

## Brief Curriculum Vitae



### RAJ KUMAR

**Ph.D. in 2014** (Motilal Nehru National Institute of Technology Allahabad)

**M.Sc. in 1998** (I. I. T. Roorkee formally **University of Roorkee**)

Associate Professor (AGP-9000) in Mathematics

Joined the V.B.S. Purvanchal University in March, 2004

**Research Interests:** Similarity transformations method, Similarity reductions and closed form solutions of non linear differential Equations

**Current Research Focus:** My primary research interest lies in the domain of nonlinear differential equations and solving them by Similarity transformations method (STM). Some of my recent work includes the exact solutions of non linear evolution equations occurring in fluids like

(2+1)-coupled breaking soliton system ( $\mathbf{u}_t + \mathbf{b} \mathbf{u}_{xxy} + 4\mathbf{b} \mathbf{u} \mathbf{v}_x + 4\mathbf{b} \mathbf{v} \mathbf{u}_x = \mathbf{0}, \mathbf{u}_y = \mathbf{v}_x$ ),

(2+1)-Kedomtsev-Petviashvili Equation ( $\mathbf{u}_{xt} + \mathbf{a} \mathbf{u} \mathbf{u}_{xx} + \mathbf{a} \mathbf{u}_x^2 + \mathbf{b}^2 \mathbf{u}_{xxx} + \mathbf{c}^2 \mathbf{u}_{yy} = \mathbf{0}$ ),

(2+1)-coupled KD system ( $\mathbf{u}_t - \mathbf{u}_{xxx} - 6\mathbf{b} \mathbf{u} \mathbf{u}_x + \frac{3}{2} \mathbf{a}^2 \mathbf{u}^2 \mathbf{u}_x - 3\mathbf{v}_y + 3\mathbf{a} \mathbf{v} \mathbf{u}_x = \mathbf{0}, \mathbf{u}_y = \mathbf{v}_x$ ),

Calogero-Bogoyavlenskii-Schiff ( $\mathbf{u}_{xt} + \mathbf{u}_{xxxz} + 4 \mathbf{u}_x \mathbf{u}_{xz} + 2\mathbf{u}_{xx} \mathbf{u}_z = \mathbf{0}$ ),

(2+1)-Zabolotskay-Khokhlov (ZK) equation ( $\mathbf{u}_{xt} + \mathbf{u}_x^2 + \mathbf{u} \mathbf{u}_{xx} + \lambda \mathbf{u}_{xxx} + \mu \mathbf{u}_{yy} = \mathbf{0}$ ) and

(2+1)-coupled Boiti-Leon-Pempinelli (BLP) system ( $\mathbf{u}_{ty} = 2\mathbf{u} \mathbf{u}_{xy} + 2 \mathbf{u}_x \mathbf{u}_y - \mathbf{u}_{xyy} + 2\mathbf{v}_{xxx}, \mathbf{v}_t = \mathbf{v}_{xx} + 2 \mathbf{u} \mathbf{v}_x$ ).

The STM is a good technique to solve system of PDE's analytically which is based on invariance property of PDE's that leaves PDE's invariant. The invariance reduces the number of independent variables by one in PDE's.

**Thesis title:** *ON SIMILARITY SOLUTIONS OF NONLINEAR FLUID PROBLEMS*

**Academic Experience:** 14 years teaching as Associate Professor and Assistant Professor in Department of Mathematics at V.B.S. Purvanchal University from March, 2004

### Distinctions, scholarship & Honours:

1. Academic Career throughout first
2. Availed **National scholarship** during 1991-92.
3. Awarded **first position** at college level in 10<sup>th</sup> class.
4. **Distinction** in English, Science and Mathematics (10<sup>th</sup> class)
5. **Distinction** in Physics & Mathematics (12<sup>th</sup> Class)
6. **Distinction** in Mathematics (B.Sc.)
7. **Distinction** in 5 papers (M.Sc.)

### National Level Achievements:

1. Qualified **LS (Dec'2000)**, **JRF (June'2000)**, **JRF (Dec'2001)** and **LS (June'2006)** of National Eligibility Test (CSIR-UGC) in Mathematical Sciences
2. Qualified **GATE-2000** with Percentile score 96.02 and **All India Rank 30** in Mathematics
3. Qualified **GATE-2001** with Percentile score 86.61 and **All India Rank 117** in Mathematics

**Publications:** Citation Index – range / average      **Research Gate Score: 12.48**  
 h-index    **7, Citations 101 (since 2013)**  
 i10 index     **5**

**2018:**

- [1]. On closed form solutions of (2+1)-breaking soliton system by similarity transformations method, Mukesh Kumar, **Dig Vijay Tanwar**, Raj Kumar, Computers & Mathematics with Applications (Elsevier), **75 (2018) 218–234. Citations 1, DOI: 10.1016/j.camwa.2017.09.005, Impact factor 1.531, SCI**
- [2]. [On Lie symmetries and soliton solutions of \(2+1\)-dimensional Bogoyavlenskii equations](#), Mukesh Kumar, **Dig Vijay Tanwar**, Raj Kumar, Nonlinear Dynamics, 1-15, **Impact factor 3.43, SCI**

**2017:**

- [3]. Some More Solutions of Kedomtsev-Petviashvili Equation, with Mukesh Kumar, **Atul Kumar Tiwari**, Computers & Mathematics with Applications (Elsevier), 74 (2017) 2599–2607, **2017. Citations 4, Impact factor 1.531, SCI DOI:10.1016/j.camwa.2017.07.034**
- [4]. Soliton solutions of KD system using similarity transformations method, with Mukesh Kumar, Computers & Mathematics with Applications (Elsevier), 73, **2017, 701-712 . Citations 9, Impact factor 1.531, SCI**

**2016:**

- [5]. Application of Lie-Group Theory for solving Calogero-Bogoyavlenskii-Schiff Equation (Sole author), IOSR Journal of Mathematics (IOSR-JM), 12(4), **2016, 144-147. Citations 4, Non SCI**
- [6]. Similarity Solutions of the Konopelchenko-Dubrovsky System Using Lie Group Theory, with Mukesh Kumar, Anshu Kumar, Computers & Mathematics with Applications (Elsevier), 71(10), **2016, 2051-2059. Citations 10, Impact factor 1.531**

**2015:**

- [7]. On Exact Solutions of (2+1)-Dissipative ZK Equation (Sole author), International Journal of Science, Environment and Technology, 4(5), **2015, 1430 -1437, Citations 1, Non SCI**
- [8]. Some more similarity solutions of the (2 + 1)-dimensional BLP system, with Mukesh Kumar and Anshu Kumar, Computers & Mathematics with Applications (Elsevier), 70, **2015, 212-221, Citations 15, Impact factor 1.831, SCI**

**2014:**

- [9]. On Some New Exact Solutions of Incompressible Steady State Navier-Stokes Equations, with Mukesh Kumar, Meccanica (Springer), 49, **2014, 335-345. Citations 15, Impact factor 2.196, SCI**
- [10]. On Exact Solutions of Zabolotskaya-Khokhlov Equation, with Mukesh Kumar and Anshu Kumar, Computers & Mathematics with Applications (Elsevier), 68, **2014, 454-463. Citations 20, Impact factor 1.831, SCI**
- [11]. On New Similarity Solutions of the Boiti-Leon-Pempinelli System, with Mukesh Kumar, Communications in Theoretical Physics (IOP Ltd.), 61(1), **2014, 121-126. Citations 13, Impact factor 1.089, SCI**
- [12]. Some More Solutions of Burgers' Equation, with Mukesh Kumar published in an International Conference: (ICMSQUARE-14) proceeding at Madrid, Spain from August 28-31, **2014. Phys.: Conf. Ser. Volume 574 (2015) 012038, IOP Publishing, ISSN: 1742-6588, Citations 2, SCI doi:10.1088/1742-6596/574/1/012038**

**2013:**

- [13]. Some Soliton Solutions of Non linear Partial Differential Equations by Tan-Cot Method, with Mukesh Kumar & Anshu Kumar, IOSR–Journal of Mathematics, 6, **2013, 23-28, Citations 7, Non-SCI**

**2007:**

- [14]. Digital Video Authentication for forensic Application, with Saurabh Upadhyay and Sanjay Singh, Atmbodh, 4(1), 2007, 54-60

**Research Papers only Presented in Conferences:** International Conferences-6 & national-6

**Current Sponsored Projects:** 01

**Reviewer in 6 SCI Journals**

### Convener/Co-Convener of workshops/lecture series etc.:

- National workshop entitled “**Growth of Science & Technology in the Campus of Purvanchal University (GSTCPU-2017)**” during 8-10th September, 2017 for discussions on new courses in the campus
- Workshop entitled “**Communication Skills**” was organized as Convener in the V.B.S. Purvanchal University, Jaunpur during 17-18<sup>th</sup> September, 2016 for all students of campus.
- Lecture series entitled\* “**Numerical Techniques and Programming in MATLAB**” during 22-28<sup>th</sup> July, 2016 for UG students. *\*All the lectures were uploaded on You Tube and corresponding link is provided at the University website. Besides it, concerned study material and tutorials are given to students and uploaded them on the University website.*
- Workshop “**Numerical Computation Using MATLAB**” during 26-30 November, 2015 for all CSE/IT students of campus
- Workshop on “**Better Engineer**” during 10-13 November, 2010.
- **For the popularization of Science** One day workshop on ‘**National Science Day (NSD-2014 to 2017)**’ was organized on the occasion of **National Science day**, 28 Feb. 2014, 2015, 2016, 2017 and to be proposed for 2018 also.

**Number of Courses/Summer Institute/Training programme attended:** 11

**Invited /conference Lectures:** National level-07, International Conf. -01

### Administrative/other contribution to V.B.S. Purvanchal University, Jaunpur

- **Chief Warden**, Member of **Academic Council** from last semester
- **Head, Department of Mathematics** from last 11 yrs (2004-2011, 2014-till date)
- **Coordinator**, PUCAT-2016
- Assistant Dean of Students Welfare from last 3 yrs
- **Programme Officer**: Unit-III of NSS for 2 yrs (2014-2016)
- **Convener, Board of Studies**, Department of Mathematics from last 11 yrs (2004-2011, 2014-till date)
- **Coordinator, Technical cell** (Result preparation cell for the whole campus courses),
- **Coordinator, B. Tech. OBC Scholarship Cell**, for 5 yrs (2005-2010)
- **Secretary, Sports meet of campus** from 2017 till date.
- **Dy. Coordinator**, UGC Sponsored **Remedial Coaching** for SC/ST/OBC students, etc. for 2 yrs.
- **Dy. Coordinator**, Academic Activities of B.Tech First year from 2014 till date.

### Tasks for University campus and social Development

- As a Coordinator of a Free Coaching “**Prerna**” which is running in nearby villages of the V.B.S. Purvanchal University, Jaunpur to upgrade the knowledge of financially weak children w.e.f. Sept. 2014, I have been thoroughly involved there to improve extension activity of the campus.
- I actively participated as Deputy Coordinator of a committee constituted for making proposal and implementation for “**स्वच्छ भारत अभियान**” of Govt. of India in the locality of the VBS Purvanchal University, Jaunpur from 29/05/2015 to April 2016.
- I have organised “**मतदाता जागरूकता अभियान**” as Co-Convener in the V.B.S. Purvanchal University, Jaunpur campus on 18<sup>th</sup> Feb., 2017

**(Dr. Raj Kumar)**