

## **Error inhibiting schemes for differential equations**

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Typically, when semi-discrete approximations to time-dependent partial differential equations (PDE) or schemes for ordinary differential equation (ODE) are constructed they are derived such that they are stable and have a specified truncation error  $T_e$ . Under these conditions, the Lax-Richtmyer equivalence theorem assures that the scheme converges and that the error is, at most, of the order of  $T_e$ . In most cases, the error is in indeed of the order of  $T_e$ .

We demonstrate that schemes can be constructed, whose truncation errors are  $T_e$ , however, the actual errors are much smaller. This error reduction is made by constructing the schemes such that they inhibit the accumulation of the local errors; therefore they are called Error Inhibiting Schemes (EIS).