

Department of Mathematics, IIT Bombay

Fresh Research Scholars Seminars (FRSS)

ABSTRACTS FOR WEEK 1:

[Monday, 19th Oct 2020 at 11.30 am](#)

Nitin Tomar *Pro C^* algebras*

Abstract: attached.

Google Meet Link: <https://meet.google.com/afe-nzqz-sgt>

[Wednesday, 21st Oct 2020 at 4 pm](#)

Saad Qadri *Lindemann-Weierstrass theorem*

Abstract: A (complex) number is said to be algebraic (over rationals) if it satisfies a nonzero polynomial equation with integer coefficients. A number that is not algebraic is said to be transcendental. Our goal in this talk will be to prove the Lindemann Weierstrass theorem which states that if b_j 's are distinct algebraic numbers then $\exp(b_j)$'s are linearly independent over the field of algebraic numbers (over \mathbb{Q}). This gives as its corollary the fact that π and e are transcendental.

Google Meet Link: <https://meet.google.com/tbg-fghh-nmg>

[Saturday, 24th Oct 2020 at 11.30 am](#)

Deep Makadiya *Schreier's theorem*

Abstract: For any group G , Schreier theorem states that any two subnormal series of G have isomorphic refinements. This is one of the fundamental results in group theory. The proof involves another interesting lemma called Butterfly Lemma (also known as Zassenhaus Lemma). As a consequence of Schreier's theorem, we shall also outline a proof of Jordan-Hölder theorem for composition series.

Google Meet Link: <https://meet.google.com/afe-nzqz-sgt>

[Saturday, 24th Oct 2020 at 4 pm](#)

Ashish Shukla *Representation theory of the symmetric group*

Abstract: We give a glimpse into the representation theory of the symmetric group (S_n). Here we begin by establishing the basics of representation theory by addressing questions such as: what is a representation? what is a module? how many irreducible representations are there? etc. We then answer these questions for the symmetric group. We define certain terminologies, building the basics of representation theory from introductory knowledge of linear algebra and group theory. We explore an intimate connection between Young tableaux and representations of the symmetric group. We describe the construction of Specht modules which are irreducible representations of S_n .

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