

> restart

> EcuacionDiferencial := diff(y(t), t, t) + g = 0

$$\text{EcuacionDiferencial} := \frac{d^2}{dt^2} y(t) + g = 0 \quad (1)$$

> Solucion := dsolve(EcuacionDiferencial, y(t))

$$\text{Solucion} := y(t) = -\frac{1}{2} g t^2 + _C1 t + _C2 \quad (2)$$

> DerivadaSolucion := diff(Solucion, t)

$$\text{DerivadaSolucion} := \frac{d}{dt} y(t) = -g t + _C1 \quad (3)$$

> DerivadaSegundaSolucion := diff(DerivadaSolucion, t)

$$\text{DerivadaSegundaSolucion} := \frac{d^2}{dt^2} y(t) = -g \quad (4)$$

> Comprobar := subs(DerivadaSegundaSolucion, EcuacionDiferencial)

$$\text{Comprobar} := 0 = 0 \quad (5)$$

> restart

>

problema de la flecha y el arco

> Modelo1 := $\left(\frac{0.030}{9.8067} \right) \text{diff}(s(t), t, t) = - \left(\frac{14.61}{0.40} \right) \cdot s(t)$

$$\text{Modelo1} := 0.003059133042 \left(\frac{d^2}{dt^2} s(t) \right) = -36.52500000 s(t) \quad (6)$$

> EcuacionDiferencial := lhs(Modelo1) - rhs(Modelo1) = 0

$$\text{EcuacionDiferencial} := 0.003059133042 \left(\frac{d^2}{dt^2} s(t) \right) + 36.52500000 s(t) = 0 \quad (7)$$

> Solucion1 := dsolve({Modelo1, s(0) = -0.436, D(s)(0) = 0})

$$\text{Solucion1} := s(t) = -\frac{109}{250} \cos\left(\frac{50000}{509855507} \sqrt{1241498159545} t\right) \quad (8)$$

> evalf(%)

$$s(t) = -0.4360000000 \cos(109.2687387 t) \quad (9)$$

> TiempoRecorrido := solve(rhs(Solucion1) = 0, t)

$$\text{TiempoRecorrido} := \frac{1}{243500000} \pi \sqrt{1241498159545} \quad (10)$$

> evalf(%)

$$0.01437553271 \quad (11)$$

(segundos)

> VelocidadInicial := rhs(subs(t = TiempoRecorrido, diff(Solucion1, t)))

$$\text{VelocidadInicial} := \frac{21800}{509855507} \sin\left(\frac{1}{2} \pi\right) \sqrt{1241498159545} \quad (12)$$

> evalf(%)

$$47.64117006 \quad (13)$$

(metros/segundos)

> evalf(%) * 3.6

171.5082122

(14)

(Kilómetros/hora)

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