Irish Debbarma

N Block Hostel, Indian Institute of Science, Bangalore, Karnataka-560012, India

🌐 personal website   ✉ irishd@iisc.ac.in   in linkedin   📱 +91-8529793288

EDUCATION

Indian Institute of Science   **Bangalore, Karnataka, India**
Bachelors of Science (Research) with Math major   *Expected Graduation: July 2023*

Bansal Public School   **Kota, Rajasthan, India**
Central Board of Secondary Education (CBSE)   *Higher Secondary Education: 2019*

Holy Cross School   **Agartala, Tripura, India**
Indian Certificate of Secondary Education (ICSE)   *Secondary Education: 2017*

RESEARCH INTERESTS

I like Number Theory and Algebra in general with specific interests in Modular Forms and Elliptic functions, Analytic Number Theory, Algebraic Number theory.

PROJECTS

Summer Project   *June 2020-August 2020*
TOPIC: BINARY QUADRATIC FORMS, AND ITS REDUCTION

Guide: Professor B. Sury from Indian Statistical Institute (ISI), Bangalore.

- Solved first 3 chapters of *Introduction to the Theory of Numbers* by Niven, Zuckerman, Montgomery.
- Read chapter 1 of this book by Lemmermeyer.
- Wrote a report on the three project topics (Gauss reduction, Gauss class number problem, Zagier's one line proof of the two squares problem) mentioned in the book . Please find my report here. Certificate of work by mentor can be found here.

Summer Project   *June 2021-August 2021*
TOPIC: ZERO SUM PROBLEMS IN FINITE ABELIAN GROUPS

Guide: Professor Venkatesh Rajendran from Indian Institute of Science (IISc), Bangalore

- First proved the Structure theorem of finite abelian groups.
- Read the expository article on *Zero sum problems*.
- Understood some preliminary results on Davenport's constant, Erdös-Ginzberg-Ziv constant, η-constant for Abelian groups of the type $C_n, C_m \oplus C_n, C_2 \oplus C_2 \oplus C_{2n}$.
- Wrote a detailed report on the proofs I encountered while reading. Please find my report here.

Winter Project   *December 2021-Ongoing*
TOPIC: CUBIC AND QUARTIC RECIPROCITY LAWS

Guide: Professor Shaunak Deo from Indian Institute of Science (IISc), Bangalore

- Reading chapter 9 from the book *A Classical Introduction to Modern Number Theory* by Kenneth Ireland, Michael Rosen and solving end of chapter questions, hopefully leading to the study of Stickelberger Relation and Eisenstein Reciprocity Law.
- Mainly focused on the proofs of the Reciprocity laws.

COURSES TAKEN

Mathematics courses:

- *Taken in Fall semester 2019*: Real Analysis and Linear Algebra-I

- *Taken in Spring semester 2020*: Real Analysis and Linear Algebra-II
- *Taken in Fall semester 2020*: Probability and Statistics
- *Taken in Spring semester 2021*: Introduction to Basic Analysis, Introduction to Algebraic Structures, Ordinary Differential Equations.
- *Taken in Fall semester 2021*: Algebra-I (Groups, Rings and Modules), Linear Algebra, Multivariable Calculus, Representation theory of finite groups.
- *Taking in Spring semester 2022*: Algebra-II (Fields and Galois Theory), Complex Analysis, Measure Theory, Algebraic Number Theory, Coxeter Groups.

ACHIEVEMENTS

- Kishore Vaigyanik Protsahan Yojna (KVPY) Scholar, fellow since 2019. Awarded by the Department of Science and Technology, Govt. of India.
- Percentile of 99.51 in the Joint Entrance Exam (JEE) Mains of 2019.

CO-CURRICULAR

- Independently reading Tom M. Apostol's *Introduction to Analytic Number Theory* and Apostol's *Modular Functions and Dirichlet Series in Number Theory*
- Programming Languages: C, Java, SAGE math, LaTeX.
- Human languages I am fluent in: English, Hindi, Bengali, Kokborok (mother tongue) and a very basic knowledge of french.
- I am also interested in reading history and non-fictional books.
- Current Convenor of the Football Club at IISc, former Logistics coordinator for Pravega-2021 (Undergraduate fest at IISc, Bangalore).
- Was part of the Notebook Drive at IISc.
- Was a part of National Cadet Corps (NCC) for two years 2014-16.
- Regular member of the IISc college football team.