

In [2]: `from sympy import *`

Example 1: $x' = \begin{bmatrix} 1 & -1 \\ 1 & 3 \end{bmatrix} x$

```
In [3]: t=symbols('t')
x1=Function('x1')
x2=Function('x2')
deq1=diff(x1(t),t)-x1(t)+x2(t)
deq2=diff(x2(t),t)-x1(t)-3*x2(t)
dsolve([deq1,deq2])
```

Out[3]: `[Eq(x1(t), (-C1 + C2*(1 - t))*exp(2*t)), Eq(x2(t), (C1 + C2*t)*exp(2*t))]`

Example 2: $x' = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} x$

```
In [4]: t=symbols('t')
x1=Function('x1')
x2=Function('x2')
deq1=diff(x1(t),t)-2*x1(t)
deq2=diff(x2(t),t)-2*x2(t)
dsolve([deq1,deq2])
```

Out[4]: `[Eq(x1(t), C1*exp(2*t)), Eq(x2(t), C2*exp(2*t))]`

Example 3: $x' = \begin{bmatrix} 1 & -4 \\ 4 & -7 \end{bmatrix} x$

```
In [5]: t=symbols('t')
x1=Function('x1')
x2=Function('x2')
deq1=diff(x1(t),t)-x1(t)+4*x2(t)
deq2=diff(x2(t),t)-4*x1(t)+7*x2(t)
dsolve([deq1,deq2])
```

Out[5]: `[Eq(x1(t), (-4*C1 + C2*(-4*t - 1))*exp(-3*t)), Eq(x2(t), (-4*C1 - 4*C2*t)*exp(-3*t))]`

In []: