PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS033/2023

Introduction to Elliptic curves and Modular forms

Name of the PMRF student

Ajay Prajapati

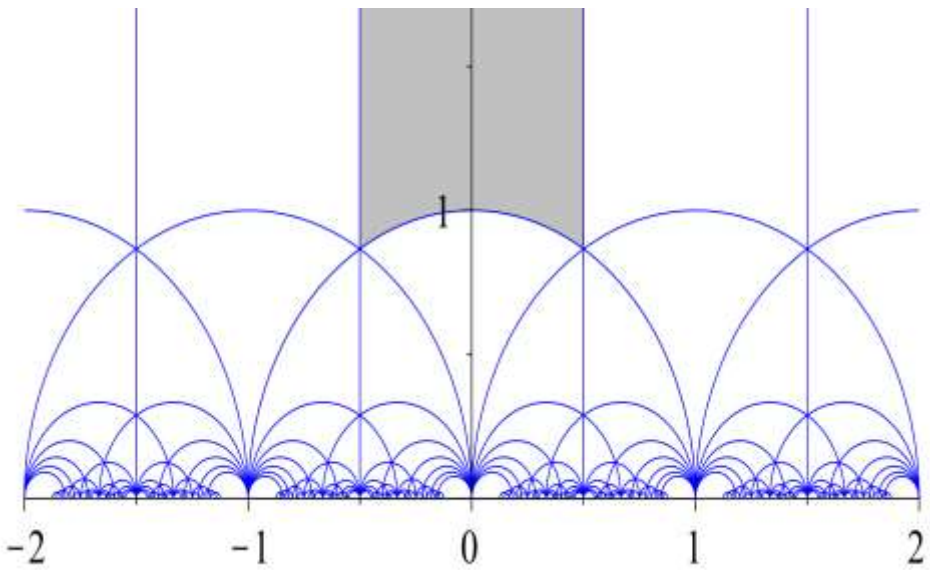
Required background of the students taught

Mathematics, Computer Science

Pre-requisites: Basic Abstract Algebra, Basic Complex Analysis

Online session coordinator

Will be chosen from the list of registrants



Graphic relevant to the module

Details of the content of the module

- **Introduction to the Congruent Number problem and its relation to elliptic curves:** Congruent number problem is a 2000-year-old problem about numbers which can be obtained as area of a right-angled triangle. This problem is related to elliptic curves which are modern (19^{th} century) objects.
- **Elliptic Curves:** These are curves defined by non-singular cubic equations. Then we will study doubly-periodic functions and show that an elliptic curve over C is a torus.
- **Hasse-Weil L-function of an Elliptic Curve:** This is an analytic object defined using arithmetic information of the curve.
- **Modular Forms:** These are functions on upper-half plane satisfying certain symmetry properties and turn out to be highly useful in number theory.
- **References:** "Introduction to Elliptic curves and Modular forms" by Neal Koblitz.

Schedule of the module

- Live lectures on Tuesdays (4:30 PM to 6:30 PM)
- In unforeseen situations, recorded lectures will be uploaded by 6:30 PM on Tuesdays.
- Starts- 12^{th} September 2023
- Ends- 5th December 2023

Meeting link : Will be shared later

Link

Contact email ID: isss.forum@gmail.com

Registration link: https://docs.google.com/forms/d/e/1FAIpQLSexjlgZTyrirZG524lw8K_MUtFPzJ9pDdYYwZ0HGgT6zvhVmg/viewform?usp=pp_url