
ZAMM, Year 2024

18. Superconvergent Jacobi Spectral Methods for System of Volterra Integral Equations for Mixed Type Kernel

Rakesh Kumar and Kapil Kanth and B. V. Rathish Kumar
International Journal of Computer Mathematics, Year 2024

19. Modified Galerkin Method for Derivative Dependent Fredholm–Hammerstein Integral Equations of Second Kind

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20. Fast rapidly convergent penetrable scattering computations

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Advanced Modeling and Simulation in Engineering Sciences, Volume 11, Year 2024

21. Convective heat transfer enhancement in an inverted T-shaped porous enclosure through vertical varying circular cylinder

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24. Variational multiscale stabilized FEM for cardiovascular flows in complex arterial vessels under magnetic forces

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25. Effect of Al2O3-Cu/Water Hybrid Nanofluid on Natural Convection in an Inverted T-Shaped Enclosure

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26. Numerical simulation of entropy generation in thermo-magnetic convection in an inverted T-shaped porous enclosure under thermal radiation

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27. A deep learning-based numerical approach for the natural convection inside a porous media

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28. Entropy generation for thermo-magnetic fractional order convective flow in complex porous enclosures: a numerical study

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31. Mathematical modeling of convective heat transfer enhancement using circular cylinders in an inverted T-shaped porous enclosure

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33. Bejan's heatline and mulitphysics analysis of double diffusive free convection in a doubly stratified non-Darcian porous enclosure with heat generation

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35. A 3D Haar wavelet method for a coupled degenerate system of parabolic equations with nonlinear source coupled with non-linear ODEs

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36. Simplified Subgrid multiscale stabilized finite element method in the transient framework for Stokes equations

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38. Time dependent subgrid multiscale stabilized finite element analysis of fully coupled transient Navier–Stokes-transport model

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    Numerical Methods for Partial Differential Equations, Volume 39, Year 2023, Pages 2163-2201

39. The pulsatile 3D-Hemodynamics in a doubly afflicted human descending abdominal artery with iliac branching

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    Computer Methods in Biomechanics and Biomedical Engineering, Volume 26, Year 2023, Pages 680-699

40. An open loop 0D-3D modeling of pulsatile hemodynamics for the diagnosis of a suspected coronary arterial disease with patient data

    Sumit Kumar;B. V. Rathish Kumar;Sanjay Kumar Rai;Om Shankar
    Physics of Fluids, Volume 35, Year 2023

41. Study of unsteady non-Newtonian fluid flow behavior in a two-sided lid-driven cavity at different aspect ratios

    Chowdhury M.;Kumar B.V.R.
    Journal of Non-Newtonian Fluid Mechanics, Volume 312, Year 2023

42. A priori and a posteriori error estimation for finite element approximation of advection-diffusion-reaction equation with spatially variable coefficients

    Rathish Kumar, B. V. and Manisha
    Journal of Applied \& Computational Mathematics, Year 2023

43. TrGANet: Transforming 3T to 7T dMRI using Trapezoidal Rule and Graph based Attention Modules

    Jha R.R.;Kumar B.V.R.;Pathak S.K.;Bhavsar A.;Nigam A.
    Medical Image Analysis, Volume 87, Year 2023

44. FINITE ELEMENT STUDY OF TRANSIENT MHD STOKES EQUATIONS AND MODELLING A DOUBLY DRIVEN CAVITY FLOW

    RATHI, ANIL and SAHOO, DIPAK KUMAR and KUMAR, BV RATHISH and CHOWDHURY, MANISHA and DEY, SANGITA
    Dynamic Systems and Applications, Volume 32, Year 2023, Pages 333--349

45. Approximation of Weakly Singular Non-Linear Volterra-Uryssohn Integral Equations by Piecewise Polynomial Projection Methods Based on Graded Mesh

    Ritu Nigam and Kapil Kant and B. V. Rathish Kumar and Gnaneshwar Nelakanti
    Journal of Applied Analysis & Computation, Volume 13, Year 2023, Pages 1359--1387

46. Undersampled single-shell to MSMT fODF reconstruction using CNN-based ODE solver

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    Computer Methods and Programs in Biomedicine, Volume 230, Year 2023

47. TrGANet: Transforming 3T to 7T dMRI using Trapezoidal Rule and Graph

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48. Undersampled single-shell to MSMT fODF reconstruction using CNN-based ODE solver

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49. Influence of abdominal aortic aneurysm shape on hemodynamics in human aortofemoral arteries: A transient open-loop study

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50. Multiscale stabilized finite element computation of the non-Newtonian Casson fluid flowing in double lid-driven rectangular cavities

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51. Numerical study of entropy generation in magneto-convective flow of nanofluid in porous enclosure using fractional order non-Darcian model

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52. Double Diffusive Convective Flow Study of a Hybrid Nanofluid in an Inverted T-Shaped Porous Enclosure Under the Influence of Soret and Dufour Prameters

Kumar S.;Kumar B.V.R.;Murthy S.V.S.S.N.V.G.K.
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53. Multi-force effect on fluid flow, heat and mass transfer, and entropy generation in a stratified fluid-saturated porous enclosure

Kumar V.;Murthy S.V.S.S.N.V.G.K.;Kumar B.V.R.
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54. THERMO-FLUIDIC CONVECTIVE FLOW STUDY OF HYBRID NANOFLUID IN AN INVERTED T-SHAPED POROUS ENCLOSURE UNDER UNIFORMLY ACTING MAGNETIC FIELD

Kumar S.;Kumar B.V.R.;Murthy S.V.S.S.N.V.G.K.;Parmar D.
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55. Finite element analysis of modified N-S equations coupled with energy transfer for hybrid nanofluid flow in complex domains

Dey S.;Rathish Kumar B.V.
Computers and Mathematics with Applications, Volume 150, Year 2023, Pages 37-53

56. Modeling and simulation of the potential indoor airborne transmission of SARS-CoV-2 virus through respiratory droplets

Bhat S.P.;Kumar B.V.R.;Kalamkar S.R.;Kumar V.;Pathak S.;Schneider W.
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57. Entropy generation in a chemically and thermally reinforced doubly stratified porous enclosure in a magnetic field

Kumar V.;Krishna Murthy S.V.S.S.N.V.G.;Rathish Kumar B.V.
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58. Steady flow past elliptic cylinders with blockage effects

Kumar D.;Kumar B.
Physics of Fluids, Volume 34, Year 2022

59. Non Uniform Weighted Extended B-Spline Finite Element Analysis of Non Linear Elliptic Partial Differential Equations

Chakraborty A.;Kumar B.V.R.
Differential Equations and Dynamical Systems, Volume 30, Year 2022, Pages 485-497

60. Cardiac electro-mechanical activity in a deforming human cardiac tissue: modeling, existence–uniqueness, finite element computation and application to multiple ischemic disease

Pargaei M.;Kumar B.V.R.;Pavarino L.F.;Scacchi S.
Journal of Mathematical Biology, Volume 84, Year 2022

61. A PDE Based Image Segmentation Using Fourier Spectral Method

Vijayakrishna R.;Kumar B.V.R.;Halim A.
Differential Equations and Dynamical Systems, Volume 30, Year 2022, Pages 469-484

62. VRfRNet: Volumetric ROI fODF reconstruction network for estimation of multi-tissue constrained spherical deconvolution with only single shell dMRI

Jha R.R.;Pathak S.K.;Nath V.;Schneider W.;Kumar B.V.R.;Bhavsar A.;Nigam A.
Magnetic Resonance Imaging, Volume 90, Year 2022, Pages 1-16

63. A PDE Based Image Segmentation Using Fourier Spectral Method

Vijayakrishna, R. and Kumar, B. V. R. and Halim, A.
Differential Equations and Dynamical Systems, Volume 30, Year 2022, Pages 469--484

64. LFANET: Transforming 3T Single-Shell to 7T Multi-Shell DMRI Using Deep Learning Based Leapfrog and Attention

Jha R.R.;Pathak S.K.;Schneider W.;Kumar B.V.R.;Bhavsar A.;Nigam A.
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65. The effect of surfactant on the drag and wall correction factor of a drop in a bounded medium

Raturi S.;Kumar B.V.R.
Zeitschrift fur Naturforschung - Section A Journal of Physical Sciences, Volume 77, Year 2022, Pages 339-352

66. Linear stability analysis of convection in a solid partitioned

inhomogeneous multilayered porous structure

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67. Variational multiscale stabilized finite element analysis of non-Newtonian Casson fluid flow model fully coupled with Transport equation with variable diffusion coefficients

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68. Convergence Analysis for Linear Fredholm and Nonlinear Fredholm Hammerstein Integral Equations

Kant, Kapil and Kumar, Rakesh and Kumar, B. V. Rathish
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69. Modified Galerkin method for Volterra-Fredholm-Hammerstein integral equations

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70. Enhancing HARDI reconstruction from undersampled data via multi-context and feature inter-dependency GAN

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71. Finite Element Modelling and Analysis of Free Vibration of a Square Plate with Side Crack

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72. On the Existence of Approximate Solution of Fredholm Integral Equation of the First Kind by Band-Limited Scaling Function

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73. Entropy and multiphysics analysis in a viscous dissipative non-Darcian porous enclosure

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74. Parameter identification in multidimensional hyperbolic partial differential equations using wavelet collocation method

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75. Effect of insoluble surfactants on the motion of Reiner–Rivlin fluid sphere in a spherical container with Newtonian fluid

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77. ## A TV−L^2−H^{-1} PDE model for effective denoising

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78. ## Wavelet Galerkin Methods for Higher Order Partial Differential Equations

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B. V. Rathish Kumar and Manisha
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80. ## HLGSNet: Hierarchical and Lightweight Graph Siamese Network with Triplet Loss for fMRI-based Classification of ADHD

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83. ## On subgrid multiscale stabilized finite element method for advection-diffusion-reaction equation with variable coefficients

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84. ## Haar wavelet method for two-dimensional parabolic inverse problem with a control parameter

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85. ## Reconstruction of the parameter in parabolic partial differential equations using Haar wavelet method

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86. Higher order PDE based model for segmenting noisy image

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88. Complete flux scheme for elliptic singularly perturbed differential–difference equations

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90. A RBF based finite difference method for option pricing under regime-switching jump-diffusion model

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92. Magnetic field effect on non-darcy mixed convection from a horizontal plate in a nanofluid-saturated porous medium

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94. On the existence–uniqueness and computation of solution of a class of cardiac electric activity models

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95. A meshless local collocation method for time fractional diffusion wave equation

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96. Finite element method for drifted space fractional tempered diffusion

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Chakraborty A.;Kumar B.V.R.
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97. A linear fourth-order PDE-based gray-scale image inpainting model

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98. A priori and a posteriori error estimation for finite element approximation of advection-diffusion-reaction equation with spatially variable coefficients

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99. Numerical study of entropy generation in a doubly stratified fluid saturated Darcy porous enclosure in the presence of Soret and Dufour effects under the influence of MHD forces

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100. On the influence of magnetic field on Darcy mixed convection from a horizontal plate in a nanofluid saturated porous medium

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103. Influence of MHD forces on Bejan's heatlines and masslines in a doubly stratified fluid saturated Darcy porous enclosure in the presence of Soret and Dufour effects – A numerical study

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