



Dr. Rakesh Kumar
Professor

Qualifications: M. Phil., Ph.D.

Contact Details:

Address: Department of Mathematics, School
of Mathematics, Computer and
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Teaching Experience: 11 years & 08 Months

Courses Taught:

- (i) Under Graduate and Post Graduate students:
Linear Algebra, Real Analysis, Discrete Mathematics, Ordinary and Partial
Differential equations, Numerical Analysis, Fractional Differential
Equations, Finite Element Methods,
Mathematical Methods
- (ii) Ph.D. Students:
Advanced Mathematical Methods, Group Analysis of Differential Equations,
Hydrodynamic Stability Theory

Research Interests: Fluid Mechanics, Numerical Analysis, Fractional Calculus

List of Research Papers Published/Accepted:

1. M.Sheikholeslami,Sabir Ali Shehzad,**Rakesh Kumar**, Natural Convection of Fe₃O₄-Ethylene glycol under the impact of electric field in a porous enclosure, **Communications in theoretical Physics**, Accepted (2018).
2. **Rakesh Kumar**, Sabir Ali Shehzad, Numerical simulation of three dimensional flow of radiating gray nanofluid through porous medium subjected to vibrational rotations and slip at liquid-sheet interfac **Journal of Porous Media**Accepted (2018).
3. **Rakesh Kumar**, Ravinder Kumar, Sabir Ali Shehzad, M Sheikholeslami, Rotating frame analysis of radiating and reacting ferro-nanofluid considering Joule heating and viscous dissipation,**International Journal of Heat and Mass Transfer** 120 (2018) 540-551.

4. **Rakesh Kumar**, Numerical exploration of thermal radiation and rotation effects on the 3- dimensional flow of Cu-water nanofluid over an oscillating flat surface, **International Journal of Applied and Computational Mathematics**, Accepted(2017).
5. **R. Kumar**, C.S.K. Raju, K.R. Sekhar, G.V. Reddy, Three dimensional MHD Ferrous nanofluid flow over a sheet of variable thickness in slip flow regime, **Journal of Mechanics**, Accepted(2017).
6. V. Kumar Joshi, P. Ram, **R. Kumar** C.S.K. Raju, Effect of Geothermal Viscosity on Unsteady Bodewadt Flow of Ferro-nanofluid Embedded in Porous Medium, **Journal of Porous Media**, Accepted (2017).
7. K.R. Sekhar, G.V. Reddy, C.S.K. Raju, B. Pullepu, **R. Kumar**, S.A. Shehzad, Aligned magnetic dipole in nonlinear radiative Falkner-Skan flow of Casson fluid over a wedge containing suspension of nanoparticles and microorganisms, **International Journal of Nanoparticles**9(4) (2017) 213-233.
8. **R. Kumar**, S. Sood, Unsteady MHD Nanobioconvective Stagnation Slip Flow in a Porous Medium Due to Exponentially Stretching Sheet Containing Microorganisms, In: Singh M., Kushvah B., Seth G., Prakash J. (eds) Applications of Fluid Dynamics, pp. 3 -16 **Lecture Notes in Mechanical Engineering**. Springer, DOIhttps://doi.org/10.1007/978-981-10-5329-0_1
9. **R. Kumar**, S. Sood, S. A. Shehzad, M. Sheikholeslami, Radiative heat transfer study for flow of non-Newtonian nanofluid past a Riga plate with variable thickness, **Journal of Molecular Liquids** 248 (2017) 143-152.
10. **R. Kumar**, S. Sood, Combined influence of fluctuations in the temperature and stretching velocity of the sheet on MHD flow of Cu-water nanofluid through rotating porous medium with cubic auto-catalysis chemical reaction, **Journal of Molecular Liquids** 237 (2017) 347-360.
11. **R. Kumar**, S. Sood, M. Sheikholeslami, S. A. Shehzad, Nonlinear thermal radiation and cubic autocatalysis chemical reaction effects on the flow of stretched nanofluid under rotational oscillations, **Journal of Colloid and Interface Science** 505 (2017) 253-265.
12. **R. Kumar**, S. Sood, S. A. Shehzad, M. Sheikholeslami, Numerical modeling of time-dependent bio-convective stagnation flow of a nanofluid in slip regime, **Results in Physics** 7 (2017) 3325-3332.
13. **R. Kumar**, S. Sood, Numerical Analysis of Stagnation Point Nonlinear Convection Flow Through Porous Medium over a Shrinking Sheet, **International Journal of Applied and Computational Mathematics**3(2) (2017) 971-985.
14. P. Ram, H. Singh, **R. Kumar**, V. Kumar, V. K. Joshi, Free Convective Boundary Layer Flow of Radiating and Reacting MHD Fluid Past a Cosinusoidally Fluctuating Heated Plate, **International Journal of Applied and Computational Mathematics** (2017) DOI: <https://doi.org/10.1007/s40819-017-0355-z>

15. **R. Kumar**, S. Sood, Interaction of Magnetic Field and Nonlinear Convection in the Stagnation Point Flow over a Shrinking Sheet, **Journal of Engineering**, Volume 2016, (2016) Article ID 6752520, 8 pages <http://dx.doi.org/10.1155/2016/6752520>
16. **R. Kumar**, S. Sood, Effect of Quadratic density variation on mixed convection stagnation point heat transfer and MHD fluid flow in porous medium towards a permeable shrinking sheet, **Journal of Porous Media**, 19 (12) (2016) 1083–1097.
17. **R. Kumar**, Combined effects of variable magnetic field and porous medium on the flow of MHD fluid due to exponentially shrinking sheet, **International Journal of Mathematical archive** 6(6), (2015) 218–226.
18. K. Chand, **R. Kumar**, S. Kumar, Heat transfer in oscillating hydromagnetic channel flow with arbitrary conducting walls, **Turkish Journal of Engineering and Environmental Sciences** 38 (2014) 256–265.
19. K. Chand, **R. Kumar**, S. Sharma, Rarefaction and Darcy effects on the hydromagnetic flow of radiating and reacting fluid in a vertical channel, **Turkish Journal of Engineering and Environmental Sciences** 37 (2013) 137–145.
20. K. Chand, **R. Kumar**, Hall effect on heat and mass transfer in the flow of oscillating viscoelastic fluid through porous medium with wall slip conditions, **Indian Journal of Pure and Applied Physics** 50 (2012) 149–155.
21. K. Chand, **R. Kumar**, S. Sharma, Hydromagnetic oscillatory flow through a porous medium bounded by two vertical porous plates with heat source and Soret effect, **Advances in Applied Science Research** 3(4) (2012) 2169–2178.
22. **R. Kumar** and K. D. Singh, Mathematical modeling of Soret and Hall effects on oscillatory MHD free convective flow of radiating fluid in a rotating vertical porous channel filled with porous medium, **Int. J. of Appl. Math. & Mech.**, 8 (2012) 49–68.
23. K.D. Singh and **R. Kumar**, Fluctuating Heat and Mass Transfer on Unsteady MHD Free Convection Flow of Radiating and Reacting Fluid past a Vertical Porous Plate in Slip- Flow Regime, **Journal of Applied Fluid Mechanics** 4(4) (2011) 101–106.
24. K. Chand, **R. Kumar**, Soret and Hall current effects on heat and mass transfer in MHD flow of viscoelastic fluid past a porous plate in rotating porous medium and slip flow regime, **Journal of Rajasthan Academy of Physical Sciences** 10(4) (2011) 357–371.
25. **R. Kumar**, K. Chand, Effect of slip conditions and Hall current on unsteady MHD flow of a viscoelastic fluid past an infinite vertical porous plate through porous medium, **International Journal of Engineering Science and Technology** 2011 (2011) 3124–3133.
26. **R. Kumar** and K. D. Singh, Unsteady MHD flow of radiating and reacting fluid past a vertical porous plate with sinusoidally fluctuating temperature, **Int. J. of Appl. Math. & Mech.**, 7 (2011) 19–35.
27. K. D. Singh and **R. Kumar**, An exact solution of an oscillatory MHD flow through a porous medium bounded by rotating porous channel in the presence of Hall current, **Int. J. of Appl. Math. & Mech.**, 6, (2010) 28–40.

28. K.D. Singh **R. Kumar**, Effects of chemical reactions on unsteady MHD free convection and mass transfer for flow past a hot vertical porous plate with heat generation/absorption through porous medium, **Indian Journal of Physics** 84 (1) (2010) 93-106.
29. K.D. Singh, **R. Kumar**, Soret and Hall Current Effects on Heat and Mass Transfer in MHD Flow of a Viscous Fluid through Porous Medium with Variable Suction, **Proceedings-Indian National Science Academy Part A, Physical Sciences** 75(3) (2009) 119-126.
30. K.D. Singh, **R. Kumar**, Heat and Mass Transfer in MHD flow of a viscous fluid through porous medium with variable suction and heat source, **Proceedings-Indian National Science Academy Part A, Physical Sciences** 75(1) (2009) 7-13.
31. K.D. Singh, **R. Kumar**, Combined effects of Hall current and rotation on free convection MHD flow in a porous medium, **Indian Journal of Pure and Applied Physics** 47 (2009) 617-623.
32. K.D. Singh, **R. Kumar**, Radiation effects on the exact solution of free convective oscillatory flow through porous medium in a rotating vertical porous channel, **Journal of Rajasthan Academy of Physical Sciences** 8(3) (2009) 295-310.

Papers Presented in National/International Conferences:

- | Sr. No. | Title/Theme/Institute |
|----------------|--|
| 1. | Magnetic field effect on the Couette flow of dusty fluid with volume fraction, Multidisciplinary National Conference on Innovative Trends in Science, Technology and Management Sri Sai University Palampur, 19 June, 2015 |
| 2. | Boundary Layer flow and heat transfer of MHD fluid due to exponentially shrinking sheet, Multidisciplinary National Conference on Innovative Trends in Science, Technology and Management , Sri Sai University Palampur, 19 June, 2015 |
| 3. | Group analysis of stagnation point flow of a fluid with nanoparticles and microorganisms, Multidisciplinary National Conference on Innovative Trends in Science, Technology and Management-III , Sri Sai University Palampur, 24 June, 2016 |
| 4. | Magnetic field effects on the mixed bio-convection stagnation point flow of nanofluid, Multidisciplinary National Conference on Innovative Trends in Science, Technology and Management-III , Sri Sai University Palampur, 24 June, 2016 |
| 5. | Analysis of stagnation point heat transfer and MHD fluid flow due to a vertical permeable shrinking sheet considering nonlinear convection, National Seminar on New Dimensions in Mechanics and Allied Fields , Department of Mathematics, HP University Shimla-5, 27-28 November, 2015 |
| 6. | Nonlinear convection effect over an exponentially shrinking sheet in porous medium, National Seminar on New Dimensions in Mechanics and Allied Fields , Department of Mathematics, HP University Shimla-5, 27-28 November, 2015 |

7. On the combined impacts of thermal radiation and rotation for the three dimensional flow of Cu-water nanofluid past an oscillating flat sheet, **National Conference on Advances in Mathematical Sciences**, Department of Mathematics, Govt. Degree

College Hamirpur, HP, 21-22 December, 2016

8. Combined effects of rotation and magnetic field on the free convection flow of nanofluid past an oscillating plate, **International conference on Mathematical Sciences Interface Humanity**, Department of Mathematics, Govt. Degree college Barsar, 7-8

October 2016

9. Entropy generations in the flow of ferro-nanofluid over a bi-directionally stretchable surface, **International conference on Mathematical Sciences Interface Humanity**, Department of Mathematics, Govt. Degree college Barsar, 7-8 October 2016

Invited Talks/Lectures:

- | Sr.No. | Title /Theme/Institute |
|--------|---|
| 1. | Mathematics- an interesting and useful discipline , INSPIRE INTERNSHIP CAMP , Department of Microbiology, College of Basic Sciences, CSK HP KrishiVishvavidalaya, Palampur, HP, 22-26 October 2013 |
| 2. | Recent Trends in Mathematics , A Programme on Career Opportunities and Recent Trends in Mathematics , M&M Educational Services, Hamirpur HP, 1 February 2014 |
| 3. | Importance of Mathematics-I , INTERNSHIP SCIENCE CAMP , Laureate Institute of Pharmacy, Kathog, Jwalaji HP, 4-8 July 2016 |
| 4. | Importance of Mathematics-II , INTERNSHIP SCIENCE CAMP , Laureate Institute of Pharmacy, Kathog, Jwalaji HP, 19-23 December 2016 |

Research Guidance:

S. No.	Degree	Name of Student	Title of thesis	Awarded/ Ongoing
1.	Ph. D.	ShilpaSood	Some steady and unsteady convective boundary layer flows past deforming surfaces	Awarded 2017
2.	Ph. D.	Ravinder Kumar	Yet to be decided	Ongoing
3.	Ph. D.	ReenaKoundal	Yet to be decided	Ongoing

Research Projects:

S.No.	Title / Subject of Research Project	Name of Sponsoring Funding Agency	Date of commencement	Date of Completion	Total Grants/ Funding Sanctioned
1.	Oscillatory Convection in Nanofluids	UGC BSR Start-Up grant vide UGC letter No. F.30-64/2014	18.02.2015	17.02.2017	6,00,000

Development of E-Learning Delivery Process/ Material:

S.No.	Name of Subject	Name of Module
1.	Fractional Differential Equations	OER in Moodle

Awards & Honours Received:

S. No.	Name of Award
1.	Gold Medal in M.A./M.Sc. Examination, 2003 from HP University Shimla
2.	Himo-Utkarsh Sahitya Academy Award for being topper in M.A./M.Sc. Examination, 2003
3.	Shyama Prasad Mukherjee Fellowship call for being among top 20% JRF awardees in June 2004