

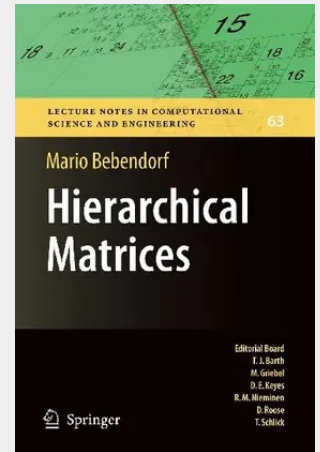
Hierarchical Matrices

A Means to Efficiently Solve Elliptic Boundary Value Problems

Hierarchical matrices are an efficient framework for large-scale fully populated matrices arising, e.g., from the finite element discretization of solution operators of elliptic boundary value problems. In addition to storing such matrices, approximations of the usual matrix operations can be computed with logarithmic-linear complexity, which can be exploited to setup approximate preconditioners in an efficient and convenient way. Besides the algorithmic aspects of hierarchical matrices, the main aim of this book is to present their theoretical background.

The book contains the existing approximation theory for elliptic problems including partial differential operators with nonsmooth coefficients. Furthermore, it presents in full detail the adaptive cross approximation method for the efficient treatment of integral operators with non-local kernel functions. The theory is supported by many numerical experiments from real applications.

Hierarchical matrices are an efficient framework for large-scale fully populated matrices arising, e.g., from the finite element discretization of solution operators of elliptic boundary value problems. In addition to storing such matrices, approximations of the usual matrix operations can be computed with logarithmic-linear complexity, which can be exploited to setup approximate preconditioners in an efficient and convenient way. Besides the algorithmic aspects of hierarchical matrices, the main aim of this book is to present their theoretical background. The book contains the existing approximation theory for elliptic problems including partial differential operators with nonsmooth coefficients. Furthermore, it presents in full detail the adaptive cross approximation method for the efficient treatment of integral operators with non-local kernel functions. The theory is supported by many numerical experiments from real applications.



171,19 €

159,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783540771463

Medium: Buch

ISBN: 978-3-540-77146-3

Verlag: Springer

Erscheinungstermin: 13.06.2008

Sprache(n): Englisch

Auflage: 2008

Serie: Lecture Notes in Computational Science and Engineering

Produktform: Kartoniert

Gewicht: 533 g

Seiten: 296

Format (B x H): 155 x 235 mm

