Next Up Previous
Next: Forward and Backward Euler **Up:** 10.001: Numerical Solution of **Previous:** Preliminary Concepts

Numerical Solution of Initial Value Problems

Some of the key concepts associated with the numerical solution of IVPs are the *Local Truncation Error*, the *Order* and the *Stability* of the Numerical Method. We should also be able to distinguish *explicit* techniques from *implicit* ones. In the following, these concepts will be introduced through simple examples.

We are interested in the numerical solution of the IVP

$$\frac{dy}{dt} = f(y,t), \quad y(t=0) = y_0. \tag{5}$$

In particular, if $f(y,t) \equiv g(y)$, the IVP above is called *autonomous* and if $g(y) = ky$ where k is a constant, the IVP is linear. We assume that a unique solution exists and denote that solution by $y^e(t)$. So, for from now on, $y(t)$ refers to the numerically computed solution, which at the best is only an approximation to $y^e(t)$.

Michael Zeltkevic
1998-04-15