

(%i1) **garbage_collect()**;

(%o1) true

(%i8) **m1\$**

m2\$

m3\$

g:-10;

x\$

y\$

S\$

g - 10

(%i13) **xp\$**

yp\$

Sp\$

xpp\$

ypp\$

(%i14) **L:0.5*(m1+m2)*((16/9)*yp^2+(8/3)*yp*xp+xp^2)+0.5*m3*(xp^2+yp^2)-m1*g*((4/3)*y+x)-m3*g*y;**

L
$$0.5 (m2 + m1) \left(\frac{16 y_p^2}{9} + \frac{8 x_p y_p}{3} + x_p^2 \right) + 0.5 m3 (y_p^2 + x_p^2) + 10 m1 \left(\frac{4 y}{3} + x \right) + 10 m3 y$$

(%i15) **Ldx:diff(L,xp);**

Ldx
$$0.5 (m2 + m1) \left(\frac{8 y_p}{3} + 2 x_p \right) + 1.0 m3 x_p$$

(%i16) **Ldy:diff(L,yp);**

Ldy
$$0.5 (m2 + m1) \left(\frac{32 y_p}{9} + \frac{8 x_p}{3} \right) + 1.0 m3 y_p$$

(%i17) **dtLdx:32.5*(8*ypp/3+2*xpp)+10.0*xpp;**

dtLdx
$$32.5 \left(\frac{8 y_{pp}}{3} + 2 x_{pp} \right) + 10.0 x_{pp}$$

(%i18) **dtLdy:32.5*(32*ypp/9+8*xpp/3)+10*ypp;**

dtLdy
$$32.5 \left(\frac{32 y_{pp}}{9} + \frac{8 x_{pp}}{3} \right) + 10 y_{pp}$$

(%i19) **G1:dtLdx-m1*g;**

G1
$$32.5 \left(\frac{8 y_{pp}}{3} + 2 x_{pp} \right) + 10.0 x_{pp} + 10 m1$$

(%i20) **G2:dtLdy-4*m1*g/3-m3*g;**

G2
$$32.5 \left(\frac{32 y_{pp}}{9} + \frac{8 x_{pp}}{3} \right) + 10 y_{pp} + 10 m3 + \frac{40 m1}{3}$$

(%i21) **LOES:solve([G1,G2],[xpp,ypp]);**

rat: replaced 10.0 by 10/1 = 10.0

rat: replaced 32.5 by 65/2 = 32.5

rat: replaced 32.5 by 65/2 = 32.5

LOES
$$\left[\left[x_{pp} = - \left(\frac{18 m1 - 156 m3}{343} \right), y_{pp} = - \left(\frac{135 m3 + 24 m1}{343} \right) \right] \right]$$

(%i22) **xpp:rhs(LOES[1][1]);**

$$xpp - \left(\frac{18 m1 - 156 m3}{343} \right)$$

(%i23) **ypp:rhs(LOES[1][2]);**

$$ypp - \left(\frac{135 m3 + 24 m1}{343} \right)$$

(%i24) **Spp:4*ypp/3+xpp;**

$$Spp - \left(\frac{4 (135 m3 + 24 m1)}{1029} \right) - \frac{18 m1 - 156 m3}{343}$$