

## C. S. Lalitha

Department of Mathematics,  
University of Delhi South Campus (UDSC)  
Benito Juarez Road, New Delhi-110021

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[cslalitha1@gmail.com](mailto:cslalitha1@gmail.com)

### EMPLOYMENT

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June, 2019 – Present	University of Delhi South Campus, <i>Senior Professor</i>
June, 2009 – June, 2019	University of Delhi South Campus, <i>Professor</i>
October, 1999 – June, 2009	Rajdhani College, University of Delhi, <i>Associate Professor/Reader</i>
August, 1991 – October, 1999	Rajdhani College, University of Delhi, <i>Lecturer</i>

### EDUCATION

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December, 1990 – March, 1996	University of Delhi, <i>Ph.D.</i> (Supervisor: R. N. Kaul, S. K. Suneja)
September, 1988 – December, 1990	University of Delhi, <i>M.Phil</i> (Supervisor: R. N. Kaul)
July, 1986 – June, 1988	Hindu College, University of Delhi, <i>M.Sc.</i>
July, 1983 – June, 1986	Sri Venkateswara College, University of Delhi, <i>B.Sc.(H) Mathematics</i>

### AWARDS AND FELLOWSHIPS

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2016	Indian National Science Academy <i>Teacher Award</i>
1988 (1990)	CSIR <i>Junior Research Fellowship</i> (CSIR <i>Senior Research Fellowship</i> )
1981	<i>National Scholarship</i> by Delhi Administration for meritorious candidates of Delhi Sec. School Exam.

### ADMINISTRATIVE ASSIGNMENTS

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July, 2021 – July, 2024	<i>Teacher-In-Charge</i> , Department of Mathematics, UDSC
April, 2018 – April, 2021	<i>Head</i> , Department of Mathematics, University of Delhi
August, 2019 – April, 2021	<i>Dean</i> , Faculty of Mathematical Sciences, University of Delhi
June, 2015 – April, 2018	<i>Teacher-In-Charge</i> , Department of Mathematics, UDSC
June, 2009 – May, 2012	<i>Teacher-In-Charge</i> , Department of Mathematics, UDSC

### MEMBERSHIP OF PROFESSIONAL BODIES

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Life member of the *Operational Research Society of India* (ID: 0463/C/93/MSL)  
Life member of the *Indian Mathematical Society* (Membership No. L-09-036)  
Life member of the *Ramanujan Mathematical Society* (Membership No. 868)  
Life member of the *Bharata Ganita Parishad*  
Member of the *American Mathematical Society*  
Member of the *International Working Group of Generalized Convexity*

### RESEARCH INTERESTS

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*Optimization Theory, Mathematical Programming, Variational Inequalities, Convex Analysis*

### BOOKS PUBLISHED AND EDITED

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*Generalized Nash Equilibrium Problems, Bilevel Programming and MPEC*, Eds. D. Aussel & C.S. Lalitha, Springer, 2018, ISBN 9789811047732  
Q.H. Ansari, C.S. Lalitha & M. Mehta, *Generalized Convexity, Nonsmooth Inequalities and Nonsmooth Optimization*, Chapman and Hall /CRC Press, Taylor and Francis Group, USA., 2014, ISBN 9781439868201  
*Combinatorial Optimization: Some Aspects*, Narosa Publishers, Eds. R. Malhotra, C.S. Lalitha, P. Gupta, A. Mehra and Sonia, 2007, ISBN 978173198151, 8173198152

- A. Moar and C.S. Lalitha, *An algorithm to solve polytopic set optimization problems based on a partial set order relation*, **Positivity**, accepted
- A. Moar, P.K. Sharma and C.S. Lalitha, *Nonlinear scalarization in set optimization based on the concept of null set*, **J. Global Optim.**, 89(4)(2024), 1099-1119
- Karuna and C.S. Lalitha, *Convergence, scalarization and continuity of minimal solutions in set optimization*, **J. Oper. Res. Soc. China**, 12(2024), 773-793
- Aanchal and C.S. Lalitha, *Second-order optimality conditions for locally Lipschitz vector optimization problems*, **Optimization**, 73(5)(2024), 1551-1570
- P.K. Sharma and C.S. Lalitha, *Connectedness of the solution sets in generalized semi-infinite set optimization*, **Optim. Lett.**, 17(2023), 1575-1594
- J. Dutta, S. Chandra, Rimpi and C.S. Lalitha, *Correction to: Convexifiers, generalized convexity, and optimality condition*, **J. Optim. Theory Appl.**, 197(2023), 383-385
- Khushboo and C.S. Lalitha, *Characterizations of set order relations and nonlinear scalarizations via generalized oriented distance function in set optimization*, **J. Global Optim.**, 85(2023), 235-249
- Rimpi and C.S. Lalitha, *Constraint qualifications in terms of convexifiers for nonsmooth programming problems with mixed constraints*, **Optimization**, 72(8)(2023), 2019-2038
- Khushboo and C.S. Lalitha, *Scalarizations and convergence in unified set optimization*, **RAIRO-Operations Res.**, 55(6)(2021), 3603-3616
- S. Kapoor and C.S. Lalitha, *Continuity and closedness of constraint and solution set mappings in unified parametric semi-infinite vector optimization*, **J. Math. Anal. Appl.**, 560(2)(2022), 125648
- Rimpi and C.S. Lalitha, *Constraint qualifications in nonsmooth optimization: classification and inter-relations*, **J. Nonlinear Var. Anal.** 6(2)(2022), 83-99
- S. Kapoor and C.S. Lalitha, *Essential stability in unified vector optimization*, **J. Global Optim.**, 80(1)(2021), 161-175
- Karuna and C.S. Lalitha, *Essential stability in set optimization*, **Optimization**, 71(7)(2022), 1803-1816
- Karuna and C.S. Lalitha, *External and internal stability in set optimization using gamma convergence*, **Carpathian J. Math.**, 35(3)(2019), 393-406
- Khushboo and C.S. Lalitha, *Scalarizations for a set optimization problem using generalized oriented distance function*, **Positivity**, 23(5)(2019), 1195-1213
- S. Kapoor and C.S. Lalitha, *Stability and scalarization for a unified vector optimization problem*, **J. Optim. Theory Appl.**, 182(3)(2019), 1050-1067
- S. Kapoor and C.S. Lalitha, *Stability in unified semi-infinite vector optimization*, **J. Global Optim.**, 74(2)(2019) 383-399
- Muskan Kapoor and C.S. Lalitha, *A strict constraint qualification in vector optimization*, **Ind. J. Indust. Appl. Math.**, 10(1)(2019), 109-120
- Khushboo and C.S. Lalitha, *A unified minimal solution in set optimization*, **J. Global Optim.**, 74(1)(2019), 195-211
- Karuna and C.S. Lalitha, *External and internal stability in set optimization*, **Optimization**, 68(4)(2019), 833-852
- C.S. Lalitha, *Convex Sets in finite and infinite dimensional spaces*, **Ganita**, 68(3)(2018), 43-54
- Karuna and C.S. Lalitha, *Continuity of approximate weak efficient solution set map in parametric set optimization*, **J. Nonlinear Convex Anal.**, 19(7)(2018), 1247-1262
- G.P. Crespi, M. Dhingra and C.S. Lalitha, *Pointwise and global well-posedness in set optimization: A direct approach*, **Ann. Oper. Res.**, 269(1-2)(2018), 149-166
- Khushboo and C.S. Lalitha, *Scalarizations for a unified vector optimization problem based on order representing and order preserving properties*, **J. Global Optim.**, 70(4)(2018), 903-916
- M. Dhingra and C.S. Lalitha, *Approximate solutions and scalarizations in set optimization*, **Optimization**, 66(11)(2017), 1793-1805
- M. Dhingra and C.S. Lalitha, *Set optimization using improvement sets*, **Yugosl. J. Oper. Res.**, 27(2)(2017), 153-167
- C.S. Lalitha and M. Dhingra, *Approximate Lagrangian duality and saddle point optimality in set optimization*, **RAIRO-Oper. Res.**, 51(3)(2017), 819-831
- M. Dhingra and C.S. Lalitha, *Well-setness and scalarization in set optimization*, **Optim. Lett.**, 10(8)(2016) 1657-1667

- C.S. Lalitha and P. Chatterjee, *Stability and scalarization in vector optimization using improvement sets*, **J. Optim. Theory Appl.**, 166(3)(2015) 825-843
- P. Chatterjee and C.S. Lalitha, *Scalarization of Levitin-Polyak well-posedness in vector optimization problems using weak efficiency*, **Optim. Lett.**, 9(2)(2015) 329-343
- C.S. Lalitha and P. Chatterjee, *Levitin-Polyak well-posedness for constrained quasiconvex vector optimization problems*, **J. Global Optim.**, 59(1)(2014) 191-205
- C. Charita, J. Dutta and C.S. Lalitha, *Gap functions for vector variational inequalities*, **Optimization**, 64(7)(2015) 1499-1520
- C.S. Lalitha and M. Dhingra, *Optimization reformulations of the generalized Nash equilibrium problem using regularized indicator Nikaidô-Isoda function*, **J. Global Optim.**, 57(3)(2013) 843-861
- J. Dutta and C.S. Lalitha, *Optimality conditions in convex optimization revisited*, **Optim. Lett.**, 7(2)(2013) 221-229
- C.S. Lalitha and P. Chatterjee, *Well-posedness and stability in vector optimization problem using Henig proper efficiency*, **Optimization**, 62(1)(2013) 155-165
- C.S. Lalitha and P. Chatterjee, *Stability and scalarization of weak efficient, efficient and Henig proper efficient sets using generalized quasiconvexities*, **J. Optim. Theory Appl.**, 155(3)(2012) 941-961
- C.S. Lalitha and P. Chatterjee, *Stability for properly quasiconvex vector optimization problem*, **J. Optim. Theory Appl.**, 155(2)(2012) 492-506
- C.S. Lalitha and G. Bhatia, *Levitin-Polyak well-posedness for parametric quasivariational inequality problem of the Minty type*, **Positivity**, 16(3)(2012) 527-541
- C.S. Lalitha and G. Bhatia, *Stability of parametric quasivariational inequality of the Minty type*, **J. Optim. Theory Appl.**, 148(2)(2011) 281-300
- C.S. Lalitha and G. Bhatia, *Well-posedness for parametric quasi-variational inequality problems with set-valued maps and for optimization problems with parametric quasivariational inequality constraints*, **Optimization**, 59(7)(2010) 997-1011
- C.S. Lalitha, *A note on duality of generalized equilibrium problem*, **Optim. Lett.**, 4(1)(2010), 57-66
- C.S. Lalitha, *A new augmented Lagrangian approach to duality and exact penalization*, **J. Global Optim.**, 46(2)(2010), 223-245
- C.S. Lalitha and R. Arora, *Proper Clarke epiderivative in set-valued optimization*, **Taiw. J. Math.**, 13(6A)(2009), 1695-1710
- C.S. Lalitha and G. Bhatia, *Well-posedness for variational inequality problems with generalized monotone set-valued maps*, **Numer. Funct. Anal. Optim.**, 30(5-6)(2009), 548-565
- C.S. Lalitha and G. Bhatia, *Duality in  $\varepsilon$ -variational inequality problems*, **J. Math. Anal. Appl.**, 356(1)(2009), 168-178
- C.S. Lalitha and M. Mehta, *Characterizations of solution sets of mathematical programs in terms of Lagrange multipliers*, **Optimization**, 58(8)(2009) 885-1007
- C.S. Lalitha and R. Arora, *Weak Clarke epiderivative in set-valued optimization*, **J. Math. Anal. Appl.** 342(1)(2008), 704-714
- C.S. Lalitha and R. Arora, *Conjugate maps, subgradients and conjugate duality in set-valued optimization*, **Numer. Funct. Anal. Optim.**, 28(7&8)(2007), 897-909
- C.S. Lalitha and M. Mehta, *Characterization of the solution sets of pseudolinear programs and pseudoaffine variational inequality problems*, **J. Nonlinear Convex Anal.**, 8(1)(2007), 87-98
- C.S. Lalitha and M. Mehta, *A note on pseudolinearity in terms of bifunctions*, **Asia Pac. J. Oper. Res.**, 24(1)(2007), 83-91
- J. Dutta and C.S. Lalitha, *Bounded sets of KKT multipliers in vector optimization*, **J. Global Optim.**, 36(3)(2006), 425-437
- C.S. Lalitha and M. Mehta, *On vector variational inequality problem in terms of bifunctions*, **Aust. J. Math. Anal. Appl.**, 3(2)(2006), Article 11, 1-11
- C.S. Lalitha and M. Mehta, *Vector variational inequalities with cone-pseudomonotone bifunctions*, **Optimization**, 54(3)(2005) 327-338
- C.S. Lalitha, P. Garg and S. Khurana, *Duality for multiobjective fractional programming via linearization and scalarization approaches*, **Opsearch**, 42(1)(2005) 37-54
- C.S. Lalitha and R. Arora, *Proximal Proper efficiency for minimization with respect to normal cones*, **Bull. Aust. Math. Soc.**, 75(2005) 215-224
- R. Arora and C.S. Lalitha, *Proximal proper efficiency in set-valued optimization*, **Omega, Inter. J. Manag. Sc.**, 33(5)(2005) 407-411

- S. Chandra, J. Dutta and C.S. Lalitha, *Regularity conditions and optimality in vector optimization*, **Numer. Funct. Anal. Optim.**, 25(5&6)(2004) 479-501
- C.S. Lalitha, *Strong efficiency in vector optimization of set-valued maps*, **Asia Pac. J. Oper. Res.**, 20(2)(2003) 231-240
- C.S. Lalitha, J. Dutta and M.G. Govil, *Optimality criteria in set-valued optimization*, **J. Aust. Math. Soc.**, 75(2)(2003) 1-11
- C.S. Lalitha and S. Davar, *A note on quasiconvex set-valued maps*, **Opsearch**, 40(1)(2003) 52-61
- C.S. Lalitha, S.K. Suneja and S. Khurana, *Symmetric duality involving invexity in multiobjective fractional programming*, **Asia Pac. J. Oper. Res.**, 20(1)(2003) 57-72
- S.K. Suneja, C.S. Lalitha and S. Khurana, *Second order symmetric duality in multiobjective programming*, **Eur. J. Oper. Res.**, 144(3)(2003) 492-500
- S.K. Suneja, C.S. Lalitha and M.G. Govil, *Generalized E-convex functions in nonlinear programming*, **Ind. J. Math.**, 45(2)(2003) 223-240
- R.N. Kaul and C.S. Lalitha, *Convexity and arcwise connectedness approach to inequalities*, **Ind. J. Pure Appl. Math.**, 33(7)(2002), 1087-1095
- S.K. Suneja, C.S. Lalitha and S. Khurana, *Saddle point type optimality criteria and duality relation for generalized fractional programming*, **Opsearch**, 38(2)(2001), 183-196
- R.N. Kaul and C.S. Lalitha, *A note on arcwise connected and related functions*, **Ind. J. Pure Appl. Math.**, 31(11)(2000), 1443-1454
- S.K. Suneja, C.S. Lalitha and S. Khurana, *Optimality and duality theorems for nonsmooth multiobjective fractional programs*, **Ind. J. Pure Appl. Math.**, 30(3)(1999), 243-257
- R.N. Kaul, S.K. Suneja and C.S. Lalitha, *Generalized nonsmooth invexity*, **J. Inf. Optim. Sc.**, 15(1)(1994), 1-17
- R.N. Kaul, S.K. Suneja and C.S. Lalitha, *Duality in pseudolinear multiobjective fractional programming*, **Ind. J. Pure Appl. Math.**, 24(5)(1993), 279-290
- S.K. Suneja and C.S. Lalitha, *Multiobjective fractional programming involving  $\rho$ -invex and related functions*, **Opsearch**, 30(1)(1993), 1-14
- C.R. Bector, S.K. Suneja and C.S. Lalitha, *Generalized B-vex functions and generalized B-vex programming*, **J. Optim. Theory Appl.**, 76(1993), 561-576

#### BOOK CHAPTERS

- S. Kapoor and Lalitha C.S. (2022) *Density Aspects in Semi-Infinite Vector Optimization*, A. Jayswal and T. Antczak (eds), Continuous Optimization and Variational Inequalities. CRC Press, Taylors & Francis, 55-70
- Khushboo and Lalitha C.S. (2021) *Linear and Pascoletti–Serafini Scalarizations in Unified Set Optimization*, V. Laha, P. Maréchal and S.K. Mishra (eds), Optimization, Variational Analysis and Applications, IFSOVAA 2020, Springer Proceedings in Mathematics & Statistics, vol 355. Springer, pp. 1-17
- C.S. Lalitha and R. Arora, *Proximal proper saddle points in set-valued optimization*, S. K. Mishra (ed), Topics in Nonconvex Optimization, Optimization and its Applications, Springer, Vol. 50, 87-100
- M. Govil and C.S. Lalitha, *Cone preinvex vector valued optimization*, M.R. Rao and M.C. Puri (eds), Operational Research and its Applications: Recent Trends (APORS-2003), Allied Publishers, Vol.1, 110-117

#### RESEARCH GUIDANCE FOR DOCOTOR OF PHILOSOPHY

Shiva Kapoor, 2022	<i>Stability and Density Aspects in Vector Optimization</i>
Khushboo, 2022	<i>Scalarization of Minimal Solutions in Vector and Set Optimization</i>
Karuna, 2022	<i>Semicontinuity of Solution Maps and External, Internal and Essential Stability in Set Optimization</i>
Muskan Kapoor, 2019	<i>Optimality and Higher-Order Duality in Certain Vector Optimization Problems</i>
Megha Sharma, 2018	<i>Vector Optimization Problems Involving Vector and Set-Valued Maps</i>
Mansi Dhingra, 2018	<i>Unified Solutions, Stability and Optimality in Set Optimization</i>
Pooja Louhan, 2017	<i>Optimality and Duality for Some Vector Optimization Problems over Cones</i>
Prashanto Chatterjee, 2015	<i>Stability and Well-Posedness in Vector Optimization</i>
Gunent Bhatia, 2011	<i>Well-posedness, Stability and Duality Aspects of Variational Inequality Problems</i>
Ruchi Arora, 2010	<i>Set-Valued Optimization: Efficiency, Derivatives and Conjugate Duality</i>
Monika Mehta, 2009	<i>Certain Aspects of Variational Inequality Problems in terms of Bifunctions</i>

## RESEARCH GUIDANCE FOR MASTER OF PHILOSOPHY

Sakshi, 2019	<i>Subdifferential and Normal Characterizations of Quasiconvex, Semistrictly and Strictly Quasiconvex Functions</i>
Shelly Khurana, 2018	<i>Constraint Qualifications and Strict Constraint Qualifications in Scalar Optimization</i>
Shipra Chauhan, 2017	<i>Optimality Conditions in Scalar and Interval-Valued Optimization</i>
Vivek Kumar Sinha, 2016	<i>Unified Optimal Solution Concepts in Vector Optimization</i>
Shiva Kapoor, 2016	<i>Scalarization Methods and Characterizations of Solution Sets in Vector Optimization</i>
Sweeti Yadav, 2015	<i>Optimality and Connectedness in Set-Valued Optimization</i>
Priyanka Sahni, 2013	<i>Optimality and Numerical Aspects of Bilevel Programming</i>
Tamanna Yadav, 2013	<i>Regularity and Optimality Conditions in Vector Optimization</i>
Khushboo, 2012	<i>Optimization Reformulations and Computational Methods of Generalized Nash Equilibrium Problems</i>
Deepti Kaur, 2011	<i>Image Space Analysis for Constrained Extremum Problems and Applications</i>
Mansi Dhingra, 2011	<i>Weak Sharp Minima for Optimization and Variational Inequality Problems</i>
Monika Gupta, 2010	<i>On Solution Sets in Vector Optimization Involving Quasiconvex and Related Functions</i>
Ruchika Sethi, 2009	<i>A Study of Certain Aspects of Mathematical Programming Problem with Equilibrium Constraints</i>
Tanu Gupta, 2008	<i>A Study of Certain Aspects of Semidefinite and Second Order Cone Programming Problems</i>
Neha Jain, 2007	<i>A Study of Lagrange Multiplier Theory for Constrained Optimization Problems</i>

## GRANTS

2024-25, Rs. 5,00,000/-	Faculty Research Programme Grant, IoE, University of Delhi	<i>Abstract Convexity and Stability in Set Optimization</i>
2023-24, Rs. 4,00,000/-	Faculty Research Programme Grant, IoE, University of Delhi	<i>Scalarization and Optimality in Vector and Set Optimization</i>
2021-22, Rs. 1,75,000/-	Faculty Research Programme Grant, IoE, University of Delhi	<i>Constraint Qualifications and Optimality in Nonsmooth Optimization</i>
2020-21, Rs. 1,75,000/-	Faculty Research Programme Grant, IoE, University of Delhi	<i>First and Second Order Constraint Qualifications in Scalar and Vector Optimization</i>
2018-21, Rs. 6,60,000/-	MATRICS, Department of Science and Technology	<i>Scalarization Aspects in Vector and Set Optimization</i>
2015-15, Rs. 1,30,000/-	R&D Research Development Grant, University of Delhi	<i>Scalarization in Set-Valued Optimization</i>
2014-15, Rs. 1,20,000/-	R&D Research Development Grant, University of Delhi	<i>On Set-Valued Optimization</i>
2013-14, Rs. 2,70,000/-	R&D Research Development Grant, University of Delhi	<i>Scalarization and Optimality of Vector-Valued Optimization</i>
2012-13, Rs. 1,20,000/-	R&D Research Development Grant, University of Delhi	<i>Reformulations for Generalized Nash Equilibrium Problems</i>
2011-12, Rs. 1,20,000/-	R&D Research Development Grant, University of Delhi	<i>Stability and Well-Posedness in Vector Optimization</i>
2010-11, Rs. 40,000/-	R&D Research Development Grant, University of Delhi	<i>Nonsmoothness and Well-Posedness in Optimization</i>
2009-10, Rs. 1,00,000/-	R&D Research Development Grant, University of Delhi	<i>Optimality and Well-Posedness Aspects of Vector Optimization Problems</i>
2001-03, Rs. 30,000/-	Minor Research Project, University Grants Commission	<i>Optimisation and Nonsmooth Analysis</i>

## EXTERNAL COMMITTEES

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2023-24	<i>External Member</i> of the Annual Audit Committee	Department of Mathematics, Jaypee Institute of Information Technology
2024-	<i>Member</i> of the FIST Expert Committee of DST	Mathematical Sciences Area
2024-27	<i>External Member</i> on the Special Committee, JNU	School of Physical Sciences
2023-24	VC Nominee of Departmental Research Committee	Department of Statistics, University of Delhi
2021-22	<i>External Member</i> of the Board of Studies	Faculty of Sciences, SGT University, Gurugram
2022-23	<i>External Member</i> of the Annual Audit Committee	Department of Mathematics, Jaypee Institute of Information Technology
2021-23	<i>External Member</i> of the Board of Studies	Department of Mathematics, Delhi Technological University
2020-22	<i>University Representative</i> of the Governing Body	Shaheed Bhagat Singh College, University of Delhi
2018-19	<i>University Representative</i> of the Governing Body	College of Arts, University of Delhi
2019	<i>Member</i> of the Committee to frame syllabus of certificate course on Applied Mathematics	Department of Mathematics, University of Jammu
2018	<i>Member</i> of Expert Committee, for revising undergraduate courses in LOCF	Quality Improvement in Higher Education System of UGC
2016-18	<i>Member</i> of the Subject Expert Committee, Women Scientists Scheme-A of DST	Physical & Mathematical Sciences
2016-18	<i>VC Nominee</i> of Departmental Research Committee	Department of Operational Research, University of Delhi

## SYMPOSIUM/WORKSHOP/SCHOOL ORGANIZED

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- Coordinator of *Pre-Entrance Summer School in Mathematics*, University of Delhi, June 5-16, 2018
- Convener of 33<sup>rd</sup> Annual Conference of the *Ramanujan Mathematical Society*, University of Delhi, June 1-3, 2018
- Organised International Conference on *Recent Advances in Optimization Theory and Applications*, University of Delhi, January 30-31, 2016
- Organised a scientific meeting on *Indian Women and Mathematics 2015* at University of Delhi South Campus, April 2-4, 2015
- Organised *CIMPA-UNESCO-INDIA Research School 2013*, Generalized Nash Equilibrium Problems, Bilevel Programming and MPEC, Department of Mathematics, University of Delhi, November 25 to December 6, 2013
- Organised *National Seminar for Research Scholars*, Department of Mathematics, University of Delhi, September 20-21, 2013
- Organised *National Seminar for Research Scholars*, Department of Mathematics, University of Delhi, May 24-25, 2012
- Organised three weeks Refresher Course on *Mathematics and Operational Research* in Centre for Professional Development in Higher Education, University of Delhi from December 13, 2010 to January 4, 2011
- Organised five day Training Programme on *Optimization Theory and Applications* during February 10-14, 2010
- Organised two day Symposium on *Recent Advances in Optimization Theory and Applications* during October 27-28, 2006

## SYMPOSIUM/WORKSHOP/COURSE ATTENDED

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- Summer School on *Generalized Convex Analysis: Advanced Theory and Applications* held at Kaohsiung, Taiwan during July 15-19, 2008
- Instructional workshop on *Convex Analysis, Optimization and Application* held at Indian Institute of Technology, Kanpur during December 5-21, 2005
- Refresher course in *Analysis* held by Centre for Professional Development in Higher Education, University of Delhi from April 2, 1993 to April 22, 1993
- Refresher course in *Differential Equations* held by Centre for Professional Development in Higher Education, University of Delhi from March 27, 1995 to April 15, 1995
- Refresher course in *Computational Mathematics* held by Centre for Professional Development in Higher Education, University of Delhi from April 27, 1998 to May 16, 1998
- Refresher course in *Mechanics and Differential Equations* held by Centre for Professional Development in Higher Education, University of Delhi from February 16, 2001 to March 8, 2001
- Training Course on *Web Designing* held by Delhi University Computer Centre, University of Delhi from November 3, 2003 to November 14, 2003

## INVITED TALKS IN CONFERENCES/SEMINARS

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|-----------------|---|
| January, 2024   | <i>Convex Optimization</i> , Ramanujan School of Mathematical Sciences, Pondicherry University (January 22-24)  |
| September, 2023 | <i>Essential Stability in Set Optimization</i> , International Conference on Variational Analysis and Optimization with Applications, Aligarh Muslim University (September 23-25)   |
| April, 2023     | <i>Constraint Qualifications in terms of Convexifiers</i> , International Symposium on Optimization Theory and its Applications, The School of Mathematics of Thapar Institute of Engineering & Technology (April 14)   |
| February, 2023  | <i>Second-order Optimality Conditions for Geoffrion Proper Efficient Solutions in Nonsmooth Vector Optimization</i> , International Symposium on Applied Optimization and Game Theoretic Models for Decision Making, Indian Statistical Institute, Delhi (February 2) |
| October, 2022   | <i>Some Solved and Unsolved Problems in Mathematics</i> , Motilal Nehru College, University of Delhi (October 17)   |
| August, 2022    | <i>Convex Optimization and Applications</i> , 3rd Conference on Algebra, Analysis and Applications, Dr. B. R. Ambedkar University, Delhi (August 5)   |
| April, 2022     | <i>Mathematics in Medicine</i> , International Webinar on Applied Mathematics, Thiagarajar College, Madurai (April 19)  |
| January, 2022   | <i>Variational Inequalities: Unification of Various Classes of Problems</i> , IWM Annual Conference 2021-22, Banasthali Vidyapith (January 29)  |
| December, 2021  | <i>Variational Inequalities and Some Formulations</i> , 5th International Conference on Recent Advances in Mathematical Sciences and its Applications, Jaypee Institute of Information Technology, Noida (December 3)   |
| December, 2021  | <i>Constant Positive Linear Independence Constraint Qualification in terms of Convexifiers</i> , 87th Annual Conference of IMS organised by MGM University Aurangabad, Maharashtra (December 6)   |
| December, 2021  | <i>Srinivasa Ramanujan – The Pride of Indian Mathematics</i> , National Mathematics Day 2021, Aligarh Muslim University (December 22)   |
| August, 2021    | <i>Some Applications of Mathematics</i> , International Webinar Series on Interdisciplinary Aspects of Mathematics, Satyawati College, University of Delhi (August 20)  |
| September, 2020 | <i>Convex Optimization and Applications</i> , The Digital International Conference on Applied Mathematical Sciences, organized by Department of Applied Sciences, Parul University and Department of Mathematics, Gujarat University (September 26-27)                |
| February, 2020  | <i>Essential Solution Sets in Set Optimization</i> , Two Day Conference, Panjab University (February 15)  |
| February, 2020  | <i>On Essential Solution Sets in Set Optimization</i> , INDO-FRENCH Seminar on Optimization, Variational Analysis and Applications, Banaras Hindu University (February 3)   |
| December, 2019  | <i>Strict Constraint Qualification in Vector Optimization</i> , 52nd Annual Convention of ORSI & International Conference, IIM Ahmedabad (December 15-18)   |

October, 2019	<i>Convex Optimization and Applications</i> , IWM Regional Workshop on Research and Opportunities, NIT Meghalaya (October 19)
October, 2019	<i>Mathematics Behind CT Scans</i> , Department of Mathematics, University of Jammu 9 (October 11)
September, 2019	<i>Kasturba and National Movement</i> , Harijan Sewak Sangh, New Delhi (September 20)
May, 2019	<i>Mathematics in Medicine</i> , Department of Mathematics, Gujarat University (May 27)
April, 2019	<i>Mathematics in Medicine</i> , Zakir Husain Delhi College, University of Delhi (April 1)
March, 2019	<i>Mathematics in Machine Learning</i> , Shaheed Rajguru College of Applied Sciences, University of Delhi (March 27)
March, 2019	<i>Mathematics in Machine Learning</i> , Indraprastha College for Women, University of Delhi (March 26)
March, 2019	<i>Mathematics in Medicine</i> , "Abscissa 2019", the Mathematics Festival of Maitreyi College, University of Delhi (March 12)
January, 2019	<i>Convex Optimization and Its Application</i> , 3rd International Conference on Recent Advances in Mathematical Sciences and its Applications, Jaypee Institute of Information Technology, Noida (January 17-19)
December, 2018	<i>Mathematics in Medicine</i> , 7 <sup>th</sup> National Conference on Mathematics Education, National Council of Educational Research and Training, Delhi (December 22)
November, 2018	<i>Convex sets in Finite and infinite Dimensional Spaces</i> , A National Conference on Recent Trends in Mathematics, Department of Mathematics and Astronomy, University of Lucknow, (November 11-12)
January, 2018	<i>Pointwise and Global Well-Posedness in Set Optimization: A Direct Approach</i> , International Symposium on Operations Research and Game Theory : Modeling and Computation, Indian Statistical Institute, Delhi (January 9-11)
November, 2017	<i>Approximate Weak Efficient Solutions and Continuity in Parametric Set Optimization</i> , International Conference on Analysis and its Applications, Aligarh Muslim University (November 20-22)
September, 2017	<i>Convergence of Solution Sets in Vector Optimization</i> , National Conference on Advances in Applied Mathematics and Statistics, Mata Sundari College for Women, University of Delhi (September 7-8)
June, 2017	<i>Stability Aspects in Set Optimization</i> , 32nd Annual Conference of Ramanujan Mathematical Society, Rani Channamma University, Belagavi (June 23-25)
January, 2017	<i>Mathematics of CT Scans</i> , National Seminar on Recent Developments in Mathematics, Kalindi College (January 12-13)
September, 2016	<i>Can Mathematics Save Life?</i> , PGDAV(E) College, University of Delhi (September 21)
June, 2016	<i>Well-Posedness in Set Optimization from a Different Viewpoint</i> , Conference on Game Theory and Optimization, IIT Madras (June 9-10)
March, 2016	<i>Mathematics of Tomography</i> , State Level Seminar, Mathematics and Its Applications, Kamla Nehru College, University of Delhi, (March 4)
February, 2016	<i>Set-Criterion for Set-Valued Problems</i> , National Conference on Analysis and Applications, Banaras Hindu University (February 5-7)
June, 2015	<i>Well-Posedness in Set Optimization</i> , International Conference on Recent Advances in Mathematical Biology, Analysis and Applications, Aligarh Muslim University (June 4-6)
March, 2015	<i>On Set-Valued Optimization</i> , National Conference on <i>Optimization Modelling and Machine Learning Technique</i> , Panjab University, Chandigarh (March 20-21)
February, 2015	<i>Henig Proper Subdifferential of Set-Valued Maps</i> , International Conference on Modeling, Simulation and Optimizing Techniques, DAV College, Jalandhar (February 12-14)
January, 2015	<i>Optimality Conditions in Convex Optimization</i> , National Seminar on Optimization and its Applications, Lakshmibai College, University of Delhi (January 15-16)
December, 2014	<i>Approximate Solutions in Set-Valued Optimization</i> , International Conference on Operational Research in conjunction with 47 <sup>th</sup> Convention of Annual Operational Research Society of India held at Tirupati (December 1-3)
October, 2013	<i>Stability Aspects in Vector Optimization</i> , International Conference on Recent Trends on Materials and Devices, Amity University (October 30-31)



January, 2013	<i>Subgradients Using Henig Proper Efficiency in Set-Valued Optimization</i> , International Symposium on Applied Optimization and Game Theoretic Models held at Indian Statistical Institute New Delhi (January 9-11)
December, 2012	<i>Optimization Reformulations of Generalized Nash Equilibrium Problems</i> , National Conference on Advances in Mathematical Sciences, Kadi Sarva Vishwa Vidhyalaya, Gujarat (December 7-8)
August, 2012	<i>Mathematics of Sudoku</i> , St. Stephen's College, University of Delhi (August 22)
February, 2012	<i>Modelling in Graph Theory</i> , Daulat Ram College, University of Delhi (February 16)
February, 2012	<i>Mathematics of Sudoku</i> , Miranda House, University of Delhi (February 1)
January, 2012	<i>Applications of Game Theory in Wireless Networks</i> , National Workshop on Applications of Mathematics in Industrial Research, Lakshmi Bai College, University of Delhi (January 19-20)
November, 2011	<i>Levitin-Polyak Well-Posedness for Parametric Quasivariational Inequality Problem of the Minty Type</i> , International Conference on Analysis and its Applications, Aligarh Muslim University (November 19-21)
September, 2011	<i>Mathematics of Sudoku</i> , Gargi College, University of Delhi (September 14)
March, 2011	<i>Modeling in Graph Theory</i> , Seminar on Mathematical Modelling and its Applications at Kamla Nehru College, University of Delhi, (March 25)
February, 2011	<i>Introduction to Vector Optimization</i> , National Conference, Mathematics Meet-2011 organized by Department of Mathematics, Gujarat University, Ahmedabad (February 3-5)
August, 2010	<i>Duality of Generalized Equilibrium Problem</i> , Satellite Conference of International Congress of Mathematicians (ICM-2010), Mathematics in Science and Technology, India Habitat Centre\India Islamic Culture Centre, New Delhi (August, 14-17)
December, 2009	<i>Optimality Criteria in terms of Weak Clarke Epiderivative for Set-Valued Optimization Problem</i> , Indian Mathematical Society Conference, Kalasalingam University, Krishnankoil, Virudhnagar, Tamil Nadu (December 27-30)
January, 2009	<i>Mathematics of Sudoku</i> , Deen Dyal Upadhyay College, University of Delhi (January 31)
December, 2007	<i>Insight into Certain Optimization Problems</i> , Dyal Singh College, University of Delhi (December 4)
January, 2007	<i>Variational Inequality in Terms of Bifunction</i> , National Symposium on Functional Analysis, Optimization and their Applications held at Deen Dayal Upadhyay College, University of Delhi (January 19-20)
January, 2007	<i>Characterization of Solution Sets of Pseudolinear Programs</i> , International Symposium on Mathematical Programming for Decision Making: Theory and Applications held at Indian Statistical Institute New Delhi (January 8-9)
December, 2005	<i>Some Aspects of Variational Inequalities</i> at Deen Dayal Upadhyay College, University of Delhi (December 3)
February, 2005	<i>Note on Variational Inequality Problem in Terms of Bifunctions</i> , National Conference on Tools and Techniques for Quality and Productivity Improvement, NCQP 2005 held at Indian Statistical Institute New Delhi (February 8-9)
October, 2004	<i>Generalized Directional Derivatives in Terms of Bifunctions: Extension to Pseudolinear and Bipseudomonotone Maps</i> at Indian Institute of Technology, Kanpur (October 7)

## RESOURCE PERSON

February, 2024	A lecture on <i>Fundamental Theorem of Algebra: Optimization Approach</i> , in the Refresher Course Refresher Course in Mathematics/Operational Research/Statistics and Computer Science, Algebra, Analysis and Applications, Centre for Professional Development in Higher Education, University of Delhi (February 13)
October, 2023	A lecture on <i>Optimization</i> , UGC-Sponsored online Refresher Course in Mathematics, Bharathidasan University, Tiruchirappalli, Tamil Nadu (October 30)
April, 2023	A lecture on <i>Convex Optimization</i> , Workshop on Optimization and Game Theory, St. Stephen's College, University of Delhi (April 12)
March, 2022	A lecture on <i>Convex Optimization and its Applications</i> , AICTE Short Term Training Program on Numerical Linear Algebra & Optimization Techniques in Engineering, NIT Meghalaya, Shillong (March 19)

February, 2022 A lecture on *Convex Optimization and Applications*, Interdisciplinary FDP on Optimization: The Omnipresent, Motilal Nehru College, University of Delhi (February 04)

August, 2021 A lecture on *Mathematics in Real Life*, FDP on MOOCs, E-Content Development, Research Methodology and Statistical Tools in Open Education World, Kalindi College, University of Delhi (August 10)

March, 2021 A lecture on *Existence Theorems and Optimality Conditions for Minimization Problems*, in the Refresher Course in Mathematics, Teaching Learning Centre, Ramanujan College, University of Delhi (March 27)

March, 2021 A lecture on *Introduction to Variational Inequalities*, in the Workshop on Nonlinear Optimization, Variational Inequalities and Artificial Intelligence, Manav Rachna University (March 21)

December, 2019 A talk on *Research Methodology* in the Faculty Development Programme, on Recent Trends in Research Methodology, E-Content, Mathematical and Statistical Methods in Open Education World, Kalindi College, University of Delhi (December 20)

July, 2019 A talk on *Basics of Convex Optimization*, Faculty Development Program on Optimization Techniques and its Applications, Jaypee Institute of Information Technology, Noida (July 2)

December, 2018 Mentor/Resource person at DST INSPIRE Science Camp, Daulat Ram College, University of Delhi on *Puzzles in Mathematics* (December 21)

December, 2018 A lecture on *Mathematics in Medicine* in the Faculty Development Programme on Advancement in Integrated Sciences: Learning & Adaptation for Effective Teaching & Research, Shyam Lal College, University of Delhi (December 11)

September, 2018 Two lectures on Introduction to Vector Optimization, in the Refresher Course in Mathematics & Statistics, UGC-Human Resource Development Centre, Pondicherry University (September 15)

September, 2018 Two lectures on *Introduction to Vector Optimization*, in the Refresher Course in Computational & Mathematical Studies UGC-Human Resource Development Centre, Jamia Millia Islamia (September 1)

August, 2018 A lecture on *Fun in Mathematics*, in the Orientation Programme, Centre for Professional Development in Higher Education, University of Delhi (August 16)

June, 2018 A lecture on *Puzzles in Mathematics*, in the Orientation Programme, Centre for Professional Development in Higher Education, University of Delhi (June 20)

December, 2017 Series of four lectures on *Convex Sets and Convex Functions*, Short Term Training Programme on Nonlinear Analysis and Optimization Indian Institute of Technology, Dhanbad (December 1-5)

November, 2017 Series of four lectures on *Convex Sets and Convex Functions*, International Workshop on Convex Analysis and Optimization, Aligarh Muslim University (November 14-19)

September, 2016 A lecture on *Minimization and the Fundamental Theorem of Algebra*, in Refresher Course in Centre for Professional Development in Higher Education, University of Delhi (September 7)

June, 2016 A lecture on *Stability Aspects in Vector Optimization* in the Workshop on Game Theory and Optimization, Indian Institute of Technology Madras (June 6-8)

March, 2015 A lecture on *Scalar and Vector Optimization* in Refresher Course in Mathematics, Panjab University, Chandigarh on (March 21)

January, 2015 A lecture on *Solution Concepts in Vector and Set Optimization*, in the Workshop on Applied Optimization Models and Computation, Indian Statistical Institute, Delhi (January 28-30)

January, 2013 Series of **two** lectures on *Introduction to Optimization Theory*, in the Refresher Course in Centre for Professional Development in Higher Education, University of Delhi (January 12)

November, 2012 Lecture on *Optimality Conditions for Mathematical Programming Problems*, in the Training Programme on Optimization and its Applications at University of Delhi (November 26 to December 1)

October, 2012 Mentor/Resource person at INSPIRE internship programme-2012, organized by DST at Deshbandhu College, University of Delhi on *Some Solved and Unsolved Problems in Mathematics* (October 1-5)

December, 2011 Series of two lectures on *Introduction to Variational Inequality Problems*, in the Refresher

- Course in Centre for Professional Development in Higher Education, University of Delhi (December 20)
- January, 2011 Series of two lectures on *Introduction to Optimization Theory*, in the Refresher Course conducted by UGC-Academic Staff College of B.P.S. Mahila Vishwavidyalaya, Khanpur Kalan (January 8)
- March, 2009 Series of two lectures on *Augmented Lagrangian Approach to Duality*, Advanced Training Program on Nonconvex Optimization and its Application at Banaras Hindu University, Varanasi (March 22-26)
- December, 2008 Series of five lectures on *Generalized Convexity and Nonlinear Programming*, Training Program held at Apaji Institute of Mathematics and Applied Computer Technology, Banasthali University, Rajasthan (December 24-29)
- September, 2008 Series of two lectures on *An Introduction to Vector Optimization*, Research Workshop in Optimization Theory and Applications, Indian Institute of Technology Kanpur (September 3-6)
- March, 2008 A lecture on *An Introduction to Variational Inequality Problems*, International Workshop on Advanced Mathematical Programming Techniques for Young Teachers and Researchers, held at Dravidian University, Kuppam, Andhra Pradesh (March 24-April 1)
- April, 2007 A lecture on *Convex and Generalized Convex Optimization*, Workshop on Mathematical Modeling Optimization and their Applications, held at Bharati Vidyapeeth University, Institute of Computer Applications and Management, New Delhi (April 23-27)