```
> restart
```

PROBLEMA MASA-RESORTE

```
> Ecuacion := Masa·diff(s(t), t$2) =- Hooke·s(t)
```

$$Ecuacion := Masa\left(\frac{d^2}{dt^2}\,s(t)\right) = -Hooke\,s(t) \tag{1}$$

```
> Gravedad := 981/100; Peso := 35/1000; Largo := 73/100; Hooke := (115/10)/(3/10); Masa
      := Peso/Gravedad; Aire := 23/100
```

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

$$Peso := \frac{7}{200}$$

$$Largo := \frac{73}{100}$$

$$Hooke := \frac{115}{3}$$

$$Masa := \frac{7}{1962}$$

$$Aire := \frac{23}{100} \tag{2}$$

```
> Ecuacion
```

$$\frac{7}{1962}\,\frac{d^2}{dt^2}\,s(t) = -\frac{115}{3}\,s(t) \tag{3}$$

```
> Condiciones := s(0) =- (Largo − Aire), D(s)(0) = 0
```

$$Condiciones := s(0) = -\frac{1}{2},\ D(s)(0) = 0 \tag{4}$$

```
> SolucionParticular := dsolve({Ecuacion, Condiciones}) : evalf(%, 5)
```

$$s(t) = -0.50000\cos(103.66\,t) \tag{5}$$

```
> TiempoImpulso := solve(rhs(SolucionParticular) = 0, t); evalf(%, 5)
```

$$TiempoImpulso := \frac{1}{150420}\,\pi\sqrt{526470}$$

$$0.015154 \tag{6}$$

```
> VelocidadSalida := subs(t = TiempoImpulso, rhs(diff(SolucionParticular, t))); evalf(%, 5);
      evalf(%%, 5)·3.6
```

$$VelocidadSalida := \frac{1}{14}\sin\left(\frac{1}{2}\,\pi\right)\sqrt{526470}$$

$$51.827$$

$$186.5772 \tag{7}$$

```
>
```

PROBLEMA TIRO PARABÓLICO

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

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

> $EcuacionHorizontal := diff(x(t), t) = VelocidadSalida \cdot \cos\left(\frac{Pi}{4}\right)$

$$EcuacionHorizontal := \frac{d}{dt} x(t) = \frac{1}{28}\sqrt{526470}\sqrt{2} \quad (9)$$

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

$$CondicionesVerticales := y(0) = 2, D(y)(0) = \frac{1}{28}\sqrt{526470}\sqrt{2} \quad (10)$$

> $CondicionHorizontal := x(0) = 5$

$$CondicionHorizontal := x(0) = 5 \quad (11)$$

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

$$SolucionVertical := y(t) = -\frac{981}{200} t^2 + \frac{1}{28}\sqrt{526470}\sqrt{2}\, t + 2 \quad (12)$$

> $SolucionHorizontal := dsolve(\{EcuacionHorizontal, CondicionHorizontal\})$

$$SolucionHorizontal := x(t) = \frac{1}{14}\sqrt{263235}\, t + 5 \quad (13)$$

> $TiempoVuelo := solve(rhs(SolucionVertical) = 0, t); evalf(\%, 5)$

$$TiempoVuelo := \frac{50}{6867}\sqrt{263235} - \frac{10}{6867}\sqrt{6773151}, \frac{50}{6867}\sqrt{263235} + \frac{10}{6867}\sqrt{6773151}$$

$$-0.0540, 7.5256 \quad (14)$$

> $Distancia := subs(t = TiempoVuelo_2, rhs(SolucionHorizontal)); evalf(\%, 5)$

$$Distancia := \frac{1}{14}\sqrt{263235}\left(\frac{50}{6867}\sqrt{263235} + \frac{10}{6867}\sqrt{6773151}\right) + 5$$

$$280.80 \quad (15)$$

> $TiempoAlturaMax := solve(rhs(diff(SolucionVertical, t)) = 0, t); evalf(\%, 5)$

$$TiempoAlturaMax := \frac{25}{6867}\sqrt{526470}\sqrt{2}$$

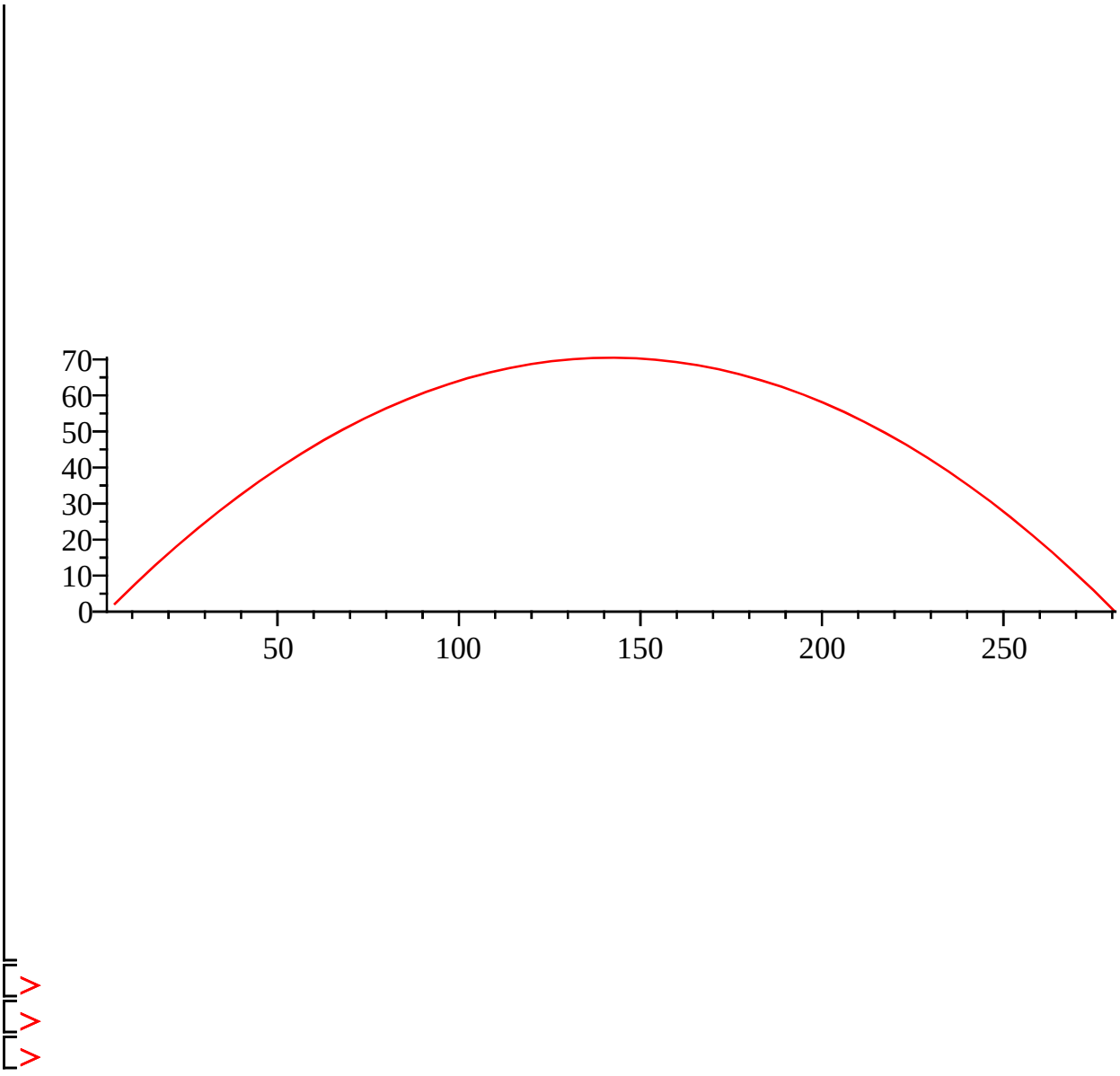
$$3.7356 \quad (16)$$

> $AlturaMax := subs(t = TiempoAlturaMax, rhs(SolucionVertical)); evalf(\%, 5)$

$$AlturaMax := \frac{2959}{42}$$

$$70.452 \quad (17)$$

> $plot([rhs(SolucionHorizontal), rhs(SolucionVertical), t = 0..TiempoVuelo_2], scaling = CONSTRAINED)$


70
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