



## Optimal Preconditioners of a Given Sparsity Pattern (Classic Reprint)

By Anne Greenbaum

Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.Excerpt from Optimal Preconditioners of a Given Sparsity Pattern 1. Introduction. In recent years much research has focused on the problem of finding efficient preconditioners to use with various iterative methods for solving linear systems. Examples of preconditioners, or of iterative methods that can be viewed as using special preconditioners, include the incomplete Cholesky factorization (19), the Ssor preconditioner (25), multigrid methods (2), domain decomposition techniques (1), hierarchical basis functions (26), and many, many more. An efficient preconditioner  $M$  for a matrix  $A$  must possess two properties: 1.) Linear systems with coefficient matrix  $M$  must be relatively easy to solve; and 2.) The matrix  $M$  must approximate the matrix  $A$ . Many of the preconditioners that have been proposed are easy to solve because of their sparsity pattern or because they are products of known lower and upper triangular matrices with simple sparsity patterns. The sense in which  $M$  should approximate  $A$  differs according to the iterative method to be used. For fast asymptotic convergence, this quantity should be small. When the matrices  $A$  and  $M$  are symmetric...



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