

Numerical Analysis and PDE

Accuracy of Finite Difference Schemes for time-dependent
problems with Boundaries and Interfaces

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A stable finite difference method applied to a problem with a smooth solution allows for a straightforward estimate of convergence rate, based on the convergence rate of the local truncation error. In many high order cases the local truncation error at a few points near boundaries is significantly larger than at interior points. The straight forward estimate will predict a rate determined by the slowest converging local truncation error. Convergence in numerical computations is often faster than this prediction. We explore ways to improve our understanding of such super-convergence. We will in particular consider the second order wave equation.