

Dr. Tanushree Pandit, Ph.D.

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Personal Details

- 📅 Date of Birth: 13th July, 1991
- ♀ Gender: Female
- 💍 Marital Status: Married
- 🇮🇳 Nationality: Indian

Research Interest

My main research interest lies in developing **algorithms** and their **convergence and complexity analysis**. I have worked on the **Simple Bilevel Programming** (SBP) problem and its extensions so far. I have developed several algorithms for this class of problems and successfully discussed their convergence analysis. Currently I am working on algorithms for (SBP) problem and their complexity analysis which has not been done so far as per my knowledge and been successful to do so. I am very much interested to extend my research to **Bilevel Programming** (BP) and explore how I can push my ideas from (SBP) to (BP) problem. Along with this I am also interested in the **optimality conditions** and **error bounds** for convex optimization problem which is also associated with the algorithms in some cases. My work mostly consists of **convex optimization** problem be it smooth or non-smooth. Recently I have been interested in **prediction models** and the algorithms that can be used for those models.

Employment History

- 2021 – 📌 **Assistant Professor**, Department of Mathematics, Cochin University of Science and Technology.
- 2019 – 2020 📌 **Project Scientist**, with Dr. Ketan Rajawat in the Department of Electrical Engineering at IIT Kanpur.

Education

- 2013 – 2019 📌 **Ph.D., Indian Institute of Technology Kanpur** in Mathematics with 9.25 CPI in Ph.D. Course work.
Thesis title: *Simple Bilevel Programming Problem and Extensions: Theory and Algorithms*
- 2011 – 2013 📌 **M.Sc. Mathematics, Indian Institute of Technology Kanpur** with 8.5 CPI.
- 2008 – 2011 📌 **B.Sc. Mathematics, Calcutta University** with 71.6% marks.

Research Publications

- 📌 Simple bilevel programming and extensions; Stephan Dempe, Nguyen Dinh, Joydeep Dutta and Tanushree Pandit. Mathematical Programming, Springer (2020).
DOI: <https://link.springer.com/article/10.1007/s10107-020-01509-x>

Research Publications (continued)

- Algorithmic schemes for non-smooth simple bilevel programming problem and simple MPEC problem; Stephan Dempe, Nguyen Dinh, Joydeep Dutta and Tanushree Pandit. Optimization, Taylor and Francis (2023).
DOI: <https://doi.org/10.1080/02331934.2023.2230991>
- About the links between equilibrium problems and variational inequalities; Didier Aussel, Joydeep Dutta and Tanushree Pandit: Mathematical programming and game theory, 115–130, Indian Stat. Inst. Ser., Springer, Singapore, 2018.
DOI: https://doi.org/10.1007/978-981-13-3059-9_6
- Algorithms for simple bilevel programming; Joydeep Dutta and Tanushree Pandit. A chapter in an edited volume titled "Bilevel Optimization: Advances and Next Challenges" by Springer (Pages 253–291).
DOI: <https://www.springer.com/gp/book/9783030521189>

Research Preprints

- A simple algorithm for the simple bilevel programming (SBP) problem; Tanushree Pandit, Joydeep Dutta, K. S. Mallikarjuna Rao: Preprint, 2024.
- Complexity Analysis for the Simple Bilevel Programming (SBP) Problem: Tanushree Pandit, Ketan Rajawat: Preprint, 2024.
- Revisiting error bounds for convex inequalities; Tanushree Pandit and Joydeep Dutta (Under preparation).

Conference Talks

- International Conference on Recent Advances in Optimization Theory and Applications organized at Delhi University: 30–31 January, 2016. Title of the talk: “An algorithm for Bi-level convex optimization problem”.
- International Symposium on Operations Research and Game Theory: Modelling and Computation organized at Indian Statistical Institute Delhi: 9–11 January, 2018, “About the links between equilibrium problem and variational inequalities”.

Other Talks

- Invited talk at St. Thomas College, Trissur, India: 7th January, 2023. Title of the talk: “Introduction to Gradient Optimization in AI”.
- Indian Institute of Technology Kanpur, India: 23–24 January, 2016; Open House Colloquium. Title of the talk: “An algorithm for Simple Bilevel Programming problem”.
- Indian Institute of Technology Kanpur, India: 27–28 January, 2018; Open House Colloquium. Title of the talk: “About the links between equilibrium problem and variational inequalities”.

Academic Achievements

- Secured All India Rank 04 in GATE (Graduate Aptitude Test in Engineering) in Mathematics, 2013.
- Secured JRF (Junior Research Fellowship) with All India Rank 36 in NET (National Eligibility Test) in the subject Mathematical Sciences under CSIR-UGC test, 2013.

Academic Achievements (continued)

- Selected for the NBHM (National Board for Higher Mathematics) postgraduate scholarship in mathematics in 2012.
- Achieved the certificate of merit for academic excellence in M.Sc. at IIT Kanpur for the year 2011-2012.
- Secured All India Rank 09 in JAM (Joint Admission Test for Masters) in Mathematics, 2011.
- Obtained National Merit Scholarship for the result in 12th standard.

Conferences/ Workshops Attended

- GIAN (Global Initiative of Academic Network) course on “Stochastic Programming and Applications” taken by John R Birge and Prof. Joydeep Dutta: March, 2018.
- International Symposium on Operations Research and Game Theory: Modelling and Computation organized at Indian Statistical Institute Delhi: January, 2018.
- “International Workshop on Convex Analysis and Optimization (IWCAO)” held at Aligarh Muslim University; India: November, 2017.
- GIAN(Global Initiative of Academic Network) course on “Optimization: Applications, Algorithms and Computations” taken by Dr. Sven Leyffer and got excellent grade: September, 2016.
- “Advanced Instructional School on Optimization” held at Indian Institute of Technology, Bombay; India: May, 2016.
- “Mini Symposium on Computation and Optimization in the Sciences and Engineering” held at Indian Institute of Technology, Kanpur; India: February, 2016.
- International Conference on Recent Advances in Optimization Theory and Applications organized at Delhi University: January, 2016.
- “Summer Program in Mathematics (SPIM)” in Harish Chandra Research Institute, Allahabad; India : July, 2012.

Teaching Experiences

Taught the following courses at Cochin University of Science and Technology for the MSc and Integrated MSc students.

- Linear Algebra
- Complex analysis
- Calculus
- Partial differential equation
- Mathematical Methods
- Ordinary differential equation.
- Basics of Python and SageMath

Teaching assistant for the following courses at IIT Kanpur.

- Complex analysis
- Partial differential equation
- Abstract Algebra
- Linear Algebra
- Ordinary differential equation.

Outreach Experiences

Teaching assistant for the following NPTEL (National Programme on Technology Enhanced Learning) online certification courses.

- Convex Optimization
- Basic Calculus for Engineers, Scientists and Economists
- Calculus of One Real Variable
- Calculus of Several Real Variables
- Linear Algebra

Extra-Curricular Activities

- Worked as Mentor in PG Team 2015-16 of Counselling Service, IIT Kanpur.
- Successfully completed the Tour de force (Marathon of 5km) in the Intra-IIT Marathon, 2013.
- Held the post of Mess committee member of Hall of residence of GH-2, IIT Kanpur in 2013.
- Participated in Guinness world record of solving Rubik's Cube organized in Techkriti, IIT Kanpur held in 2013.

Skills

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| Languages | ■ Strong reading, writing and speaking competencies for English and Bengali. Speaking competencies for Hindi and Tamil. |
| Coding | ■ Python, C, Matlab, AMPL, $\text{\LaTeX}$. |