```
> restart
```

PROBLEMA DINÁMICO

```
> EcuacionDinamica := diff(s(t), t$2) + (Hooke/Masa)·s(t)
```

$$EcuacionDinamica := \frac{d^2}{dt^2} s(t) + \frac{Hooke\, s(t)}{Masa} \tag{1}$$

```
> Hooke := (118/10)/(30/100); Peso := 31/1000; gravedad := 981/100; Masa := Peso/gravedad
```

$$Hooke := \frac{118}{3}$$

$$Peso := \frac{31}{1000}$$

$$gravedad := \frac{981}{100}$$

$$Masa := \frac{31}{9810} \tag{2}$$

```
> evalf(Hooke, 3); evalf(Peso, 3); evalf(gravedad, 3); evalf(Masa, 3)
```

$$39.3$$

$$0.0310$$

$$9.81$$

$$0.00316 \tag{3}$$

```
> Condiciones := s(0) = -((77/100) - (23/100)), D(s)(0) = 0
```

$$Condiciones := s(0) = -\frac{27}{50}, D(s)(0) = 0 \tag{4}$$

```
> SolParticular := dsolve({EcuacionDinamica, Condiciones}) : evalf(%, 3)
```

$$s(t) = -0.540 \cos(112.\, t) \tag{5}$$

```
> TiempoImpulso := solve(rhs(SolParticular) = 0, t) : evalf(%, 3)
```

$$0.0141 \tag{6}$$

```
> VelocidadSalida := subs(t = TiempoImpulso, rhs(diff(SolParticular, t))) : evalf(%, 3);
      evalf(%%, 3)·3600/1000
```

$$60.2$$

$$216.7200000 \tag{7}$$

```
>
```

PROBLEMA CINAMÁTICO

```
> EcuacionVertical := diff(y(t), t$2) = -gravedad
```

$$EcuacionVertical := \frac{d^2}{dt^2} y(t) = -\frac{981}{100} \tag{8}$$

```
> EcuacionHorizontal := diff(x(t), t) = VelocidadSalida·cos(Pi/4)
```

(9)

$$EcuacionHorizontal := \frac{d}{dt} x(t) = \frac{27}{1550} \sqrt{2990415}\ \sqrt{2} \quad (9)$$

> $CondicionesVerticales := y(0) = 2, D(y)(0) = VelocidadSalida \cdot \sin\left(\frac{Pi}{4}\right)$

$$CondicionesVerticales := y(0) = 2, D(y)(0) = \frac{27}{1550} \sqrt{2990415}\ \sqrt{2} \quad (10)$$

> $CondicionesHorizontales := x(0) = 1$

$$CondicionesHorizontales := x(0) = 1 \quad (11)$$

> $SolucionVertical := dsolve(\{EcuacionVertical, CondicionesVerticales\}) : evalf(\%, 3)$

$$y(t) = -4.90\, t^2 + 42.5\, t + 2. \quad (12)$$

> $SolucionHorizontal := dsolve(\{EcuacionHorizontal, CondicionesHorizontales\}) : evalf(\%, 3)$

$$x(t) = 42.6\, t + 1. \quad (13)$$

> $TiempoVuelo := solve(rhs(SolucionVertical) = 0, t) : evalf(\%, 3)$

$$-0.03, 8.71 \quad (14)$$

> $DistanciaMaxima := subs\left(t = TiempoVuelo_2, rhs(SolucionHorizontal)\right) : evalf(\%, 3)$

$$372. \quad (15)$$

> $TiempoAltura := solve(rhs(diff(SolucionVertical, t)) = 0, t) : evalf(\%, 3)$

$$4.34 \quad (16)$$

> $AlturaMaxima := subs(t = TiempoAltura, rhs(SolucionVertical)) : evalf(\%, 3)$

$$94.5 \quad (17)$$

>

>