

## **JOYDEEP DUTTA**

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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, 1991.

### **RESEARCH INTERESTS**

Major Area : Optimization Theory

Specific Interest in Optimization : Convex and Nonsmooth Optimization, Vector Optimization, Bilevel Programming and Variational Inequalities.

### **RESEARCH PUBLICATIONS**

M. Durea, J. Dutta and Chr. Tammer, "Lagrange multipliers for epsilon- Pareto solutions in vector optimization with non-solid cones in Banach Spaces" to appear *Journal of Optimization Theory and Applications*, 2009.

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

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.

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, 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” to appear, *Journal of Global Optimization*, Vol 36, 2006, pp 425-437.

S. Dempe, J. Dutta and S. Lohse “Optimality conditions in bilevel programming” to appear in *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 and S. Dempe, “Bilevel programming with convex lower level problems” in S. Dempe, V. Kalashnikov (eds.): *Optimization with Multivalued Mappings: Theory, Applications and Algorithms*. Springer, 2006, pp 51-71.

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.

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.

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*, 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" the *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**,(7 & 8), 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.

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.

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.

## **BOOK**

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*)

## **MONOGRAPH**

A monograph titled : **Variational Inequalities and Equilibrium Problems : A View Through Gap Functions.** ( *under preparation* ) (*Book proposal currently under consideration by Springer*)

## **PAPERS COMMUNICATED AND UNDER PREPARATION**

Charitha, Ch and J. Dutta, A note on D-gap functions of equilibrium problems, ( *under preparation*)

Charitha, Ch and J. Dutta, Regularized gap functions and error bounds for vector variational inequalities ( *submitted to Pacific Journal of Optimization*).

Regina Burachik and Joydeep Dutta, Inexact proximal point methods for variational inequality problems (submitted to *SIAM Journal of Optimization*)

S. Dempe and J. Dutta, Is bilevel programming a special case of mathematical program with complementarity constraints ?( *submitted to Mathematical Programming*)

K. Deb, R. Tewari, M. Dixit and J. Dutta, Finding trade-off solutions Close to KKT points using evolutionary multi-objective optimization, (Accepted for the IEEE Conference on Evolutionary Computation, Sept 25<sup>th</sup> to 28<sup>th</sup>, 2007, Singapore)

J. Dutta, S. R. Pattanaik and Michel Thera, On approximate multiplier rules (currently being revised for *Mathematical Programming* ).

J. Dutta and . Martinez-Legaz “Monotonic analysis over cones-IV. (Under preparation)

## **ACADEMIC AWARDS**

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**

Associate Professor of Mathematics, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur-208016, India from 31<sup>st</sup> December 2007-till date.

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

Assistant Professor of Mathematics, Department of Mathematics, Indian Institute of Technology, Kharagpur-721 302, India , June 2002-December 2002( upto 26<sup>th</sup> 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, 2<sup>nd</sup> July and 3<sup>rd</sup> July.

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

Invited Lecture titled : Variational Analysis and Bilevel Programming, at the International Symposium of Mathematical Programming for Decision Making: Theory and Applications on 11<sup>th</sup> January 2007 at Indian Statistical Institute Delhi.

## **RESEARCH VISITS**

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

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

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

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

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

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

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

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

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

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

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

Department of Mathematics, University of Limoges, France, 7<sup>th</sup> June 2007-5<sup>th</sup> July 2007.

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

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

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

Department of Mathematics, University of Perpignan, France , 2<sup>nd</sup> June 2008-30<sup>th</sup> June 2008.

## **CONDUCTING WORKSHOPS/CONFERENCES**

Conducted the *Instructional Workshop on Convex Analysis, Optimization and Applications*, held at I.I.T. Kanpur from the 5<sup>th</sup> to the 21<sup>st</sup> 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 3<sup>rd</sup> to the 6<sup>th</sup> of September 2008. This was sponsored by the Department of Science and Technology, Government of India.

## 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 : Basic Engineering Mathematics ( 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).

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.

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

## MEMBERSHIP OF PROFESSIONAL SOCIETIES

International Working Group on Generalized Convexity and Generalized Monotonicity;  
Research Group on Mathematical Inequalities and Applications; Pacific Optimization 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 and Zentralblatt Reviews of the European 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.

## **REFERENCES**

Professor Suresh Chandra, Department of Mathematics, Indian Institute of Technology, Hauz Khas, New Delhi, 110016, India. email: [chandras@maths.iitd.ernet.in](mailto: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](mailto: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](mailto:JuanEnrique.Martinez@uab.es) or [jemartinez@selene.uab.es](mailto:jemartinez@selene.uab.es)

Place and Date : I. I. T. Kanpur, 12<sup>th</sup> November 2008.

Signature

J. Dutta

(Joydeep Dutta)