Utils

RKA

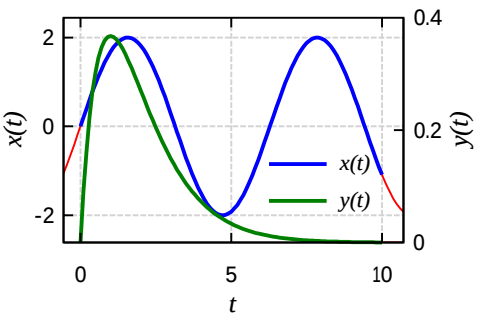
Example

DE System

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

$$RK := RKA\left(\begin{pmatrix} x(t) \\ y(t) \end{pmatrix}', \begin{bmatrix} 0 \\ -2 \end{bmatrix}, 10, 100\right)$$

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



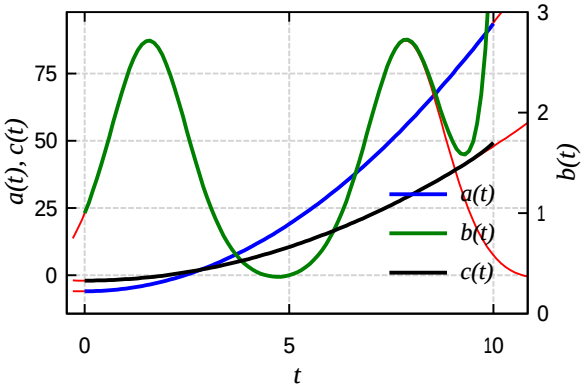
Example

DE System

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

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

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



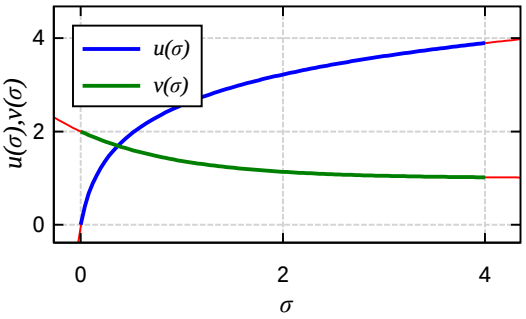
Example

DE System $\alpha := 12$

$$\begin{bmatrix} v(0)=2 & v'(0)=-1 & u(0)=0 \\ v''(\sigma)\cdot v(\sigma)-\sigma\cdot u(\sigma) = \frac{e^{\sigma}+1-\sigma\cdot\ln(1+\alpha\cdot\sigma)\cdot e^{2\cdot\sigma}}{e^{2\cdot\sigma}} \\ u'(\sigma)\cdot v''(\sigma)+\cos(2\cdot\sigma) = \frac{\alpha+\cos(2\cdot\sigma)\cdot(1+\alpha\cdot\sigma)\cdot e^{\sigma}}{(1+\alpha\cdot\sigma)\cdot e^{\sigma}} \end{bmatrix}$$

$$RK := RKA\left(\begin{pmatrix} u(\sigma) \\ v(\sigma) \end{pmatrix}', \begin{bmatrix} \alpha \\ 1 \end{bmatrix}, 4, 100\right)$$

$$\begin{cases} us(\sigma) := \ln(1+\alpha\cdot\sigma) \\ vs(\sigma) := e^{-\sigma}+1 \end{cases}$$



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