

National Mathematics Day Lecture December 22, 2023 LH-3, IISER Mohali, 9:30 AM

## Title:Totally positive matrices and Pólya frequency sequences

## Speaker: Professor Apoorva Khare

## Indian Institute of Sciences, Bengaluru.

Abstract: Total positivity is a notion that arose out of analysis and has widely been used in many fields, including probability, algebra (quantum groups, cluster algebras), and combinatorics (TNN Grassmannian, symmetric functions). In this talk I will introduce the basic objects totally positive matrices - and their infinite counterparts, Pólya frequency sequences. We will see how these connect to the Laguerre-Pólya class of entire functions with only real zeros (and in particular, to the Riemann Hypothesis). We will also see the connection between total positivity and the variation diminishing property - which has its origins in the work of Descartes (1600s) and Laguerre (1800s) - and discuss 20th and 21st century results on the latter.



Professor Apoorva Khare is an Indian mathematician who works in matrix positivity and analysis, combinatorics and discrete mathematics, and representation theory. He was awarded the Shanti Swarup Bhatnagar Prize for Science and Technology, the highest science award in India, for the year 2022 in Mathematical Sciences. Besides the Bhatnagar Prize, Khare is also a recipient of the Swarnajayanti Fellowship and the Ramanujan Fellowship from SERB/DST, Govt. of India, and a Fellow of the Indian Academy of Sciences. In a publication by the Government of India celebrating 75 years of Indian independence, Khare was listed as one of the 75 scientists aged under 50 who are shaping today's Bharat (India).

