An Important Mathematical Theory Explained

A Well Written Book for the B.Sc. and M.Sc. Student

S Thangavelu

Fourier Series.
Rajendra Bhatia
Hindustan Book Agency, Delhi. 1993
pp.106. Rs.95.

The theory of Fourier series is one of the most powerful theories that mathematicians have developed. It has a wide range of applications, not only in mathematics and natural sciences, but also in engineering fields. Any student of science and engineering must learn the rudiments of the theory. Although there are several excellent text books on the subject they are of no use to poor Indian students studying in remote colleges without access to good libraries. It is a pity that in a vast country like ours, good text books are not written and published at affordable prices. The book under review, a small book on Fourier series, is the outcome of an attempt to alleviate the scarcity of reasonable mathematical text books in the country.

A most books on Fourier series would do, this one introduces the subject through a partial differential equation, in the present case, the equation of Laplace. Once Fourier series is defined, one can take off and develop the subject in several directions. As this book is mainly aimed at B.Sc. final year students or M.Sc. first year students without any knowledge of functional analysis, only very basic material like pointwise convergence and convergence in L^2 and L^1 are treated. To exemplify the power of Fourier series the author has included some results from ergodic theory and number theory, a discussion on the isoperimetric problem and of course the solution to the wave equation. The book abounds in exercises and has a nice appendix on the historical development of the subject.

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There are five chapters in this book. In the first chapter the author treats the Laplace equation $\partial_x^2 u + \partial_y^2 u = 0$ in the unit disc in the complex plane. He solves this equation in polar coordinates and in the process defines the Fourier series of a periodic function. Chapter 2 deals with convergence of Fourier series; the author treats Abel and Cesaro summability, and proves the celebrated theorem of Fejer regarding the pointwise convergence of the Cesaro means of Fourier series of continuous functions. The third chapter deals with sine and cosine series, functions with arbitrary periods and the Gibbs phenomenon. The L^2 convergence of Fourier series is considered in chapter 4 and, as already mentioned, the last chapter deals with some applications.

This is a very well written book and can be used effectively at the B.Sc. final year and

Suggested Reading

The following books will be suitable at the M.Sc. second year level:

Henry Helson. Harmonic Analysis. Hindustan Book Agency, New Delhi. 1995.
Gerald B Folland. Fourier Analysis and its Applications. Belmont, California: Wadsworth Inc. 1992.
T W Körner. Fourier Analysis. Cambridge University Press. 1989.

M.Sc. first year levels. The author has done justice to the good cause of writing text books for Indian students.

S Thangavelu is with Statistics and Mathematics Unit, Indian Statistical Institute, R V College Post, Bangalore 560 059.

A Haldane Primer: Getting Messages Across

"A Box of Reusable Chocolates that can be Savoured Afresh Each Time"

S Krishnaswamy

Haldane was a scientist known for his contri-

On Being the Right Size and Other Essays
J B S Haldane
Oxford University Press, Delhi. 1992.
pp. 187. Rs. 90.

bution to the theory of evolution. He and others developed the theory of population genetics. He was a liberal individualist, a leading communist who contributed a weekly article to the *Daily Worker*. He was supreme as a popularizer of science, because he saw connections that others missed. This book is a collection of his essays, compiled by John Maynard Smith who in his introduction mentions their impact on him when he came across them in school. Maynard Smith says " fifteen years later, when I decided to leave engineering and train as a biologist, I entered University College, London, where Haldane was at that time a professor, and became his student and later his colleague."

The essays covered in the book range from articles intended for a scientific readership to others written for a daily newspaper, and are comprehensible without the need for any special technical knowledge. The book is inexpensive enough to make it affordable and worthy enough to make efforts to locate and buy it. The introduction by Maynard Smith is evocative and gives an endearing perspective of Haldane and his essays. There are in all nineteen essays here, with three small bits in the appendix. The essays are arranged in chronological order and cover the period from the 1920s to the 1940s. The articles: 'Is History a Fraud?', 'God-Makers', 'The Origin of Life', ' What "Hot" Means' and 'Cats' appeared in the *Daily Worker* . Most of the other essays

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