

**Hackbusch, W.**

**Local defect correction method and domain decomposition techniques.** (English)

Zbl 0552.65070

Defect correction methods. Theory and applications, Comput. Suppl. 5, 89-113 (1984).

[For the entire collection see [Zbl 0545.00019](#).]

Author's summary: For elliptic problems a local defect correction method is described. A basic (global) discretization is improved by a local discretization defined in a subdomain. The convergence rate of the local defect correction iteration is proved to be proportional to a certain positive power of the step size. The accuracy of the converged solution can be described. Numerical examples confirm the theoretical results. We discuss multi-grid iterations converging to the same solution. The local defect correction determines a solution depending on one global and one or more local discretizations. An extension of this approach is the domain decomposition method, where only (overlapping) local problems are combined. Such a combination of local subproblems can be solved efficiently by a multi-grid iteration. We describe a multi-grid variant that is suited for the use of parallel processors.

Reviewer: [J.Mandel](#)

**MSC:**

- [65N22](#) Numerical solution of discretized equations for boundary value problems involving PDEs
- [65N50](#) Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs
- [35J25](#) Boundary value problems for second-order elliptic equations

Cited in **4** Reviews  
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**Keywords:**

[local defect correction method](#); [convergence rate](#); [Numerical examples](#); [multi-grid iterations](#)