

Solutions

2.1 Euler uses $y_1 = y_0 + h f(y_0) = 2 + 0.2 \times 0.5 \times 2 = 2.2$.

2.2 Repeat from y_1 : $y_2 = 2.2 + 0.2 \times 0.5 \times 2.2 = 2.42$.

2.3 At $x=0$ the exponential is 1, so $y=2$.

2.4 False. An initial condition determines the integration constant; it is not a replacement for integrating. Dividing by y can omit an equilibrium solution $y=0$. Euler accuracy depends on step size and the equation.

2.5 A A specified value that selects a particular solution from a family.

3.1 Updates $2 \rightarrow 1 \rightarrow 0.5$; $\text{exact} \approx 0.735759$. Euler underestimates here; finite steps introduce error. Halve the step and compare convergence, rather than treating the numerical value as exact.