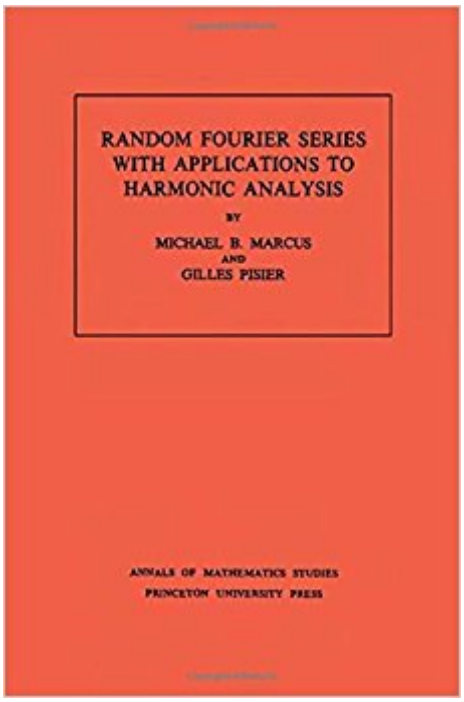
Random Fourier Series With Applications To Harmonic Analysis. (AM-101), Volume 101 (Annals Of Mathematics Studies)



Synopsis

In this book the authors give the first necessary and sufficient conditions for the uniform convergence a.s. of random Fourier series on locally compact Abelian groups and on compact non-Abelian groups. They also obtain many related results. For example, whenever a random Fourier series converges uniformly a.s. it also satisfies the central limit theorem. The methods developed are used to study some questions in harmonic analysis that are not intrinsically random. For example, a new characterization of Sidon sets is derived.The major results depend heavily on the Dudley-Fernique necessary and sufficient condition for the continuity of stationary Gaussian processes and on recent work on sums of independent Banach space valued random variables. It is noteworthy that the proofs for the Abelian case immediately extend to the non-Abelian case once the proper definition of random Fourier series is made. In doing this the authors obtain new results on sums of independent random matrices with elements in a Banach space. The final chapter of the book suggests several directions for further research.

Book Information

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In a series of three papers published in 1930 and 1931, Paley and Zygmund [44] studied a variety of problems concerning series of independent random functions and raised the question of the uniform convergence a.s. of the random Fourier series.

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