

**>**  $Sistema := \text{diff}(x_1(t), t) = 3 \cdot x_1(t) + 4 \cdot x_2(t), \text{diff}(x_2(t), t) = 2 \cdot x_1(t) + 5 \cdot x_2(t) : Sistema_1;$   
 $Sistema_2;$

$$\begin{aligned} \frac{d}{dt} x_1(t) &= 3 x_1(t) + 4 x_2(t) \\ \frac{d}{dt} x_2(t) &= 2 x_1(t) + 5 x_2(t) \end{aligned} \quad \textbf{(1)}$$

**> Condiciones**  $:= x_1(0) = 5, x_2(0) = -5;$

$$\textit{Condiciones} := x_1(0) = 5, x_2(0) = -5 \quad (2)$$

```
> AA := array([ [3, 4], [2, 5] ])
```

$$AA := \begin{bmatrix} 3 & 4 \\ 2 & 5 \end{bmatrix} \quad (3)$$

```
> Xzero := array( [5,-5])
```

$$X_{cero} := \begin{bmatrix} 5 & -5 \end{bmatrix} \quad (4)$$

**>** *with(linalg) :*

- > with(inttrans) :**

```
> II := array( [[1, 0], [0, 1]])
```

$$H := \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad (5)$$

**>**  $MatSi := evalm( s \cdot II - AA )$

$$MatSi := \begin{bmatrix} s-3 & -4 \\ -2 & s-5 \end{bmatrix} \quad (6)$$

```
> InvMatSi := inverse(MatSi)
```

$$InvMatSi := \begin{bmatrix} \frac{s-5}{s^2-8s+7} & \frac{4}{s^2-8s+7} \\ \frac{2}{s^2-8s+7} & \frac{s-3}{s^2-8s+7} \end{bmatrix} \quad (7)$$

```
> MatExp := map(convert, map(invlaplace, InvMatSi, s, t), exp)
```

$$MatExp := \begin{bmatrix} \frac{2}{3} e^t + \frac{1}{3} e^{7t} & \frac{2}{3} e^{7t} - \frac{2}{3} e^t \\ \frac{1}{3} e^{7t} - \frac{1}{3} e^t & \frac{1}{3} e^t + \frac{2}{3} e^{7t} \end{bmatrix} \quad (8)$$

```
> MatExp2 := exponential(AA, t)
```

$$MatExp2 := \begin{bmatrix} \frac{2}{3} e^t + \frac{1}{3} e^{7t} & \frac{2}{3} e^{7t} - \frac{2}{3} e^t \\ \frac{1}{3} e^{7t} - \frac{1}{3} e^t & \frac{1}{3} e^t + \frac{2}{3} e^{7t} \end{bmatrix} \quad (9)$$

$$\begin{aligned}
 & \text{Sol} := \text{evalm}(\text{MatExp} \&^* \text{Xcero}) : \text{Sol}_1; \text{Sol}_2 \\
 & \qquad \qquad \qquad \frac{20}{3} e^t - \frac{5}{3} e^{7t} \\
 & \qquad \qquad \qquad -\frac{5}{3} e^{7t} - \frac{10}{3} e^t
 \end{aligned} \tag{10}$$

$$\begin{aligned}
 & \text{Solucion} := \text{dsolve}(\{\text{Sistema}, \text{Condiciones}\}) : \text{Solucion}_1; \text{Solucion}_2 \\
 & \qquad \qquad \qquad x_1(t) = \frac{20}{3} e^t - \frac{5}{3} e^{7t} \\
 & \qquad \qquad \qquad x_2(t) = -\frac{5}{3} e^{7t} - \frac{10}{3} e^t
 \end{aligned} \tag{11}$$

>