

JOYDEEP DUTTA

Professor

Department of Economic Sciences

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Indian Institute of Technology, Kanpur

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ACADEMIC QUALIFICATIONS

Ph.D. in Mathematics, Indian Institute of Technology, Kharagpur, 1998.

M.Sc. in Mathematics, Indian Institute of Technology, Kharagpur, 1993.

B.Sc. (Honours) in Mathematics, University of Calcutta, (St. Xavier's College) 1991.

RESEARCH INTERESTS

Major Area : Optimization Theory

Specific Interest in Optimization : Convex and Nonsmooth Optimization, Vector Optimization, Bilevel Programming, Error bounds for Variational Inequalities, and Algorithms for convex optimization and those applicable to machine learning.

Note : I have been a faculty member at the Department of Mathematics and Statistics, IIT Kanpur till July 1st 2014. Currently I am interested in application of optimization to problems of economics and engineering. In particular currently I am interested in application of the multi-leader follower games and Generalized Nash Equilibrium. I am also interested in optimization algorithms for machine learning problems and also on the complexity analysis of convex optimization algorithms.

RESEARCH PUBLICATIONS (Mathematical Optimization)

Papers in Refereed Journals

P. Kesarwani, P. K. Shukla, J. Dutta and K. Deb, Approximations for Pareto and proper Pareto solutions and their KKT conditions, to appear in *Mathematical Methods of Operations Research.*, 2022. (Currently Online)

P. Kesarwani and J. Dutta, Charnes-Cooper Scalarization and Convex Vector Optimization, *Optimization Letters*, Vol 15, (2021), pp 833-846.

J. Dutta and J. E. Martinez-Legaz, Error bounds for inequality systems defining convex sets, To appear *Mathematical Programming Series B*. Vol 89, (2021), pp 299-314.

S. Dempe, N. Dinh, J. Dutta and T. Pandit, Simple bilevel programming and extensions, *Mathematical Programming, Series A*, Vol 188, (2021), pp 227-253.

P. K. Shukla, J. Dutta, K. Deb and P. Kesarwani, On a practical notion of Geoffrion proper optimality in multicriteria optimization, *Optimization*, Vol 69, (2019) pp 1513-1539.

D. Aussel, J. Dutta and A. C. Xu, The dual gap function and error bounds for strongly Monotone Variational Inequalities, *Journal of Convex Analysis*, Vol 25, (2018), pp 1121-1138.

J. Dutta, P. Kesarwani, S. Gupta, Gap functions and error bounds for nonsmooth convex vector optimization problem., *Optimization*, Vol 66, (2017), pp 1807-1836.

C. Charitha, J. Dutta and D. R. Luke, Lagrange multipliers, (exact) regularization and error bounds for monotone variational inequalities, *Mathematical Programming (Series A)*, Vol 161, (2017), pp 519-549.

J. M. Borwein and J. Dutta, Maximal monotone inclusions and Fitzpatrick functions, *Journal of Optimization Theory and Application*, Vol 171, (2016), pp 757-784.

J. Dutta, Barrier methods in nonsmooth convex optimization without convex representation. *Optimization Letters*, Vol 9, (2015), pp1177-1185.

C. Charitha, J. Dutta and C. S. Lalitha, Gap functions for vector variational inequalities., *Optimization*, Vol 64, (2015), pp 1499-1520.

D. Aussel and J. Dutta, Addendum to “Generalized Nash equilibrium problem, variational inequality and quasiconvexity”, *Operations Research Letters*, Vol 42, (2014), pp 6-7.

J. Dutta, K. Deb, R. Arora and R. Tulshyan, Approximate KKT conditions: Theory and numerical Experiments , *Journal of Global Optimization*, Vol 56, (2013), pp 1463-1499.

J. Dutta and C. S. Lalitha, Optimality conditions for convex optimization revisited, *Optimization Letters*, Vol 7, (2013), pp 221-229.

J. Dutta, Gap Functions and Error Bounds for Variational and Generalized Variational Inequalities. *Vietnam Journal of Mathematics*, Vol 40, (2012). pp 231-253. (This is a special issue for the 65th birthday of Prof. P. Q. Khanh)

S. Dempe and J. Dutta, Is bilevel programming a special case of mathematical program with complementarity constraints?, *Mathematical Programming Series A*, Vol 131, 2012, pp 37-48.

J. Dutta and C. Yalcin Kaya, A new scalarization and numerical method for constructing weak Pareto front of multi-objective optimization problem, *Optimization*, Vol 60, 2011. pp 1091-1104.

M. Durea, J. Dutta and C. Tammer, Stability properties of KKT points in vector optimization, *Optimization*, Vol 60, 2011, pp 823-838.

D. Aussel and J. Dutta, On gap functions for multivalued Stampacchia variational inequalities, *Journal of Optimization Theory and Applications*, Vol 149, 2011, 513-527.

Regina Burachik, and J. Dutta Inexact proximal point methods for variational inequality problems. *SIAM Journal of Optimization*. Vol 20, 2010, pp 2653–2678,

C. Charitha, and J. Dutta, Regularized gap functions and error bounds for vector variational inequalities, *Pacific Journal of Optimization*, Vol 6, 2010, pp 497–510.

J. Dutta, S. R. Pattanaik and Michel Thera, A note on approximate Lagrange multiplier rules, *Mathematical Programming*, Series B. Vol 123, 2010, pp 161-171

M. Durea, J. Dutta and Chr. Tammer, “Lagrange multipliers for epsilon-Pareto solutions in vector optimization with non-solid cones in Banach Spaces” *Journal of Optimization Theory and Applications*, Vol 145, 2010, pp 196-211

M. Durea and J. Dutta, Lagrange multipliers for Pareto minimum in general Banach spaces, *Pacific Journal of Optimization*, Vol 4, 2008, pp 447-463.

M. Durea, J. Dutta and Chr. Tammer, Bounded sets of Lagrange multipliers for vector optimization problems in infinite dimension. *Journal of Mathematical Analysis and Applications*, Vol 348, 2008, pp 589-606.

D. Aussel and J. Dutta, Generalized Nash equilibrium problem, variational inequality and quasiconvexity, Vol 36, *Operations Research Letters*, 2008, pp 461-464.

J. Dutta, J. E. Martinez-Legaz and A. M. Rubinov, Monotonic analysis over cones – III. Vol 15 *Journal of Convex Analysis*, 2008, pp 561-579

S. Dempe, J. Dutta, and B. S. Mordukhovich, New necessary optimality conditions in optimistic bilevel programming, *Optimization*, Vol 56, 2007, pp 577-604.

J. Dutta, Revisiting the Lagrange multiplier rule, *Pacific Journal of Optimization*, Vol 2, 2006, pp 501-519

J. Dutta and C. S. Lalitha, Bounded sets of KKT multipliers in vector optimization, *Journal of Global Optimization*, Vol 36, 2006, pp 425-437.

S. Dempe, J. Dutta and S. Lohse Optimality conditions in bilevel programming”, *Optimization*, Vol 55, 2006, pp 505-524.

J. Dutta and C. Tammer, Lagrangian conditions for vector optimization in Banach Spaces, *Mathematical Methods of Operations Research*, Vol 64 2006, 521-540.

J. Dutta, Generalized derivatives and nonsmooth optimization – a finite dimensional tour , (Invited Survey) , *TOP*, Vol 13, 2005, pp 185-314.

J. Dutta, Optimality conditions for maximizing a locally Lipschitz function, *Optimization*, Vol 54, 2005, pp 377-389.

J. Dutta, “Necessary optimality conditions and saddle points for approximate optimization in Banach Spaces, *TOP*, (*Trabajos de Investagacion Operativa*)(Journal of the Spanish Society of Statistics and Operations Research), Vol 13, 2005, pp 143-127.

J. Dutta, J. E. Martinez-Legaz and A. Rubinov, Monotonic analysis over cones-II, *Optimization*, Vol 53, 2004, pp 529-547.

S. Chandra, J. Dutta and C. S. Lalitha, Regularity Conditions and Optimality in Vector Optimization, *Numerical Functional Analysis and Optimization*, Vol 25, 2004, pp 479-501.

S. S. Dragomir, J. Dutta and A. Rubinov, Hermite-Hadamard type inequalities for increasing and convex-along rays functions, *Analysis(Munich)*, Vol 24, 2004, 171-181.

J. Dutta, J. E. Martinez-Legaz and A. Rubinov, “Monotonic analysis over cones: I, *Optimization*, Vol 53, 2004, pp 129-146.

J. Dutta and S. Chandra, Convexifactors, generalized convexity and vector optimization, *Optimization*, Vol 53, 2004, pp 77-94.

C. S. Lalitha, J. Dutta and M. Govil, On optimality criteria in set-valued optimization, , *Journal of Australian Mathematical Society* , Vol 75, 2003, pp 221-232.

A. Rubinov and J. Dutta, “Hadamard type inequality for quasiconvex functions in higher dimensions”, *Journal of Mathematical Analysis and Applications*, Vol 270, No 1, 2002, pp 80-91.

J. Dutta and S. Chandra, “Convexifactors, generalized convexity and optimality conditions”, *Journal of Optimization Theory and Applications* , Vol 113, no 1. 2002, pp 41-64.

J. Dutta and V. Vetrivel , Mathematical programming with a class of non-smooth functions, *Journal of Systems Science and Complexity*, Vol 15 No 1, 2002, pp 52-60.

J. Dutta, and V. Vetrivel, On approximate minima in vector optimization, *Numerical Functional Analysis and Optimization*, Vol 22, 2001, pp 845-859.

J. Dutta, On generalized pre-invex functions, *Asia Pacific Journal of Operational Research*, Vol 18, 2001 , pp 257-272.

V. Vetrivel and J. Dutta, Motzkin type alternative theorem and set-valued optimization", *Journal of Analysis*, Vol 9, 2001, pp 137-147.

J. Dutta, On convex vector optimization, *Bulletin of the Australian Mathematical Society* , Vol 61, 2000, pp 85-83.

J. Dutta, V. Vetrivel and S. Nanda, Equivalence of optima and saddle point in nonsmooth nonconvex programs, *Optimization*, Vol 42, 1997, pp 73-81.

J. Dutta, V. Vetrivel and S. Nanda, Semi-invex Functions and their subdifferentials, *Bulletin of the Australian Mathematical Society*, Vol 56, 1997, pp 385-393.

Papers in Refereed Handbooks/ Conference Proceedings

J. Dutta and T. Pandit, Algorithms for simple bilevel programming, appeared as Chapter 9 in *Bilevel Optimization: Advances and Next Challenges*, Springer, (Springer Optimization and Applications, 161), 2020, pp 253-291

D. Aussel, J. Dutta and T. Pandit, About the links between equilibrium problems and variational inequalities., *Mathematical Programming and Game Theory*. Indian Statistical Institute Series, Springer, 2018, pp 115-130.

J. Dutta, Convex Functions in Optimization, Chapter 1 in the book titled : Decision Sciences: Theory and Practices, Eds: R. N. Sengupta, Aparna Gupta and J. Dutta CRC Press, Taylor and Francis. 2016, pp 1-78.

J. Dutta, Strong KKT, second order conditions and nonsolid cones in vector optimization, Chapter 5 in *Recent Advances in Vector Optimization* (Multi-authored book on vector optimization) Edited by Q. H. Ansari and J. C. Yao. To In the series on Vector Optimization, Springer, October 2011.

S. Dempe, N. Dinh and J. Dutta, Optimality condition for a simple convex bilevel programming problem, In *Variational Analysis and Generalized Differentiation in Optimization and Control*, (In honour of Boris. S. Mordukhovich), Eds R. S. Burachik and J. C. Yao., Springer Optimization and Its Applications, Vol 47, Springer, 2010.

S. Dempe, J. Dutta and B. S. Mordukhovich, Variational analysis in bilevel programming, *Mathematical Programming and Game Theory for Decision Making*, Proceedings of the International Symposium on Mathematical Programming and Game Theory for Decision Making : Indian Statistical Institute, Delhi, December 10-11, 2007, World Scientific, Singapore, 2008, pp 257-277

J. Dutta and S. Dempe, "Bilevel programming with convex lower level problems. Optimization with multivalued mappings', pp 51--71, Springer Optim. Appl., 2, Springer, New York, 2006

A. Rubinov and J. Dutta, "Abstract convexity", *Handbook of Generalized Convexity and Generalized Monotonicity*, (Series : Nonconvex Optimization and Applications 76), Springer, New York, 2005, pp 293-333.

V. Vetrivel and J. Dutta, "Necessary optimality conditions with subdifferentials of semi-invex functions." *Proceedings of the ASME Conference on Nonsmooth / Nonconvex Modelling , Theory and Applications*, Chapter 20, pp 427 - 436, Kluwer Academic Publishers 2000.

RESEARCH PUBLICATIONS (Optimization Heuristics)

Papers in Refereed Journals

K. Deb, S. Gupta, J. Dutta, B. Ranjan, Solving dual problem using coevolutionary algorithm, *Journal of Global Optimization*, Vol **57**, 2013, pp 891-933. K

Papers in Refereed Handbooks/ Conference Proceedings

K. Deb, M. Abouhawwash and J. Dutta, An optimality theory based proximity measure for evolutionary multiobjective and many objective optimization. *Evolutionary Multiobjective Optimization LNCS Vol 9019*, pp 18-33. 2015.

R. Arora, U. Upadhyay R. Tulshyan and J. Dutta, A parallel algorithm for solving large scale convex minimax problems, in the proceedings of SEAL 2010,(K Deb, et al, Eds) held at IIT Kanpur, 2010, pp 35-44.

K. Deb, R. Tewari, M. Dixit and J. Dutta, Finding trade-off solutions close to KKT points using evolutionary multi-objective optimization, *Proceedings of the Congress on Evolutionary Computation (CEC-2007)*, (Singapore), (pp. 2109--2116).

BOOKS

Co-authored, "**Principles of Optimization Theory**" with Professor C. R. Bector (University of Manitoba, Winnipeg, Canada) and Professor Suresh Chandra, (Indian Institute of Technology, Delhi). Published by Narosa

Publishers, New Delhi, India, September 2004 and Alpha Science International, Harrow, U. K, 2005. Pages 224. (*Revised and Expanded edition under preparation*)

Co-authored, “**Optimality Conditions in Convex Optimization : A Finite Dimensional View**”, with Anulekha Dhara. , published by CRC/ Taylor and Francis on October 17th 2011.

EDITED BOOKS

Decision Sciences : Theory and Practice : Edited jointly with R. N. Sengupta and Aparna Gupta, CRC Press, Taylor and Francis, October 2016.

PAPERS COMMUNICATED AND UNDER PREPARATION

T. Pandit, J. Dutta and Mallikarjun Rao, A Simple Algorithm for the Simple Bilevel Programming. (submitted to *Journal of Optimization Theory and Applications*)

S. Dempe, N. Dinh, J. Dutta and T. Pandit, Algorithms for simple bilevel and simple MPEC problem (revised version submitted to *Optimization*).

SPONSORED PROJECTS / MOBILITY PROJECTS

MATRIX project titled : “A study of first order methods in scalar and vector optimization” funded by the Science and Energy Research Board (SERB) of the Department of Science and Technology, DST (India). 2020.

“Increasing and convex functions along rays : A study in monotonic analysis”. Funded by the National Board for Higher Mathematics, India (2003-2006).

Indo-French Institute of Mathematics, Mobility Project to visit University of Limoges, France , 2006

Optimizing Engineering Design, DST (Department of Science and Technology, India) sponsored project, 2009-2012 (jointly with Professor Kalyanmoy Deb)

Multiobjective Multidisciplinary Optimization, DST sponsored project, 2010-2013 (jointly with Professor Kalyanmoy Deb).

FM-Radio project for celebrating 150 the birth centenary of the legendary mathematician Srinivasa Ramanujan through 90, radio episodes of 15 minutes each. (jointly with Dr. Satyaki Roy). 2012-2013.

IFCAM (Indo-French Center for Applied Mathematics), Mobility Grant for the project titled : Local Nash Equilibrium in Electricity Markets. French participant : Professor Didier Aussel, PROMES, Energy Lab (CNRS), Perpignan, France. Granted : March 2016.

EUPHRATES-ERASMUS Faculty Mobility project to visit LAB PROMES, Energy Lab (CNRS), France. Granted May 2016.

FELLOWSHIPS

Visiting Fellowship of the Spanish Ministry of Education and Culture, June 2000.

Post-Doctoral Fellowship of the National Board for Higher Mathematics (NBHM), India, December 1998.

Junior Research Fellowship, University Grants Commission, Government of India, 1993.

Graduate Aptitude Test in Engineering Scholarship, Government of India, 1993.

EMPLOYMENT

Professor, on Deputation at the School of Artificial Intelligence and Data Sciences, Indian Institute of Technology, Jodhpur, from February 1st 2021. The contract to expire on December 31st 2021.

Professor of Mathematical Economics, Department of Economic Sciences, Indian Institute of Technology, Kanpur-208016, from 5th of May 2017-till date.

Professor of Mathematical Economics, Economics Group, Department of Humanities and Social Sciences, Indian Institute of Technology, Kanpur-208016, from 2nd July 2014-5th of May 2017.

Professor of Mathematics, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur-208016, India from 26th March 2012-1st July 2014

Associate Professor of Mathematics, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur-208016, India from 31st December 2007-25th March 2012

Assistant Professor of Mathematics, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur -208016, India from 27th December 2002- 30th December 2007

Assistant Professor of Mathematics, Department of Mathematics, Indian Institute of Technology, Kharagpur-721 302, India , June 2002-December 2002(upto 26th December 2002).

Assistant Professor of Quantitative Methods, Institute of Management Technology, India, September 2000-October 2000

Lecturer in Mathematics, P. D. Women's College, North Bengal University, India, August 1997-June 1999.

Software Engineer, Complete Business Solutions Inc, Chennai, India, July 1993-April 1994

VISITING AND POST DOCTORAL POSITIONS

Post-Doctoral Fellow, Department d' Economia i d' Historia Economica of the Universitat Autònoma de Barcelona, Spain, November 2000-April 2002.

Visiting Scientist, Statistical Quality Control and Operations Research Unit, Indian Statistical Institute , Delhi. July 2000-August 2000.

Post-Doctoral Fellow, Indian Statistical Institute, Delhi , July 1999-June 2000.

Visiting Scientist, Statistical Quality Control and Operations Research Unit, Indian Statistical Institute, Delhi, February, 1999-March, 1999.

INVITED LECTURES

Lecture on Optimality Conditions in Approximate Optimization in the University of Aix-Marseilles, December 14th 2001.

Lecture on Hermite-Hadamard Inequality for Quasiconvex functions at the Laboratory for Analysis and Optimization, University of Limoge, France, on February 9th, 2001.

A series of two invited lecture on Non-smooth Optimization at the Department of Operations Research, University of Delhi, India, March 8th, 2000 and March 15th, 2000.

Lecture on Non-smooth Optimization at the Indian Institute of Technology, Guwahati, India, September 9th , 1998.

Invited lecture series titled : Generalized Derivatives and Optimization, at the University of Alicante Spain, 2nd July and 3rd July 2003.

Invites lecture series at the Workshop on Convexity in Discrete Structures, Trivandum, March 2006

Invited lecture titled : Revisiting the Lagrange Multiplier Rule, at the University of Limoges France, on 19th May 2006.

Invited Lecture titled : Variational Analysis and Bilevel Programming, at the International Symposium of Mathematical Programming for Decision Making: Theory and Applications on 11th January 2007 at Indian Statistical Institute Delhi. The lecture was a part of the S. R. Mohan memorial lectures at the conference.

CARMA Colloquium Lecture : Is Bilevel Programming a Special Case of MPEC, at the University of Newcastle, Australia in October 2009

Invited Lecture Series : Interior Point Methods in Linear and Convex Optimization., at the Tata Institute of Fundamental Research, Mumbai, India, from 10th to 14th April 2010.

Invited Lecture Series : Recent Advances In Convex Optimization : University of Pondicherry, Puducherry, India, February, 2011

Invited Lecture Series at the Winter School on Control and Optimization, 13-17th January 2014. IIT Bombay, Mumbai.

Resource Person and Lecturer at the CIMPA school on Bilevel Programming, Generalized Nash Equilibrium and Mathematical Programming under Equilibrium Constraints, New Delhi 24th November 2014-6th December 2013.

Invited Lecture at the Symposium on Bilevel Control Problems, University of Heidelberg Germany, October 20th 2014-October 22nd 2014.

Invited Lecture Series at the Workshop on Variational Analysis and Optimization, IIT Gandhinagar, 2-8th March 2015.

Invited Lecture at the Symposium in the memory of Jon Borwein, 22nd-28th September, 2017.

Invited speaker at the International Workshop on Evolutionary Algorithms and Applications(with main focus on multi-objective, many-objective and bilevel problems), 9th-10th March, South Asian University, New Delhi.

Invited Lecture at the Colloquium and Conference on Variational Analysis and Nonsmooth Optimization : Celebrating the 70th birthday of Boris Mordukhovich, 28th June to 1st-July 2018.

RESEARCH VISITS (International)

Institute for Optimization and Stochastics, Department of Mathematics and Informatics, Martin-Luther University, Halle, Germany from 1st June 2003 to 30th June 2003.

Department of Statistics and Operation Research, University of Alicante , Spain from 1st July 2003- 5th July 2003.

Department of Mathematics, Institute for Optimization and Scientific Computing, T. U. Bergakademie, Freiberg, Germany, June 20th-June 28th 2004.

Department of Mathematics, Institute for Optimization and Scientific Computing, T. U. Bergakademie, Freiberg, Germany, 16th May 2005 – 22nd May 2005.

The Laboratory for Arithmetic, Formal Calculus and Optimization(LACO), University of Limoges, France from 23rd May 2005 – 28th May 2005.

Institute for Optimization and Stochastics, Department of Mathematics and Informatics, Martin-Luther University, Halle, Germany from 1st June 2005 to 30th June 2005.

Department of Mathematics and XLIM, University of Limoges, France from 6th June 2006 to 28th June 2006. This visit was supported by the Indo-French Institute of Mathematics.

Department of Mathematics, University of Perpignan, France from 29th June 2006 to 1st July 2006.

Department of Economic Theory, Universidad Autonoma de Barcelona, Spain from July 2nd 2006 to July 4th 2006.

Department of Mathematics, University of New South Wales, Sydney, Australia, 1st May 2007- 30th May 2007.

Department of Mathematics, University of South Australia, Adelaide 17th May 2007-21st May 2007.

Department of Mathematics, University of Limoges, France, 7th June 2007-5th July 2007.

Department of Economic Theory, Universidad Autonoma de Barcelona, Spain from July 23rd June 2007 to 26th June 2007.

Department of Mathematics, Martin-Luther University, Halle, Germany, November 23rd 2007-17th December 2007.

Department of Mathematics, University of Limoges, France, 26th May 2008-1st June 2008.

Department of Mathematics, University of Perpignan, France , 2nd June 2008-30th June 2008.

Department of Mathematics, International University, Ho Chi Minh City, Vietnam, 22nd February-11th March 2009.

Department of Mathematics, University of Limoges, France, 26th May 2009-25th June 2009.

Department of Industrial Engineering and Operations Research, Indian Institute of Technology, Bombay, Powai, Mumbai, July 17th to July 24th, 2009.

Department of Mathematics, University of South Australia, Mawson Lakes Campus, Adelaide, Australia, 20th August -26th October 2009.

Centre for Informatics and Applied Optimization, University of Ballarat, Australia, 15th -16th October 2009.

Department of Mathematical Sciences and Centre for Computer Assisted Research Mathematics and Applications (CARMA), University of Newcastle, Australia, 21st-23rd October 2009.

School of Computer Science and Technology, Tata Institute of Fundamental Research, Mumbai, India, 10th April-14th April 2010.

Department of Mathematics, Institute for Optimization and Scientific Computing, T. U. Bergakademie, Freiberg, Germany, July 1st 2010-July 6th 2010.

Department of Mathematics, International University, Ho Chi Minh City, Vietnam, 31st May 2011-22nd June 2011

School of Computer Science and Technology, Tata Institute of Fundamental Research, Mumbai, India , 26th June 2011-5th July 2011.

Institute for Mathematics, Martin-Luther University, Halle, Germany from 5th June 2012 to 2nd July 2012.

Department of Numerical Analysis and Applied Mathematics, University of Goettingen, from 14th October 2012 to 20th October 2012.

Department of Business Administration, University of Zurich, from 21st October 2012 to 25th October 2012.

Institute for Mathematics, Martin-Luther University, Halle, Germany from 7th July 2013 to 16th July 2013.

CARMA high priority lab, University of Newcastle, Australia from 25th May 2014 to 28th June 2014.

Institute for Numerical Analysis and Optimization, T. U. Freiberg, Germany from 23rd October 2014 to 24th October 2014.

LAB Promes, CNRS : University of Perpignan, 1st -30th June 2015.

Department of Mathematics, Martin-Luther University, Halle, Germany, 1st - 9th July, 2015.

Department of Applied Mathematics, National Sun-Yet San University, Kaoshiung, Taiwan, 12th June 2016-3rd July 2016.

LAB Promes, CNRS : University of Perpignan, 3rd-18th, December 2016.

LAB Promes, CNRS, : University of Perpignan, 15th May 2018 to 31st May 2018.

Department of Mathematics, King Monkut's Institute of Technology, Bangkok, Thailand, 4th -7th September 2019.

CONDUCTING WORKSHOPS/CONFERENCES

Conducted the *Instructional Workshop on Convex Analysis, Optimization and Applications*, held at I.I.T. Kanpur from the 5th to the 21st of December

2005, jointly with Dr. P. Shunmugaraj. This was sponsored by Department of Science and Technology, Government of India.

Conducted the *Research Workshop on Optimization Theory and Applications*, held at the Indian Institute of Technology from 3rd to the 6th of September 2008. This was sponsored by the Department of Science and Technology, Government of India.

Conducted a GIAN course titled : **Stochastic Programming and Applications**

From 28th March 2018 to 28th March 2018.

Foreign Faculty : Prof. John R. Birge, Booth School of Business, University of Chicago.

TEACHING

Indian Institute of Technology, Kharagpur

MATHS 101 - Basic Engineering Mathematics (Instructor)

Optimization Methods (Instructor)

Numerical Analysis (Instructor)

Indian Institute of Technology , Kanpur :

ESO 209 : Probability and Statistics (Tutorial Instructor)

MTH-102 : Linear Algebra and Complex Variables (Tutorial Instructor)

MTH 506 : Principles of Optimization (Instructor)

MTH 101 : Calculus (Institute Core-Course) (Instructor/ Tutorial Instructor)

MTH 306 : Linear Programming and Extensions(Instructor)

MTH203 : Ordinary and partial differential equations (Tutorial Instructor)

MTH102 : Linear Algebra and Complex Variables (Institute Core-Course)(Instructor).

ECO261/261A : Mathematical Economics.

Introduced and taught a new interdisciplinary course titled : **Multiobjective Optimization : Theory, Methods and Applications**, jointly with Professor Kalyanmoy Deb of the Department of Mechanical Engineering at the Indian Institute of Technology, Kanpur.

Developed and taught a new course titled : **Foundations of Mathematical Finance** (MTH 512) in the Spring-Semester 2007 and 2013.

Developed and taught a new course titled : **Advanced Quantitative Finance** (MTH 659) in the Spring-Semester of 2008.

Developed a graduate course titled : **Mathematical Analysis for Economists** (ECO760A / ECO 760) .

OUTREACH ACTIVITIES

NPTEL Courses

Convex Optimization : 2013

Foundations of Optimization : 2014

MOOC Courses

Basic Calculus for Scientists and Engineers, 2015 (Ten hour course)

Probability and Stochastics for Finance, Part-I, 2016 (Ten hour course).

Probability and Stochastics for Finance Part-II, 2016 (Ten hour course)

Calculus of one real variable, 2017 (Twenty hour Course)

Calculus of several variable, 2019 (Twenty hour course).

ADMINISTRATIVE EXPERIENCE

Founder Head of the Department of Economic Sciences at IIT Kanpur from 6th May 2017 to 30th April 2019.

PUGC (Programme Under-graduate Committee Convener), Economics from September 2015 -September 2016.

DFAC member, Department of Humanities and Social Science, February 2016-April 2017. DFAC : Departmental Faculty Advisory Committee)

Convenor, Economics Group, Humanities and Social Sciences, April 2016-till date.

DPGC (Departmental Post-graduate Committee Convenor), Mathematics and Statistics, September 2010-August 2011.

Member, Institute Environmental Committee, 2003-2005.

MEMBERSHIP OF PROFESSIONAL SOCIETIES

International Working Group on Generalized Convexity and Generalized Monotonicity; Research Group on Mathematical Inequalities and Applications; Pacific Optimization Research Activity Group.

REFEREE FOR JOURNALS

Journal of Mathematical Analysis and Applications; Journal of Optimization Theory and Applications; Journal of Global Optimization., Numerical Functional Analysis and Optimization, Optimization, Asia-Pacific Journal of Operational Research, Journal of Convex and Nonlinear Analysis, Mathematical Programming, Pacific Journal of Optimization.

Reviewer for Mathematical Reviews of the American Mathematical Society.

EDITORIAL WORK

Member of the editorial board of the journal **International Journal of Modern Mathematics** published by Dixie. W. Publishers, Alabama, U. S. A. from March 2006 to September 2008.

Ph. D SUPERVISION

Name of Phd students and Thesis title :

Dr. Suvendu Pattanaik, Thesis title: **Optimization with Generalized Differentiation and Extremal Principal**. Received Phd in May 2009

Dr Charitha Churchill, Thesis title : **Gap Functions and Error Bounds for Vector Variational Inequalities and Equilibrium Problems**. Received Ph.d in May 2010.

Dr Arnab Sur, Thesis title : **A Study on Stationarity Concepts for a class of SMPCC problems**, Received Phd in June 2014.

Ms Poonam Kesarwani, Thesis title : **A Study of Approximate Solutions and Error Bounds in Vector Optimization**. Received Ph.d in Jun 2019.

Ms Tanushree Pandit, Thesis title : **A Study of Simple Bilevel Programming and Related Issues**, Received Ph.d. in 2020.

HOBBIES AND OTHER ACADEMIC ACTIVITIES

Interested in the history and technical issues associated with Indian Railways. Authored several articles on various aspects of Indian Railways including a book on diesel locomotive

BOOK :

S. M. Sharma and J. Dutta, The Story of Indian ALCO Locomotives : Legend of the WDM2. Published by the National Rail Museum , New Delhi, October 2009.

ARTICLE :

J. Dutta and A. Agarwal, Diesel Locomotives of Indian Railways : A Technical History, In Locomotives and Railroad Transportation : Technology, Challenges and Prospect., Edited by A. Agarwal, A. Dhar, A. Gautam and A. Pandey, Springer , 2017.

Other Academic Interests : Classical Mechanics and Geometry.

REFERENCES

Professor Suresh Chandra, Department of Mathematics, Indian Institute of Technology, Hauz Khas, New Delhi, 110016, India. email: chandras@maths.iitd.ernet.in.

Professor Boris. S. Mordukhovich, Department of Mathematics, Wayne State University, Detroit, Michigan, 48202, U.S.A. email : boris@math.wayne.edu

Professor J. E. Martinez-Legaz, Department d' Economia i d'Historia
Economia, Universitat Autònoma de Barcelona, 08193, Bellaterra, Barcelona,
Spain. email: JuanEnrique.Martinez@uab.es or jemartinez@selene.uab.es

Professor Didier Aussel, LAB-PROMES, CNRS, University of Perpignan,
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Professor Stephan Dempe, Department of Mathematics and Informatics. T.U.
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