



# KAAPI WITH KURIOSITY

## PERIODS

NUMBERS THAT CONNECT  
GEOMETRY, ANALYSIS, AND ARITHMETIC

$$\int_{\gamma}$$

A period is the integral of an algebraic differential form over a cycle.

$$(x^2 + y^2)^2 = (x^2 - y^2)$$

Bernoulli's Lemniscate

The lemniscate constant

$$\varpi = \int_{-1}^1 \frac{dt}{\sqrt{1-t^4}} = 2.622057554\dots$$

Hurwitz's Formula

$$\sum_{n,m=-\infty}^{\infty} \frac{1}{(n + \sqrt{-1}m)^4} = \frac{\varpi^4}{15}$$

# Circles, Constants, and Curiosity: The story of $\pi$ and beyond

ARCHIMEDES • MADHVA  
LAMBERT • EULER • GAUSS  
RAMANUJAN • HURWITZ  
SIEGEL • SINGH  
DELIGNE • KONTSEVICH • ZAGIER

Transcendence and the arithmetic of periods

The most famous mathematical constant is arguably the number  $\pi$ . We first encounter it in school, in formulae for the circumference and area of a circle, and encounter it again in calculus when we learn why those formulae are true. But what is often missed is just how extraordinary  $\pi$  really is: it appears, often unexpectedly, across vast areas of mathematics. In this talk, we begin with this familiar constant and gradually uncover its deeper and more surprising presence. From there, we step into a broader world of numbers known as periods, which arise from geometry, symmetry, and integration. Along the way, we will explore a striking example: what happens when a circle is replaced by a curve shaped like the infinity symbol—a lemniscate. This leads to a new constant, the lemniscate constant, a number that captivated some of the greatest mathematicians, including Gauss, Hurwitz, and Siegel. Together, these ideas reveal a rich and beautiful landscape where simple shapes give rise to profound and mysterious numbers.

FROM GEOMETRY ARISES INTEGRATION.  
FROM INTEGRATION, NUMBERS OF PROFOUND BEAUTY.



## A. Raghuram

Raghuram is a number theorist and a leading expert on the special values of L-functions. He is a Professor of Mathematics at Fordham University and previously has been the head of the mathematics department at Fordham University and the Indian Institute of Science Education and Research, Pune. Raghuram is a Fellow of both the Indian Academy of Sciences and the Indian National Science Academy. He has been a frequent visitor of the Max Planck Institute for Mathematics at Bonn and a member of Institute for Advanced Study (IAS) at Princeton. He was a recipient of the Alexander von Humboldt fellowship, and most recently he was awarded the prestigious Simons Fellowship based on which he will be a member of the IAS, Princeton, for 2026–2027. Raghuram is an avid runner, and has twice run the Bengaluru marathon.

4 PM, Sunday,  
5 July 2026

Mini Auditorium, U R Rao  
Bhavana, Jawaharlal Nehru  
Planetarium, Bengaluru

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