微分方程的數值方法

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Euler method

$$\frac{dy}{dx} = f(x, y), y(0) = y_0$$

$$\frac{\Delta y}{\Delta x} = f(x_0, y_0)$$

$$\begin{aligned}
y_1 &= f(x_0, y_0)\Delta x + y_0 && (1)\\
y_2 &= f(x_1, y_1)\Delta x + y_1 && (2)\\
y_3 &= f(x_2, y_2)\Delta x + y_2 && (3)\\
y_4 &= f(x_3, y_3)\Delta x + y_3 && (4)\\
\cdots &= \cdots && (5)\\
y_n &= f(x_{n-1}, y_{n-1})\Delta x + y_{n-1} && (6)
\end{aligned}$$

Questions:

What happens if Δx is very large ?

What happens if Δx is very small ?