Fast algorithms for structured matrices: theory and applications: AMS-IMS-SIAM Joint Summer Research Conference on Fast Algorithms in Mathematics, Computer Science, and Engineering, August 5-9, 2001, Mount Holyoke College, South Hadley, Massachusetts

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Abstrak

One of the best known fast computational algorithms is the fast Fourier transform method. Its efficiency is based mainly on the special structure of the discrete Fourier transform matrix. Recently, many other algorithms of this type were discovered, and the theory of structured matrices emerged.

This volume contains 22 survey and research papers devoted to a variety of theoretical and practical aspects of the design of fast algorithms for structured matrices and related issues. Included are several papers containing various affirmative and negative results in this direction. The theory of rational interpolation is one of the excellent sources providing intuition and methods to design fast algorithms. The volume contains several computational and theoretical papers on the topic. There are several papers on new applications of structured matrices, e.g., to the design of fast decoding algorithms, computing state-space realizations, relations to Lie algebras, unconstrained optimization, solving matrix equations, etc.