

Example of Euler method with $h = 0.5$

Observe that at the beginning of each segment the slope agrees with the direction field at that point. By the end of the segment, that is no longer true.

The equation is:

$$\frac{dx}{dt} = \sin\left(\frac{1}{2}t^2 + x\right), \quad \text{with } y(0) = 0.$$

$$t_1 = t_0 + h, \quad t_2 = t_1 + h, \quad \text{etc...}$$

$$x_1 = x_0 + h \cdot f(t_0, x_0), \quad x_2 = x_1 + h \cdot f(t_1, x_1), \quad \text{etc...}$$

Here $f(t, x) = \sin\left(\frac{1}{2}t^2 + x\right)$, and $h = 0.5$, $t_0 = 0$, $x_0 = 0$.

