Nirmal Kotal

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Education

- Ph.D. in Mathematics, Chennai Mathematical Institute, India, (2018-2024).

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

- PhD student, IIT Kharagpur, India, (2017-2018).

- M.Sc. in Mathematics, IIT Kharagpur, India (2015-2017).

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

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

Publications and Preprints

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

- Published:

  1. N. Kotal, M. Kummini, *Blow-up rings and F-rationality*. to appear in Journal of Commutative Algebra, 2024. https://doi.org/10.48550/arXiv.2305.12383.

  2. N. Kotal, M. Kummini, *The Non-F-rational locus of the Rees algebras*, to appear in Illinois Journal of Mathematics, 2024. https://doi.org/10.48550/arXiv.2311.07074.

  3. N. Kotal, *Mean value theorems for holomorphic functions of a generalized complex variable*, The Mathematics Student, Vol.:92, No.:3-4, pp:45-58, 2023.

- Submitted (Under review):

  1. N. Kotal, *On Frobenius Betti numbers of graded rings of finite Cohen-Macaulay type*, 2023. Preprint: https://doi.org/10.48550/arXiv.2401.00783.

  2. N. Kotal, K. Saha, *On the v-number of Gorenstein ideals and Frobenius powers*, 2023. Preprint: https://doi.org/10.48550/arXiv.2311.04136.

  3. P. V. Cheri, D. Dey, Akhil K, N. Kotal, D. Veer, *Cohen-Macaulay permutation graphs*, 2023. Preprint: https://doi.org/10.48550/arXiv.2310.17343.

- Manuscript under preparation:

  1. M. Koley, N. Kotal, D. Veer, *On Knutson ideals and polyominoes* (Expecting to communicate by August 2024).

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*; 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.

Poster Presentation

- *On Frobenius Betti numbers of graded rings of finite Cohen-Macaulay type.* Conference on Local rings and singularity, IIT Bombay, June 2024.
- *F-rationality of Blow-up and Test Ideals*; Commutative Algebra Towards Application, Torino, Italy, May 2023.

Short Time Research Visits

- 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

- Conference and workshop on *Local rings and singularity*, IIT Bombay, June 2024.
- *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.
- Qualified National Eligibility Test three times with all India rank 64,54, and 66 respectively between 2016-2017.
- 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: Python (including libraries like NumPy, Pandas, SciPy etc.), C.
- Tools: Macaulay2, SageMath (basic).

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 2020-24.
- 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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