```
> restart
> SolGral := y(x) = C1·exp(x) + C2·exp(-x) + 2·exp(2 x)
```

$$SolGral := y(x) = C_1\, e^{x} + C_2\, e^{-x} + 2\, e^{2x} \tag{1}$$

```
> Condiciones := y(0) = 5, D(y)(0) = -6
```

$$Condiciones := y(0) = 5,\ D(y)(0) = -6 \tag{2}$$

```
> Sistema := subs(x = 0, rhs(SolGral) = rhs(Condiciones1)), subs(x = 0, rhs(diff(SolGral, x))
      = rhs(Condiciones2)) : Sistema1; Sistema2
```

$$C_1 + C_2 + 2 = 5$$

$$C_1 - C_2 + 4 = -6 \tag{3}$$

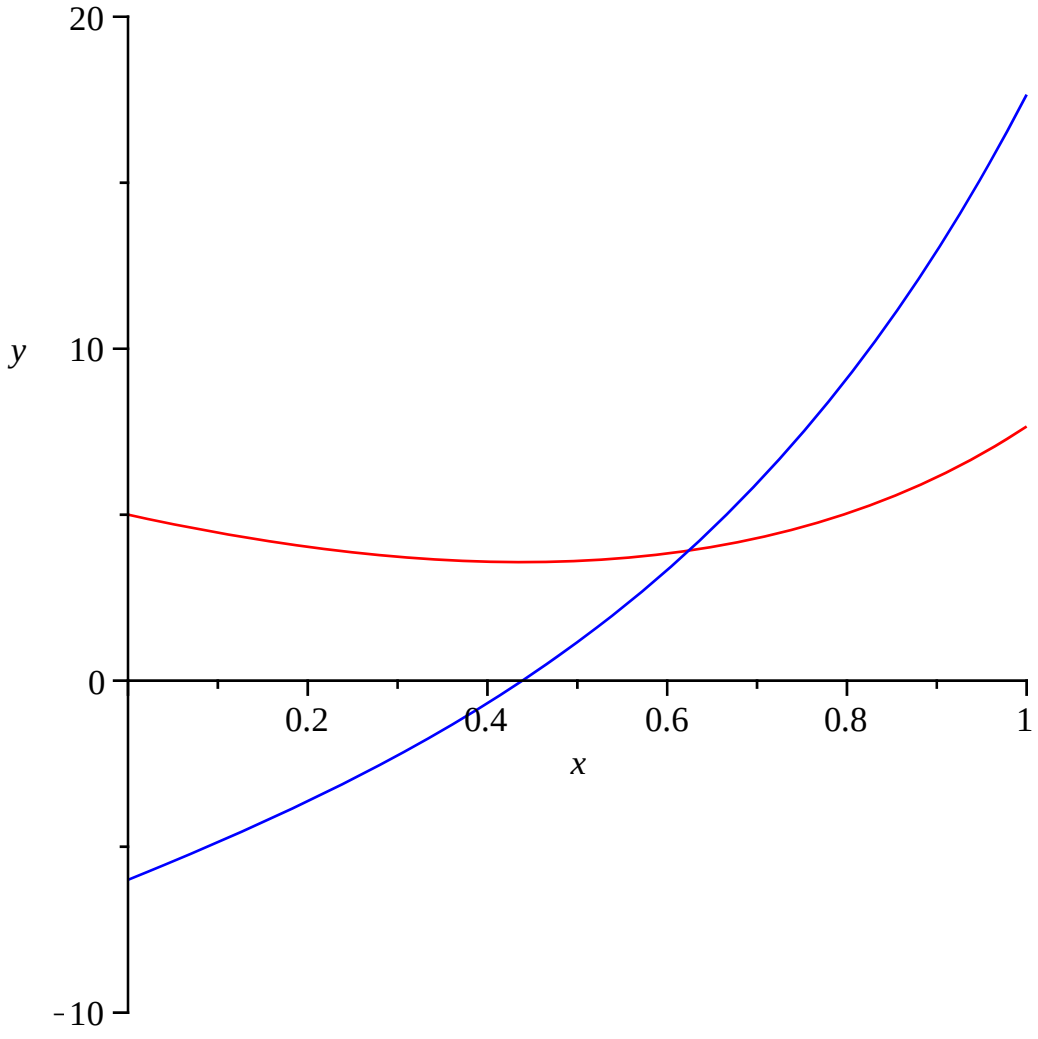
```
> Parametro := solve({Sistema}, {C1, C2})
```

$$Parametro := \left\{C_1 = -\frac{7}{2},\ C_2 = \frac{13}{2}\right\} \tag{4}$$

```
> SolPart := subs(C1 = rhs(Parametro1), C2 = rhs(Parametro2), SolGral)
```

$$SolPart := y(x) = -\frac{7}{2}\, e^{x} + \frac{13}{2}\, e^{-x} + 2\, e^{2x} \tag{5}$$

```
> plot([rhs(SolPart), rhs(diff(SolPart, x))], x = 0..1, y = -10..20, color = [red, blue])
```



```
> restart
> Sistema := diff(x(t), t) = 2·x(t) + 3·y(t), diff(y(t), t) = x(t) + 4·y(t) : Sistema[1]; Sistema[2]
```

$$\frac{d}{dt} x(t) = 2\,x(t) + 3\,y(t)$$

$$\frac{d}{dt} y(t) = x(t) + 4\,y(t) \qquad \textbf{(6)}$$

```
> Condiciones := x(0) = 4, y(0) = -3
```

$$Condiciones := x(0) = 4,\ y(0) = -3 \qquad \textbf{(7)}$$

```
> SolGral := dsolve({Sistema}) : SolGral[1]; SolGral[2]
```

$$x(t) = \_C1\ e^{t} + \_C2\ e^{5t}$$

$$y(t) = -\frac{1}{3}\ \_C1\ e^{t} + \_C2\ e^{5t} \qquad \textbf{(8)}$$

```
> SolPart := dsolve({Sistema, Condiciones}) : SolPart[1]; SolPart[2]
```

$$x(t) = \frac{21}{4}\ e^{t} - \frac{5}{4}\ e^{5t}$$

$$y(t) = -\frac{7}{4}\ e^{t} - \frac{5}{4}\ e^{5t} \qquad \textbf{(9)}$$

```
> restart
> AA := array([[2, 3], [1, 4]])
```

$$AA := \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} \qquad \textbf{(10)}$$

```
> Xcero := array([4, -3])
```

$$Xcero := \begin{bmatrix} 4 & -3 \end{bmatrix} \qquad \textbf{(11)}$$

```
> with(linalg) :
> MatExp := exponential(AA, t)
```

$$MatExp := \begin{bmatrix} \frac{3}{4}\ e^{t} + \frac{1}{4}\ e^{5t} & \frac{3}{4}\ e^{5t} - \frac{3}{4}\ e^{t} \\ \frac{1}{4}\ e^{5t} - \frac{1}{4}\ e^{t} & \frac{1}{4}\ e^{t} + \frac{3}{4}\ e^{5t} \end{bmatrix} \qquad \textbf{(12)}$$

```
> MatExp[1, 1]; MatExp[1 , 2]; MatExp[2, 1]; MatExp[2, 2]
```

$$\frac{3}{4}\ e^{t} + \frac{1}{4}\ e^{5t}$$

$$\frac{3}{4}\ e^{5t} - \frac{3}{4}\ e^{t}$$

$$\frac{1}{4}\ e^{5t} - \frac{1}{4}\ e^{t}$$

$$\frac{1}{4}\ e^{t} + \frac{3}{4}\ e^{5t} \qquad \textbf{(13)}$$

```
> SolPart := evalm(MatExp &* Xcero) : x(t) = SolPart[1]; y(t) = SolPart[2]
```

$$x(t) = \frac{21}{4}\ e^{t} - \frac{5}{4}\ e^{5t}$$

$$y(t) = -\frac{5}{4}\,e^{5t} - \frac{7}{4}\,e^{t} \qquad \textbf{(14)}$$

```
> Xgral := array( [C1, C2] )
```

$$Xgral := \begin{bmatrix} C_1 & C_2 \end{bmatrix} \qquad \textbf{(15)}$$

```
> SolGral := evalm( MatExp &* Xgral ) : SolGral[1]; SolGral[2]
```

$$\left(\frac{3}{4}\,e^{t} + \frac{1}{4}\,e^{5t}\right) C_1 + \left(\frac{3}{4}\,e^{5t} - \frac{3}{4}\,e^{t}\right) C_2$$

$$\left(\frac{1}{4}\,e^{5t} - \frac{1}{4}\,e^{t}\right) C_1 + \left(\frac{1}{4}\,e^{t} + \frac{3}{4}\,e^{5t}\right) C_2 \qquad \textbf{(16)}$$

```
>
>
```