

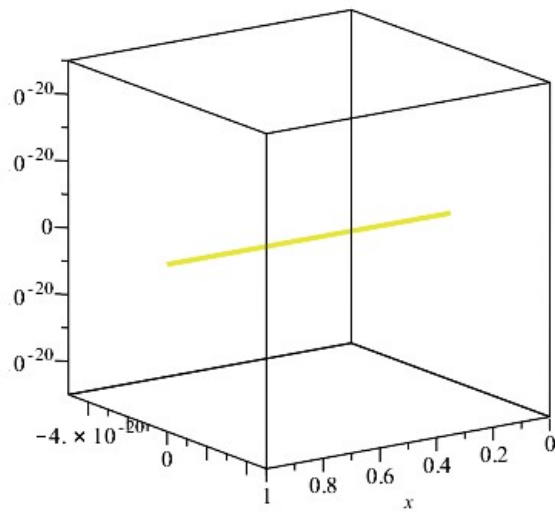
$$sde := D(y1)(x) = -4y1(x) - 8y2(x), D(y2)(x) = -3y1(x) + 6y2(x) \quad (1)$$

`dsolve([sde])`

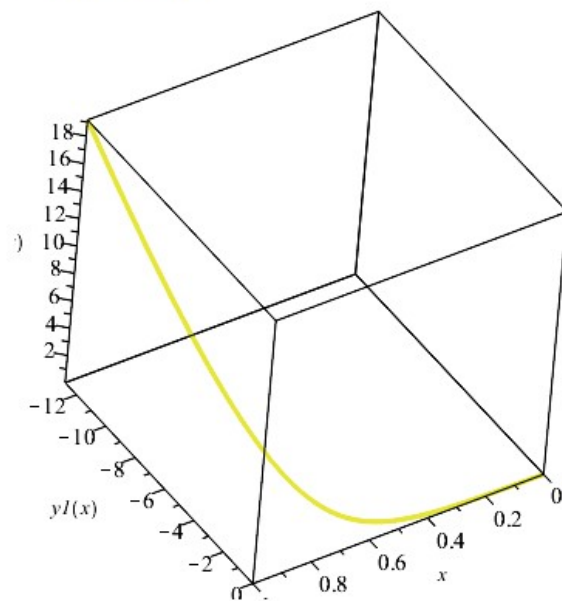
$$\left\{ y1(x) = _C1 e^{8x} + _C2 e^{-6x}, y2(x) = -\frac{3}{2} \frac{C1 e^{8x}}{2} + \frac{C2 e^{-6x}}{4} \right\} \quad (2)$$

`with(DEtools):`

`DEplot3d(sde, (y1(x), y2(x)), x=0..1, [[y1(0)=0, y2(0)=0]])`



`DEplot3d(sde, (y1(x), y2(x)), x=0..1, [[y1(0)=0.01, y2(0)=0.01]])`



`A := Matrix([[-4, -8], [-3, 6]])`

$$A := \begin{bmatrix} -4 & -8 \\ -3 & 6 \end{bmatrix} \quad (3)$$

`with(LinearAlgebra):`

`Eigenvectors(A)`

$$\left[ \begin{bmatrix} -6 \\ 8 \end{bmatrix}, \begin{bmatrix} 4 & -\frac{2}{3} \\ 1 & 1 \end{bmatrix} \right] \quad (4)$$

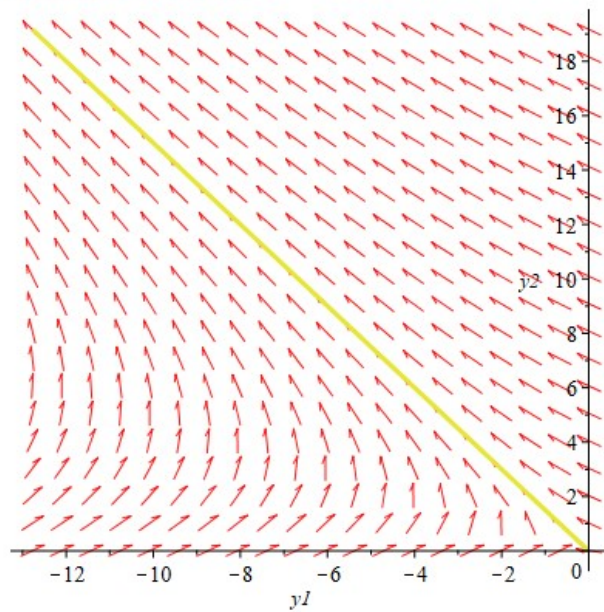
`A := Matrix([ [ e^{8x}, e^{-6x} ], [ -\frac{3}{2} \frac{e^{8x}}{2}, \frac{e^{-6x}}{4} ] ])`

$$A := \begin{bmatrix} e^{8x} & e^{-6x} \\ -\frac{3}{2} \frac{e^{8x}}{2} & \frac{e^{-6x}}{4} \end{bmatrix} \quad (5)$$

`simplify(Determinant(A))`

$$\frac{7 e^{2x}}{4} \quad (6)$$

`phaseportrait( (sde), (y1(x), y2(x)), x=0..1, [[y1(0)=0.01, y2(0)=0.01]])`



`sde := D(y1)(x) = 3 y1(x) + 2 y2(x), D(y2)(x) = y1(x) + 4 y2(x)`

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`dsolve( [sde])`

$$\left\{ y1(x) = \_C1 e^{5x} + \_C2 e^{2x}, y2(x) = \_C1 e^{5x} - \frac{\_C2 e^{2x}}{2} \right\}$$

(7)

(8)