

Math Unlimited : Essays in Mathematics

by Asia Pacific Mathematics Newsletter - Sunday, June 09, 2013

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Edited by R Sujatha, H N Ramaswamy and C S Yogananda,

CRC Press, 2012, 350 pp.

Math Unlimited is a collection of essays that has been edited by R Sujatha, H N

Ramaswamy and C S Yogananda, whose aim is to offer, to a wide audience, a flavor of current mathematical research and an introduction to aspects of the history of Indian mathematics.

The scope of the book is extensive. There are selections from a diverse set of areas, and these include both pure and applied mathematics, particularly those areas that are actively pursued in the country. The reader can get an idea of the extensive role that mathematics has in modern physics, in biology, or in computer science, in addition to essays on pure mathematics and “standard” applied mathematics. A final section deals with ancient Indian mathematics.

The chapters are, by and large, written in a fairly engaging style that gives a mix of formal results and theorems along with applications. This is coupled with some pedagogy, particularly in the chapters on pure mathematics, and that makes the book not only a quick introduction to different branches of mathematics, but also a way for one to first learn about a specific subject. The chapter on Generating Functions, by S Ramanan, for instance, very quickly brings the sophisticated reader to a fair level. The chapter on Elliptic Curves and Number Theory by one of the editors gives a very comprehensive introduction to the subject, including its applications. Given the use of some of these techniques in the recent achievements such as the proof of Fermat’s last theorem, articles like this are sure to whet the appetite of the reader.

The section on Applicable Mathematics has a number of very distinguished contributors that include S R S Varadhan and K R Parthasarathy, who write on large deviation theory and quantum computing respectively. The latter area is one of intense research activity, and the author is an especially lucid writer. An area of physics that has benefited from— and contributed to— mathematics is String theory. This interplay is described in the article by Sunil Mukhi. Survey articles by Pranay Goel and Sunta Gakhar discuss the application of mathematics to problems of biology. These give a flavour of the different aspects of mathematics that have had a major impact on biology today.

The section on Ancient Indian Mathematics is naturally of both mathematical and historical interest, given the long tradition of mathematics in India and incomplete documentation of our traditional knowledge. The final chapter on discussion of geometric patterns in Indus Valley pottery is intriguing while being somewhat speculative, but there has been so little written on such topics that it is a welcome

addition to the collection.

This book will surely appeal to a slightly sophisticated reader, namely one with a modicum of mathematical training as well as some idea of its use in the sciences. Both the presentation as well as the choice of topics makes it an ideal addition to the library of colleges and universities (or other institutions) where senior undergraduate and masters students in the sciences can access it.

Most of the essays are between 10 and 20 pages in length, but this is a book that, for the most part, must be read with a notepad on the side for working out the arguments, not a book to dip into, but that is its plus point in my opinion. A somewhat unnecessary and irritating feature of the book is that the colour illustrations have been collected at the end of the book while the same figures appear in black and white in the text.

All in all, this is a good introduction to the range of mathematics that has been pursued in India, and hopefully a catalyst that can persuade more students to either take up the subject for its own sake, or to be made aware of the fundamental applications that mathematics finds today in all areas of scientific enquiry.

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Source:- Asia Pacific Mathematics Newsletter, Volume 2 No. 3 (July 2012).

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