Nirmal Kotal

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Experience

- Post Doctoral Research Fellow | The Institute of Mathematical Sciences, Chennai, Tamil Nadu | August, 2024-Present.

Education

- Ph.D. in Mathematics | Chennai Mathematical Institute, Chennai, Tamil Nadu | 2018-2024.

  Thesis: "*On F-rationality of Blow-up and Frobenius Betti numbers*", Advisor: Prof. Manoj Kummini.

- Research Scholar | IIT Kharagpur, West Bengal | 2017-2018.

- M.Sc. in Mathematics | IIT Kharagpur, West Bengal | 2015-2017.

  Dissertation: *An algebraic view on N-dimensional hypercomplex numbers*, Advisor: Prof. Debapriya Biswas.

- B.Sc. (Honours) in Mathematics | Midnapore College, Vidyasagar University, West Bengal | 2012-2015.

Publications and Preprints

Visit my *arxiv* profile for up-to-date papers: `https://arxiv.org/a/kotal_n_1.html`.

Published/Accepted:

1. With M. Kummini, "Blow-up rings and F-rationality", to appear in *Journal of Commutative Algebra*.
   Preprint: https://arxiv.org/abs/2305.12383.

2. With M. Kummini, "The Non-F-rational locus of the Rees algebras", to appear in *Illinois Journal of Mathematics*.
   Preprint: https://arxiv.org/abs/2311.07074.

3. With K. Saha, "On the v-number of Gorenstein ideals and Frobenius powers", *Bulletin of the Malaysian Mathematical Sciences Society*, Vol.:47, No.:167, 2024.
   Preprint: https://arxiv.org/abs/2311.04136.

4. With P. V. Cheri, D. Dey, Akhil K, D. Veer, "Cohen-Macaulay permutation graphs", to appear in the *Mathematica Scandinavica*.
   Preprint: https://arxiv.org/abs/2310.17343.

5. "Mean value theorems for holomorphic functions of a generalized complex variable", *The Mathematics Student*, Vol.:92, No.:3-4, pp:45-78, 2023.

Submitted/Under review:

1. "On Frobenius Betti numbers of graded rings of finite Cohen-Macaulay type".
   Preprint: https://arxiv.org/abs/2401.00783.

2. With M. Koley, D. Veer, "On Knutson ideals and polyominoes."

Research Talks

- *On the v-number of Gorenstein ideals and Frobenius powers*; Mathematics Colloquium, Dept. of Mathematics, IIT Kharagpur, February 2024.

- *On Knutson ideals and Polyominoes*; School of Mathematics and Statistics, University of Sheffield, UK, February 2024.

- *On the v-number of Gorenstein ideals and Frobenius powers*; Conference celebrating Clas Löfwall's and Ralf Fröberg's 80th birthdays, Stockholm University, Sweden, January 2024.

- *On F-rationality of Blow-up*; RGAS School on Singularities, Instituto de Matemáticas de la Universidad de Sevilla (IMUS), Spain, January 2024.

- *On Knutson ideals and Polyominoes*; Department of Mathematics, Stockholm University, Sweden (Online), November 2023.

- *On Knutson ideals and Polyominoes*; CMI Annual Mathematics Seminar, Chennai, India, October 2023.

- *F-rationality of Blow-up and Test Ideals*; Commutative Algebra Towards Application, Torino, Italy, May 2023.

- *F-rationality of Blow-up*; School and Workshop on Commutative Algebra and Algebraic Geometry in Prime Characteristic, ICTP, Trieste, Italy, May 2023.

- *On F-rationality of Proj of Rees Algebra*; CMI Annual Mathematics Seminar, Chennai, India, September 2022.

- *Rolle's Mean Value Theorem for Holomorphic Functions of a Generalized Complex Variable*; International Conference on Mathematical Analysis and Applications, National Institute of Technology, Jamshedpur, India, May 2021.

RESEARCH VISIT

- University of Sheffield, UK, February 2024. Host: Prof. Mordechai Katzman.

- Stockholm University, Sweden, January 2024. Host: Prof. Samuel Lundqvist.

- Universitat Politècnica de Catalunya (UPC) Barcelona, Spain, January 2024. Host: Prof. Josep Àlvarez Montaner.

- University of Genoa, Italy, May 2023. Host : Prof. Matteo Varbaro.

OTHER PARTICIPATION IN WORKSHOPS AND CONFERENCES

- *RGAS school on Singularities*, Instituto de Matemáticas de la Universidad de Sevilla (IMUS), Spain, January 2024.

- Workshop on *Representation theory and syzygies*, Chennai Mathematical Institute, December 2023.

- Workshop on *Hilbert functions and local cohomology*, IIT Bombay, November 2023.

- Workshop on *Cohen Macaulay simplicial complexes in graph theory*, Chennai Mathematical Institute, Tamil Nadu, July 2023.

- *School and Workshop on Commutative Algebra and Algebraic Geometry in Prime Characteristic*, ICTP, Trieste, Italy, May 2023.

- *Conference on Commutative Algebra and Algebraic Geometry*, IIT Hyderabad, Telangana, February 2023.

- Workshop on *Maximal Cohen-Macaulay Modules*, Chennai Mathematical Institute, Tamil Nadu, July 2022.

- ICTP online graduate course on *Tight Closure of Ideals and Its Applications*, May-July 2022.

- Workshop on *Dualities in Topology and Algebra*, ICTS Bangalore, Karnataka, February 2021.

- School on *Commutative Algebra*, IIT Kharagpur, West Bengal, December 2019.

- School on *Linear Algebraic Group*, IIT Bombay, Maharashtra, July 2019.

- Workshop on *Commutative algebra and algebraic geometry in positive characteristics*, IIT Bombay, Maharashtra, December 2018.

- Workshop on *Topology of manifolds and group action*, University of Delhi, New Delhi, November 2017.

Awards/Grants/Achievements

- National Board for Higher Mathematics travel grant to attend research school on singularities at Seville, Spain, January 2024.

- National Board for Higher Mathematics Post Graduate Fellowship, 2015-2017.

- Qualified GATE in Mathematics 2018, with all India rank 26. Eligible for a fellowship. Not availed.

- Qualified National Eligibility Test three times with all India rank 64,54, and 66 respectively between 2016-2017. Eligible for a PhD fellowship. Not availed.

- Qualified West Bengal State Eligibility Test in Mathematics 2017.

- Qualified JAM (Joint Admission-test for M.Sc in IITs and IISC) exam 2015, with all India rank 39.

Technical Skills

- Languages: C, Python.

- Tools: Macaulay2, Latex.

Teaching Assistant Experience

- Teaching assistant in many courses during my Ph.D. tenure at Chennai Mathematical institute: Algebra-1 (Spring-2020), Commutative algebra(Fall-2020,2021), Graduate algebra-1(Fall-2022).

- NPTEL graduate course *Computational Commutative Algebra* instructed by Prof. Manoj Kummini, funded by MHRD, Govt. of India, five times during 2020-2024.

- Annual Foundation School, Pondicherry University, Puducherry, June 2022.

- Instructional School for Teachers (Algebra), Chennai Mathematical Institute, Tamil Nadu, December 2022.

Contact for Reference

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