Dr. Manjit Singh

Professor (Assistant)

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The secret of getting ahead is getting started

Education

1997–2000 **BSc**, *Govt. Brijindra College*, Faridkot, *First Division*.
Non-Medical

2000–2002 **MSc**, *Guru Nanak Dev University*, Amritsar, *First Division*.
Pure Mathematics

2014–2017 **PhD**, *Thapar Institute of Engineering & Technology*, Patiala, *First Division*.
Lie Group Analysis

PhD Thesis

Title *Exact solutions and Painlevé analysis of some nonlinear partial differential equations*

Supervisor Dr. Rajesh Kumar Gupta

Description The integrability of nonlinear partial differential equations has been addressed in this thesis. The various approaches for complete integrability have been comprehensively exploited for important equations in mathematical physics.

Research Interest

My main research interest are:

- Lie Group Analysis.
- Lie Algebra.
- Painlevé analysis.
- Exact solutions including soliton solutions.
- Integrable properties such as; Lax pairs, Bäcklund transformations.
- Hirota Method.
- Conservation Laws.

Experience

2003–2006 **Lecturer**, *LLRIET*, Moga.

2006–Present **Professor(Assistant)**, *Yadavindra College of Engineering, Punjabi University Guru Kashi Campus*, Talwandi Sabo.

Work Description

- Planning, preparing and delivering lessons to all students in the class.
- Assessing, recording and reporting on the development, progress, attainment and behaviour of students.
- Providing guidance and advice to students on educational and social matters and on their further education and future careers; providing information on sources of more expert advice.
- Reviewing and evaluating one's own teaching and learning strategies, methodologies and programme/s in line with the National Curriculum Framework guidelines.
- Participating in In-Service education and training courses as well as in continuing professional development (CPD) opportunities, and taking part in action research exercises.
- Maintaining good order and discipline amongst students under one's care and safeguarding their health and safety at all times.
- Registering and monitoring the attendance of students under one's care.
- Making use of audiovisual technological devices/aides (such as radio aids; projectors) and other adaptations during the delivery of the lessons.

Languages

English	Proficient	*Reading, Writing, Spoken*
Punjabi	Proficient	*Reading, Writing, Spoken*
Hindi	Proficient	*Reading, Writing, Spoken*

Computer skills

Computational Tools	Maple, Mathematica	*Experience of writing code for complicated mathematical calculations*
Formatting Tools	Latex	*Experience of writing all types of document class in Latex*

General Interests

DIY — I love modifying, or repairing all kinds household items

Stack Exchange — I spend my free time in browsing Stack Exchange. This has improved my basics understanding about mathematics and academia. Following are my most favourite community websites:

- `https://math.stackexchange.com/` **(Score: 622)**
- `https://tex.stackexchange.com/` **(Score: 432)**
- `https://academia.stackexchange.com/` **(Score: 2208)**
- `https://www.mapleprimes.com/` **(Score: 245)**

Reading — I love to read history of mathematics including biographies of famous mathematicians.

Favourite Books

- Symmetry and Integration Methods for Differential Equations, George W. Bluman & Stephen C. Anco.

- Applications of Symmetry Methods to Partial Differential Equations, George W. Bluman, Alexei F. Cheviakov & Stephen C. Anco.
- Applications of Lie Groups to Differential Equations, Peter Olver.
- Lie Groups, Physics and Geometry, Robert Gilmore.
- The Direct method in Soliton Theory, Ryogo Hirota.
- The Bilinear Transformation Method, Yoshimasa Matsuno.
- Introduction to Linear Algebra, Gilbert Strang.
- Mathematics and Its History, John Stillwell.
- The Painlevé Handbook, Robert Conte & Micheline Musette.

Invited Lectures

- Given invited talk at Baba Farid Group of Institutions on the topic; *How ICT has Change the way of Teaching and Learning of Mathematics*

Review Work

- Reviewer for *Physics letters A*
- Reviewer for *Results in Physics*
- Reviewer for *Pramana-Journal of Physics*
- Reviewer for *Zeitschrift fur Naturforschung A*
- Reviewer for *Hacettepe Journal of Mathematics and Statistics*

Conferences Attended

- Presented paper on the topic, *On Weak, Strong Derivatives and Sobolev Spaces in Numerical Analysis* at Baba Farid Group of Institutions, Bathinda, Punjab, India.
- Attended two days National Conference on topic *Advancements and Futuristic Trends in Mechanical and Material Engineering*
- Presented paper on the topic, *Explicit exact traveling wave solutions for Novikov equation using Riccati equation mapping method* at Baba Farid Group of Institutions, Bathinda, Punjab, India.
- Presented paper on the topic, *An Application Hirota's method to study complete integrability of nonlinear evolution equation in (2+1)-dimension* at Baba Farid Group of Institutions, Bathinda, Punjab, India.

Workshops, Seminars and Short Term Courses

- Four weeks General Orientation Course at Guru Nanak Dev University, Amritsar
- One week Short term Course on *VB.NET* at NITTTR, Chandigarh
- Three weeks Refresher Course at Panjab University, Chandigarh
- Three weeks Refresher Course at Punjabi University, Patiala
- One week Short term Course on *Scilab for Engineering Applications* at NITTTR, Chandigarh

- One week Short term Course on *Applied Numerical Methods with MATLAB* at NITTTR, Chandigarh
- One week Short term Course on *Data Science for Researchers* at Central University of Punjab, Bathinda
- Two week FDP on *Research Methodology* at NITTTR, Chandigarh
- One week STC on *Data Science for Researchers* at Central University of Punjab, Bathinda

Reference

- Dr. Rajesh Kumar Gupta, Associate Professor, Central University of Punjab, Bathinda, India.
- Dr. T.D. Narang, Professor Emeritus, Guru Nanak Dev University, Amritsar.
- Dr. Parminder Singh, Professor, Guru Nanak Dev University, Amritsar.
- Dr. A.K. Lal, Professor, Thapar University, Patiala.

Publications

- **M. Singh**, Multi soliton solutions, bilinear Bäcklund transformation and Lax pair of nonlinear evolution equation in (2+ 1)-dimension." Computational Methods for Differential Equations **3**(2): 134-146, 2015. (**Scopus Indexed**)
- **M. Singh**, R.K. Gupta, Explicit exact solutions for variable coefficient Broer-Kaup equations. Computational Methods for Differential Equations **3**(3): 192-199, 2015. (**Scopus Indexed**)
- **M. Singh**, 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**: 362–373, 2016. (**SCI Impact Factor: 3.967**)
- **M. Singh**, New exact solutions for (3+ 1)-dimensional Jimbo-Miwa equation. Nonlinear Dynamics **84**(2): 875-880, 2016. (**SCI Impact Factor: 4.604**)
- **M. Singh**, R.K. Gupta, Exact solutions for nonlinear evolution equations using novel test function, Nonlinear Dynamics, **86(2)**: 1171–1182, 2016. (**SCI Impact Factor: 4.604**)
- **M. Singh**, Bilinear Bäcklund transformations and explicit solutions of equation in (3+ 1)-dimension. International Journal of Computing Science and Mathematics, 8(1): 82-90, 2017. (**Scopus Indexed**)
- R.K. Gupta, **M. Singh**, Nonclassical symmetries and similarity solutions of variable coefficient coupled KdV system using compatibility method, Nonlinear Dynamics, **87(3)**: 1543–1152, 2016. (**SCI Impact Factor: 4.604**)
- R.K. Gupta, **M. Singh**, On group classification and nonlocal conservation laws for a multi phase flow model, International Journal of Applied and Computational Mathematics, International Journal of Applied and Computational Mathematics, **3**(4): 3925-3935. (**A Springer Journal**)
- **M. Singh**, R.K. Gupta, Soliton and quasi-periodic wave solutions for b-type Kadomtsev-Petviashvili equation, Indian Journal of Physics, **91**(11): 1345-1354. **SCI Impact Factor: 1.242**.

- R.K. Gupta, **M. Singh**, On invariant analysis and conservation laws for degenerate coupled multi-KdV equations for multiplicity $l = 3$, Pramana–Journal of Physics. (**SCI Impact Factor: 1.185**)
- **M. Singh**, R.K. Gupta, Group classification, conservation laws and Painlevé analysis for Klein–Gordon–Zakharov equations in (3+1)–dimension, Pramana–Journal of Physics. (**SCI Impact Factor: 1.185**)
- **M. Singh**, 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**(3): 88, 2018. (**A Springer Journal**)
- R.K. Gupta, **M. Singh**, Multi-dimensional optimal system of certain low dimensional Lie algebras, Communicated.
- **M. Singh**, On invariant analysis, group classification and conservation laws of two component Novikov equation. International Journal of Dynamical Systems and Differential Equations, In forth coming edition. (**Scopus Indexed**)
- **M. Singh**, Generalized symmetries and conservation laws of (3+1)-dimensional variable coefficient Zakharov-Kuznetsov equation . Computational Methods for Differential Equations, In Press. (**Emerging Sources Citation Index (Web of Science)**)
- **M. Singh**, R.K. Gupta, A note on optimal systems of certain low dimensional Lie algebras, International Journal of Nonlinear Sciences and Numerical Simulation. (**SCI Impact Factor: 1.467**)