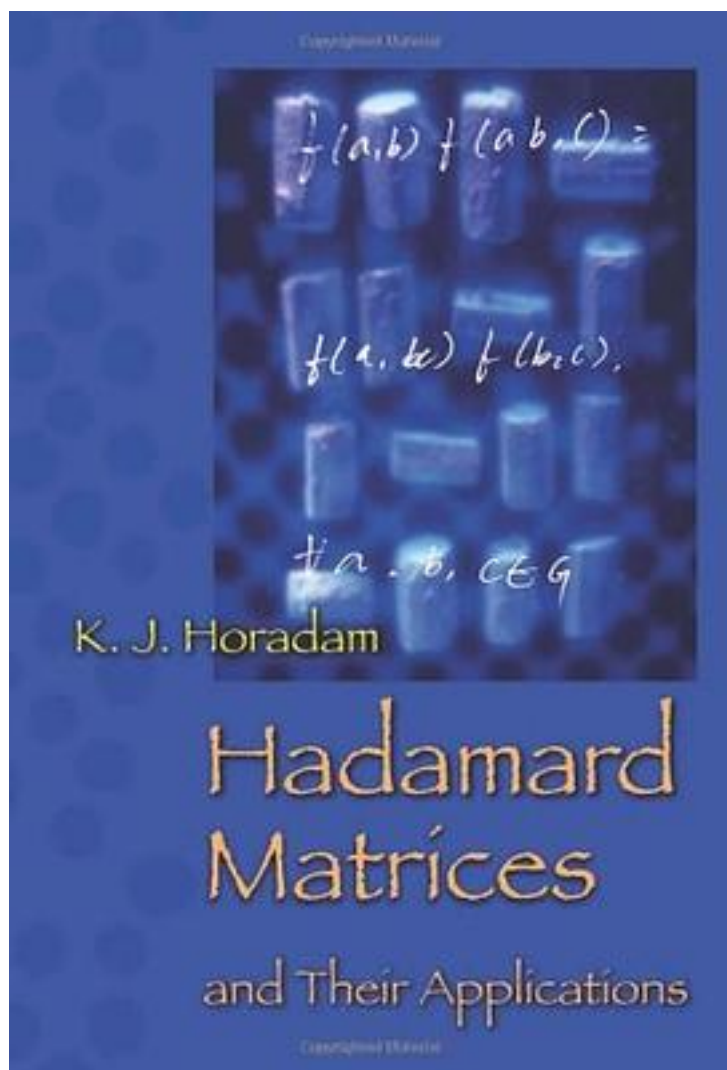# Hadamard Matrices and Their Applications

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In "Hadamard Matrices and Their Applications", K. J. Horadam provides the first unified account of cocyclic Hadamard matrices and their applications in signal and data processing. This original work is based on the development of an algebraic link between Hadamard matrices and the cohomology of finite groups that was discovered fifteen years ago. The book translates physical applications into terms a pure mathematician will appreciate, and theoretical structures into ones an applied mathematician, computer scientist, or communications engineer can adapt and use. The first half of the book explains the state of our knowledge of Hadamard matrices and two important generalizations: matrices with group entries and multidimensional Hadamard arrays.It focuses on their applications in engineering and computer science, as signal transforms, spreading sequences, error-correcting codes, and cryptographic primitives. The book's second half presents the new results in cocyclic Hadamard matrices and their applications. Full expression of this theory has been realized only recently, in the Five-fold Constellation. This identifies cocyclic generalized Hadamard matrices with particular "stars" in four other areas of mathematics and engineering: group cohomology, incidence structures, combinatorics, and signal correlation. Pointing the way to possible new developments in a field ripe for further research, this book formulates and discusses ninety open questions.

作者介绍:

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