



# Harmonic Analysis and the Theory of Probability (Dover Books on Mathematics)

By Salomon Bochner

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Nineteenth-century studies of harmonic analysis were closely linked with the work of Joseph Fourier on the theory of heat and with that of P. S. Laplace on probability. During the 1920s, the Fourier transform developed into one of the most effective tools of modern probabilistic research; conversely, the demands of the probability theory stimulated further research into harmonic analysis.

Mathematician Salomon Bochner wrote a pair of landmark books on the subject in the 1930s and 40s. In this volume, originally published in 1955, he adopts a more probabilistic view and emphasizes stochastic processes and the interchange of stimuli between probability and analysis. Non-probabilistic topics include Fourier series and integrals in many variables; the Bochner integral; the transforms of Plancherel, Laplace, Poisson, and Mellin; applications to boundary value problems, to Dirichlet series, and to Bessel functions; and the theory of completely monotone functions.

The primary significance of this text lies in the last two chapters, which offer a systematic presentation of an original concept developed by the author and partly by LeCam: Bochner's characteristic functional, a Fourier transform on a Euclidean-like space of infinitely many dimensions. The characteristic functional plays a role in stochastic processes similar to its relationship with numerical random variables, and thus constitutes an important part of progress in the theory of stochastic processes.

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## Harmonic Analysis and the Theory of Probability (Dover Books on Mathematics) By Salomon Bochner Bibliography

- Sales Rank: #2921251 in Books
- Published on: 2005-08-27
- Released on: 2005-08-27
- Original language: English
- Number of items: 1
- Dimensions: 8.50" h x .41" w x 5.51" l, .44 pounds
- Binding: Paperback
- 192 pages



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