Emergent Research:
The PIMS Postdoctoral Fellow Seminar

Jan 17, 2024 | 9:30am Pacific

Pacific Institute *for the* Mathematical Sciences

On Certain Affine Varieties

ABSTRACT:

An algebraic variety is a central object of study in algebraic geometry. A special kind of algebraic variety has caught the attention of analysts recently. These are called distinguished varieties because they intersect the topological boundary of a domain of interest only at its distinguished boundary. One of the most important results in operator theory is Ando's inequality which states that for any pair of commuting contractions (T_1, T_2) and two variables polynomial p, the operator norm of the operator $p(T_1, T_2)$ does not exceed the sup norm of p over the bidisc, i.e.,

$$\|p(T_1, T_2)\| \leq \sup_{(z_1,z_2)\in\mathbb{D}^2}|p(z_1, z_2)|.$$

A quest to improve Ando's inequality led to the study of distinguished varieties, conducted by Agler-McCarthy. Since then, distinguished varieties are a fertile venue for function theoretic operator theory and connection to algebraic geometry.

In this talk, we shall discuss descriptions of distinguished varieties with respect to two domains namely the bidisc and the symmetrized bidisc, $\mathbb{G}$. It is in terms of the joint eigenvalue of a pair of commuting linear pencils. Using the new characterization of distinguished varieties of $\mathbb{D}^2$, we improved the known description by Pal--Shalit of distinguished varieties over $\mathbb{G}$. Moreover, we shall see complete algebraic and geometric characterizations of distinguished varieties over $\mathbb{G}$ solving an unsettled problem left open by Pal-Shalit.
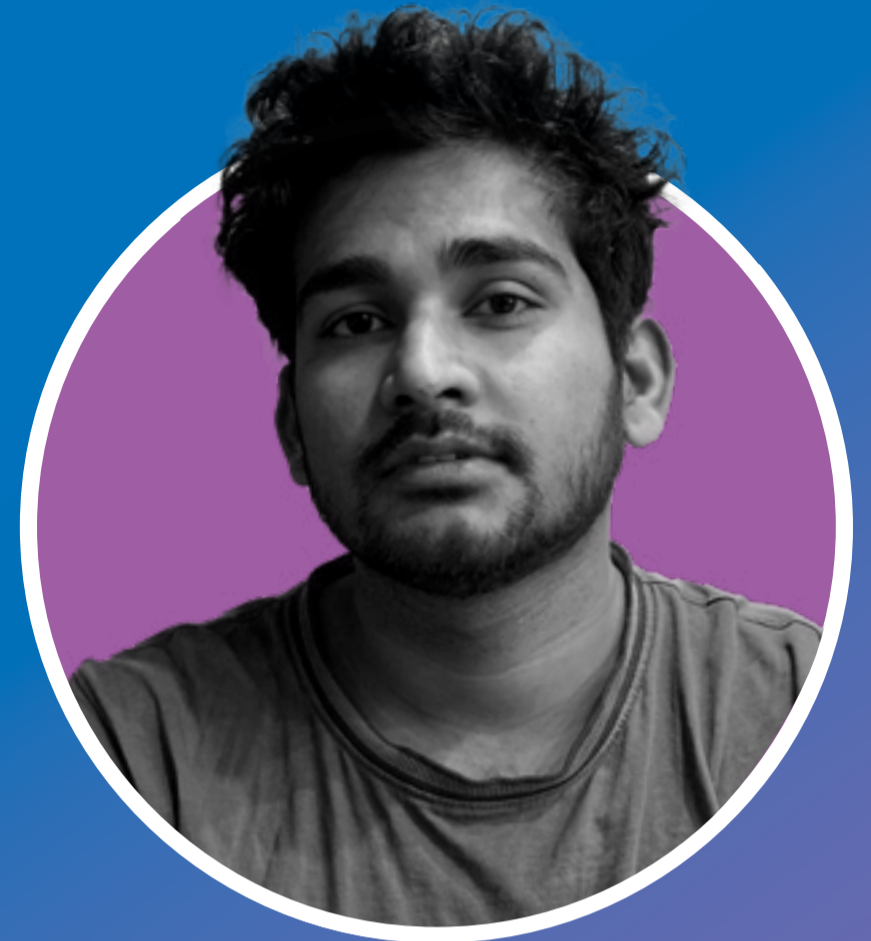
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SPEAKER BIO:

Dr. Poornendu Kumar, is a scholar and researcher in the field of mathematics, and currently serves as a PIMS Postdoctoral fellow at the University of Manitoba, working under the guidance of Professor Raphaël Clouâtre. He obtained his Ph.D. from the prestigious Indian Institute of Science, Bangalore. His area of research lies in the interplay between complex geometry, operator theory, and function theory on certain domains. Outside if academia Kumar has a passion for cricket. During his Ph.D. years, he actively participated in the sport, representing the IISc Gymkhana in division IV for the Karnataka State Cricket Association (KSCA). He served as the captain of the club for several years.

For more information and registration:
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