

☒ - Utils

☒ - RKA

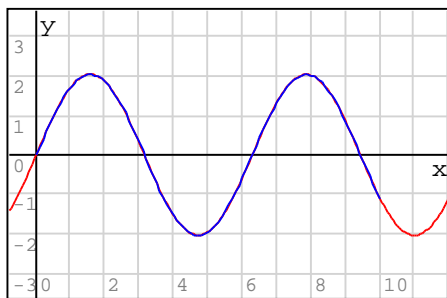
☒ - Example

DE System

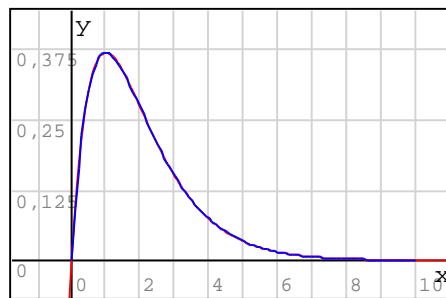
$$\begin{cases}
 x'(0) = 2 & y(0) = 0 & y'(0) = 1 & x(0) = 0 \\
 y''(t) \cdot t - x(t) \cdot y(t) = -\frac{t \cdot (2 - t + 2 \cdot \sin(t))}{e^t} \\
 x''(t) - \cos(4 \cdot t) \cdot y'(t) = -\frac{2 \cdot \sin(t) \cdot e^t + \cos(4 \cdot t) \cdot (1 - t)}{e^t}
 \end{cases}$$

$$\begin{cases}
 xs(t) := 2 \cdot \sin(t) \\
 ys(t) := t \cdot e^{-t}
 \end{cases}$$

$$RK := RKA \left(\begin{cases} x(t) \\ y(t) \end{cases}, \begin{bmatrix} 0 \\ -2 \end{bmatrix}, 10, 100 \right)$$



{ augment (col (RK , 1), col (RK , 2))
xs (x)



{ augment (col (RK , 1), col (RK , 4))
ys (x)

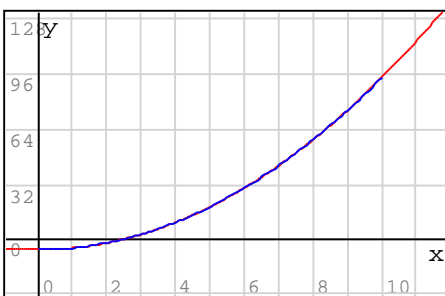
☒ - Example

DE System

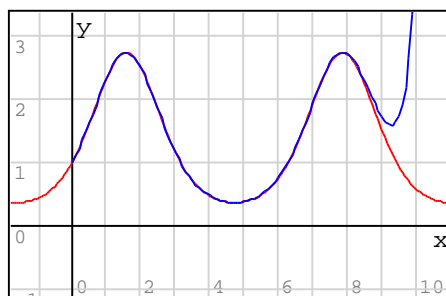
$$\begin{cases}
 a'(0) = 0 & b(0) = 1 & b'(0) = 1 & c'(0) = 0 & a(0) = -6 & c(0) = -2 \\
 a''(t) \cdot b(t) - c(t) = \frac{4 \cdot (1 + e^{\sin(t)}) - t^2}{2} \\
 b''(t) - t \cdot c'(t) = e^{\sin(t)} \cdot ((\cos(t))^2 - \sin(t)) - t^2 \\
 c''(t) \cdot a''(t) - 3 \cdot b(t) = 2 - 3 \cdot e^{\sin(t)}
 \end{cases}$$

$$\begin{cases}
 xs(t) := t^2 - 6 \\
 ys(t) := e^{\sin(t)} \\
 zs(t) := 0.5 \cdot t^2 - 2
 \end{cases}$$

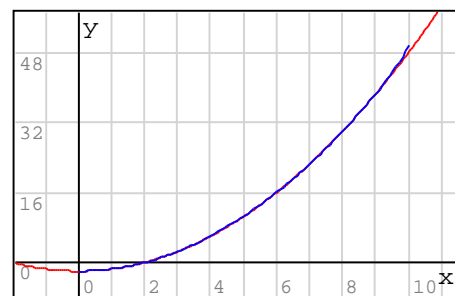
$$RK := RKA \left(\begin{cases} a(t) \\ b(t) \\ c(t) \end{cases}, \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}, 10, 100 \right)$$



{ augment (col (RK , 1), col (RK , 2))
xs (x)



{ augment (col (RK , 1), col (RK , 4))
ys (x)



{ augment (col (RK , 1), col (RK , 6))
zs (x)

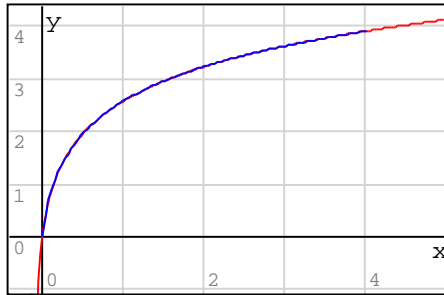
□ Example

DE System

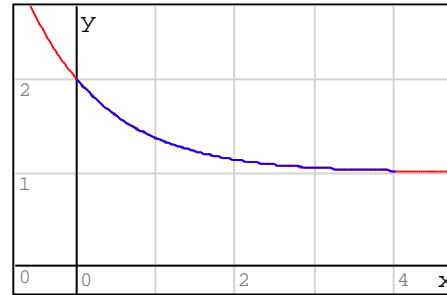
$\alpha := 12$

$$\left[\begin{array}{l} v(0) = 2 \quad v'(0) = -1 \quad u(0) = 0 \\ v''(\sigma) \cdot v(\sigma) - \sigma \cdot u(\sigma) = \frac{e^{\sigma} + 1 - \sigma \cdot \ln(1 + \alpha \cdot \sigma) \cdot e^{2 \cdot \sigma}}{e^{2 \cdot \sigma}} \\ u'(\sigma) \cdot v''(\sigma) + \cos(2 \cdot \sigma) = \frac{\alpha + \cos(2 \cdot \sigma) \cdot (1 + \alpha \cdot \sigma) \cdot e^{\sigma}}{(1 + \alpha \cdot \sigma) \cdot e^{\sigma}} \end{array} \right. \quad \left. \begin{array}{l} us(\sigma) := \ln(1 + \alpha \cdot \sigma) \\ vs(\sigma) := e^{-\sigma} + 1 \end{array} \right.$$

$$RK := RKA \left(\left\{ \begin{array}{l} u(\sigma) \\ v(\sigma) \end{array} \right\}, \left[\begin{array}{l} \alpha \\ 1 \end{array} \right], 4, 100 \right)$$



$$\left\{ \begin{array}{l} \text{augment}(\text{col}(RK, 1), \text{col}(RK, 2)) \\ us(x) \end{array} \right.$$



$$\left\{ \begin{array}{l} \text{augment}(\text{col}(RK, 1), \text{col}(RK, 3)) \\ vs(x) \end{array} \right.$$

Alvaro