

> restart

> Sistema := diff(x<sub>1</sub>(t), t) = x<sub>3</sub>(t), diff(x<sub>2</sub>(t), t) = x<sub>4</sub>(t), diff(x<sub>3</sub>(t), t) = - (  $\frac{H_1}{M_1} + \frac{H_2}{M_1}$  ) · x<sub>1</sub>(t)

+  $\frac{H_2}{M_1}$  · x<sub>2</sub>(t), diff(x<sub>4</sub>(t), t) =  $\frac{H_2}{M_2}$  · x<sub>1</sub>(t) -  $\frac{H_2}{M_2}$  · x<sub>2</sub>(t) : Sistema<sub>1</sub>; Sistema<sub>2</sub>; Sistema<sub>3</sub>;  
Sistema<sub>4</sub>;

$$\frac{d}{dt} x_1(t) = x_3(t)$$

$$\frac{d}{dt} x_2(t) = x_4(t)$$

$$\frac{d}{dt} x_3(t) = - \left( \frac{H_1}{M_1} + \frac{H_2}{M_1} \right) x_1(t) + \frac{H_2 x_2(t)}{M_1}$$

$$\frac{d}{dt} x_4(t) = \frac{H_2 x_1(t)}{M_2} - \frac{H_2 x_2(t)}{M_2} \quad (1)$$

> M<sub>1</sub> := 2; M<sub>2</sub> := 1; H<sub>1</sub> := 2; H<sub>2</sub> := 4

$$M_1 := 2$$

$$M_2 := 1$$

$$H_1 := 2$$

$$H_2 := 4 \quad (2)$$

> Sistema<sub>1</sub>; Sistema<sub>2</sub>; Sistema<sub>3</sub>; Sistema<sub>4</sub>;

$$\frac{d}{dt} x_1(t) = x_3(t)$$

$$\frac{d}{dt} x_2(t) = x_4(t)$$

$$\frac{d}{dt} x_3(t) = -3 x_1(t) + 2 x_2(t)$$

$$\frac{d}{dt} x_4(t) = 4 x_1(t) - 4 x_2(t) \quad (3)$$

> Condiciones := x<sub>2</sub>(0) =  $\frac{15}{100}$ , x<sub>1</sub>(0) =  $\frac{15}{100} \cdot \frac{H_1}{H_2}$ , x<sub>3</sub>(0) = 0, x<sub>4</sub>(0) = 0;

$$\text{Condiciones} := x_2(0) = \frac{3}{20}, x_1(0) = \frac{3}{40}, x_3(0) = 0, x_4(0) = 0 \quad (4)$$

> SolucionParticular := dsolve( {Sistema, Condiciones}, {x<sub>1</sub>(t), x<sub>2</sub>(t), x<sub>3</sub>(t), x<sub>4</sub>(t)} ) :  
evalf( SolucionParticular<sub>1</sub>, 3 ); evalf( SolucionParticular<sub>2</sub>, 3 ); evalf( SolucionParticular<sub>3</sub>,  
3 ); evalf( SolucionParticular<sub>4</sub>, 3 )

$$x_1(t) = 0.0962 \cos(-0.795 t) - 0.0213 \cos(2.52 t)$$

$$x_2(t) = 0.114 \cos(-0.795 t) + 0.0357 \cos(2.52 t)$$

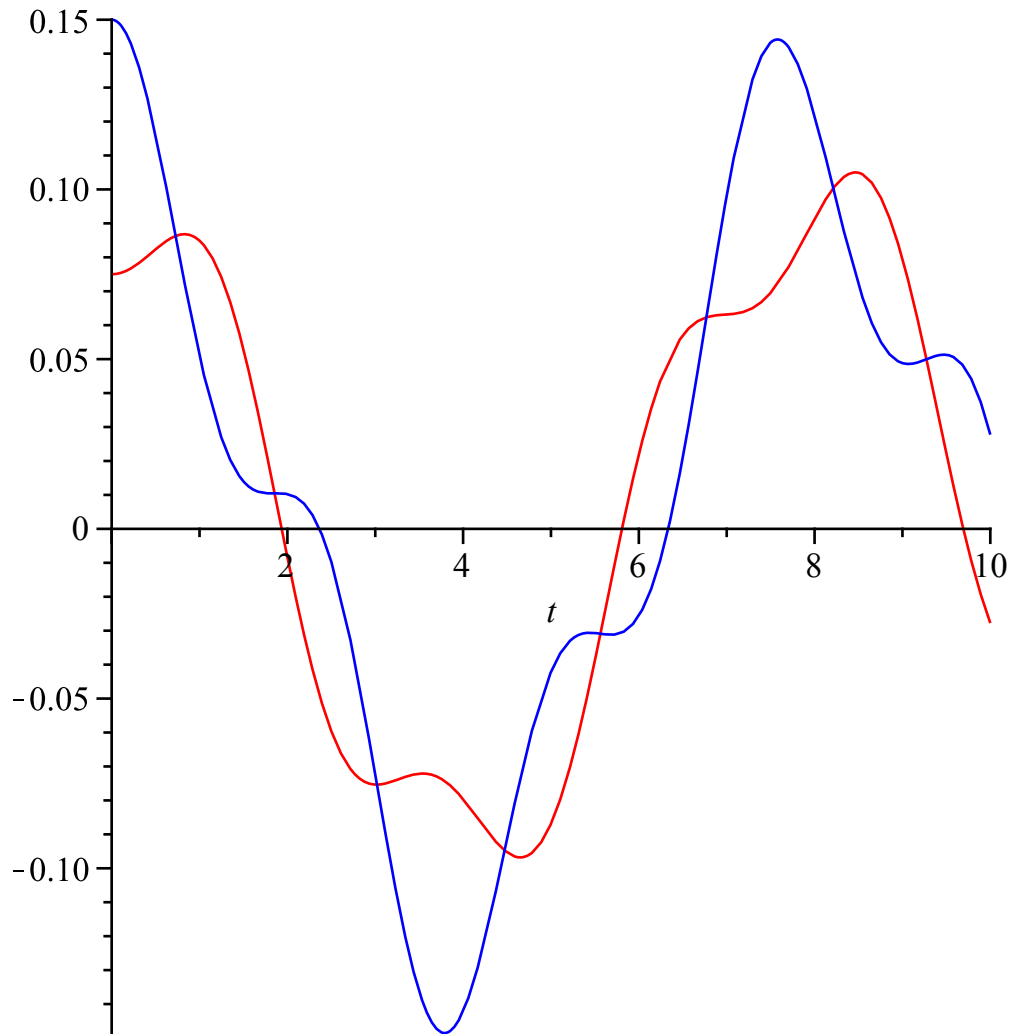
$$x_3(t) = 0.0762 \sin(-0.795 t) + 0.0536 \sin(2.52 t)$$

(5)

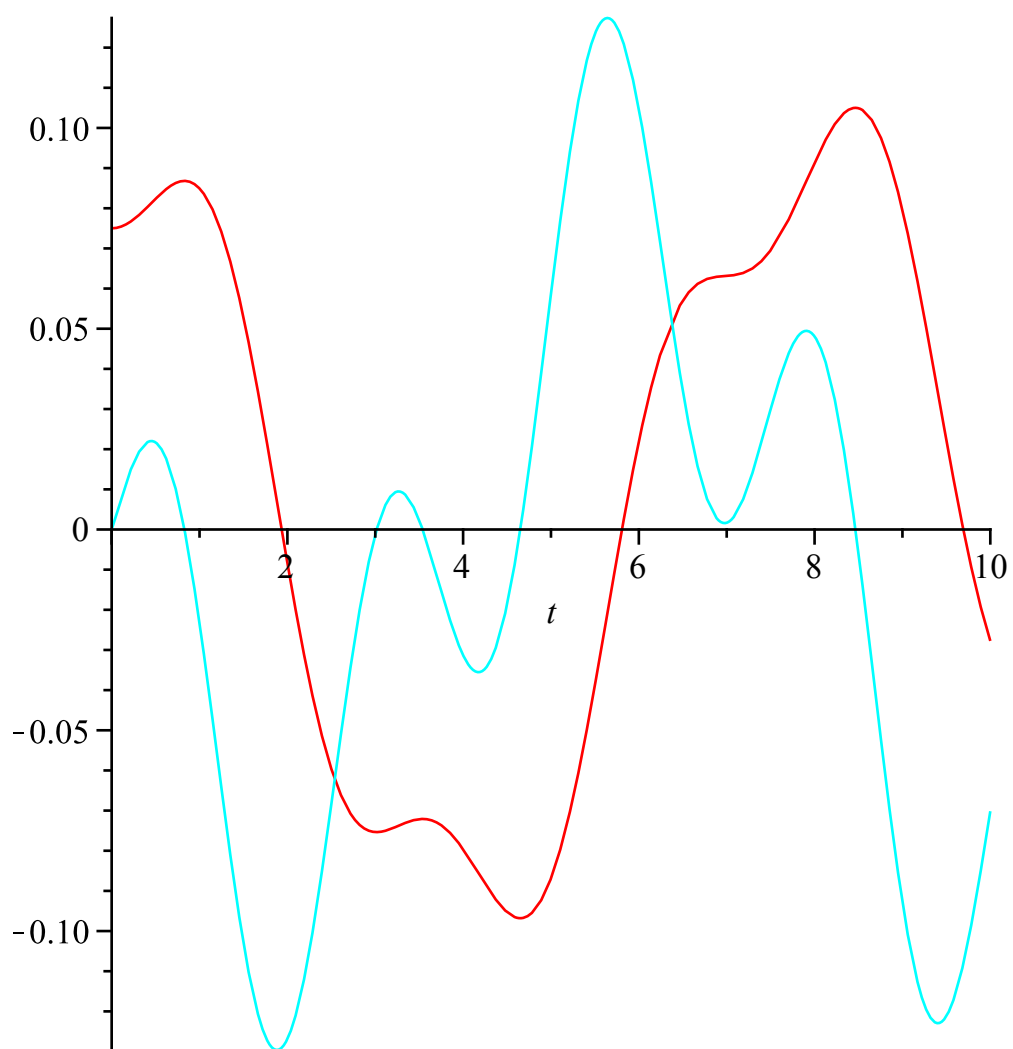
$$x_4(t) = 0.0900 \sin(-0.795 t) - 0.0904 \sin(2.52 t)$$

(5)

> `plot([rhs(SolucionParticular1), rhs(SolucionParticular2)], t=0..10, color=[red, blue])`



> `plot([rhs(SolucionParticular1), rhs(SolucionParticular3)], t=0..10, color=[red, cyan])`



```
> plot([rhs(SolucionParticular2), rhs(SolucionParticular4)], t=0..10, color=[blue, green])
```

