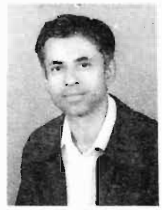
Editorial

N Mukunda, Chief Editor



In this issue we focus on several topics concerned with mathematics and its uses. Our aim had been to present a portrait of the Kerala mathematician Nīlakaṇṭha Somayāji (1444-1545) on the back cover, but for practical reasons this could not be arranged. So now we have Leonhard Euler (1707-1783). In an *article-in-a-box*, C S Yogananda tells us about the lives and accomplishments of both Nīlakantha and Euler. As time goes by, more and more of us are becoming aware that there existed an outstanding school of mathematics in Kerala from the 14th to the 17th century, and many of their discoveries predate European mathematics by a century and a half or more. The comparison of Nīlakaṇṭha and Euler continues in Shirali's article devoted to the 'Gregory Nīlakaṇṭha' series for π. It is remarkable that the Kerala school achieved so much before the calculus and the limit concept had been developed.

V Balakrishnan resumes his series on 'intelligent' uses of mathematics in physical problems, and deals with the properties of reciprocal bases in vector spaces. Here as elsewhere the importance of a good *notation* cannot be overemphasized. It is good to remember that prior to an important paper of Einstein in 1916, there was no 'summation convention' in tensor analysis! And Dirac must have enjoyed quiet delight when he broke up the word 'bracket' into the bra and the ket vectors of quantum mechanics. The greatest notational development of all time brings us back to India, and that is the place value system for numbers. To quote John Barrow: "The Indian system of counting has been the most successful intellectual innovation ever made on our planet. ... It constitutes the nearest thing we have to a universal language."

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The Buffon Needle problem on page 76 shows how π is related to a problem in probability. This is no surprise to anyone familiar with the Gaussian or normal distribution, but a delightful story by Wigner bears repetition:

"There is a story about two friends, who were classmates in high school, talking about their jobs. One of them became a statistician and was working on population trends. He showed a reprint to his former classmate. The reprint started, as usual, with the Gaussian distribution and the statistician explained to his former classmate the meaning of the symbols for the actual population, for the average population, and so on. His classmate was a bit incredulous and was not quite sure whether the statistician was pulling his leg. "How can you know that?" was his query. "And what is the symbol here?" "Oh", said the statistician, "this is π". "What is that?" "The ratio of the circumference of the circle to its diameter." "Well, now you are pushing your joke too far, " said the classmate, "surely the population has nothing to do with the circumference of the circle."

So much for π!

K Ramachandra describes briefly some of the 'wild' properties of numbers, and the difficulties in making progress on many conjectures so deceptively easy to conceive of and to state. He tells us of the Goldbach conjecture, the Waring problem, and many other guesses of primes and partitions unresolved to this day.

On other topics, V Rajaraman, from whose books so many in this country have learnt their basic computing skills, describes the latest from FORTRAN. G S Ranganath shows you how to compute the temperatures of heaven and hell; with suitable assumptions, whichever you like comes out warmer. Finally, did you know that the technical name for the house rat is *Rattus rattus rattus*? Did somebody run out of ideas?