

**Wesseling, Peter**

**An introduction to multigrid methods.** (English) [Zbl 0760.65092](#)

Pure and Applied Mathematics. A Wiley-Interscience Series of Texts, Monographs & Tracts. Chichester: John Wiley & Sons Ltd. vii, 284 p. (1992).

This book gives a complete introduction to multigrid methods for partial differential equations. Only a basic understanding of analysis, partial differential equations and numerical analysis is necessary. First the essential principle of multigrid methods is introduced. Then finite difference and finite volume discretizations are given. A basic smoothing analysis is presented and convergence results for the whole multigrid algorithm are derived. Finally applications to computational fluid dynamics are discussed.

Reviewer: [W.Heinrichs \(Düsseldorf\)](#)

**MSC:**

- [65M55](#) Multigrid methods; domain decomposition for initial value and initial-boundary value problems involving PDEs
- [65N55](#) Multigrid methods; domain decomposition for boundary value problems involving PDEs
- [65-02](#) Research exposition (monographs, survey articles) pertaining to numerical analysis
- [76M99](#) Basic methods in fluid mechanics
- [65M06](#) Finite difference methods for initial value and initial-boundary value problems involving PDEs
- [65N06](#) Finite difference methods for boundary value problems involving PDEs
- [65M60](#) Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs
- [65N30](#) Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
- [65M99](#) Numerical methods for partial differential equations, initial value and time-dependent initial-boundary value problems
- [65N99](#) Numerical methods for partial differential equations, boundary value problems

Cited in **334** Documents

**Keywords:**

[textbook](#); [multigrid methods](#); [finite difference](#); [finite volume](#); [convergence](#); [computational fluid dynamics](#)

**Software:**

[HLLE](#); [Wesseling](#)