



**Theoretical Statistics and Mathematics Unit, Kolkata**  
**INDIAN STATISTICAL INSTITUTE**

**SEMINAR**

Date: May 29, 2025  
Time: 02:30 PM

**VENUE:**

**L-infinity**

(5<sup>th</sup> Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

**TITLE:**

**Monomial retracts of Polynomial rings**

**SPEAKER:**

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**ABSTRACT:**

*Let  $R$  be a commutative ring with unity and  $B := R[X_1, \dots, X_n]$  the polynomial ring in  $n$  variables over  $R$ . An  $R$ -algebra homomorphism  $f: B \rightarrow B$  such that  $f^2 = f$  is called an  $R$ -algebra retraction ( $R$ -retraction, in short) and the image  $f(B)$  of such a map  $f$  is called an  $R$ -algebra retract ( $R$ -retract) of  $B$ . In this talk we'll consider retractions  $f: B \rightarrow B$  such that, for each  $1 \leq i \leq n$ ,  $f(X_i)$  is either a monic monomial or  $0$ . We'll see that these retractions can be represented by idempotent matrices with non-negative integer entries and if  $R$  is an integral domain, then any such retract is isomorphic to the polynomial ring in  $p$  variables over  $R$ , for some non-negative integer  $p$  not exceeding  $n$ . At the end we'll try to see when different monomial retractions of  $B$  can give the same retract.*

**ALL ARE CORDIALLY INVITED**