> **restart:**

Ejercicio 3 - Examen final 11 septiembre 2000

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Problema de cable con rozamiento sobre un plano inclinado

> $datos := \{\phi = \frac{\pi}{6}, \mu = 1, q = 1\}$

> $y_C := \alpha + 12$

> $eq2 := y_B = \mu\, s\, \cos(\phi) - s\, \sin(\phi)$

> $eq3 := y_B \cos(\phi) = \alpha$

> $eq4 := y_C - y_B = s\, \sin(\phi)$

> **solu:=solve({eq2,eq3,eq4},{s,a,y[B]});**

$$solu := \{s = -12\frac{1}{\cos(\phi)\,(\mu\cos(\phi) - \sin(\phi) - \mu)}, y_B = -12\frac{\mu\cos(\phi) - \sin(\phi)}{\cos(\phi)\,(\mu\cos(\phi) - \sin(\phi) - \mu)}, \alpha = -12\frac{\mu\cos(\phi}{\mu\cos(\phi)}$$

> **evalf(subs(datos,solu));**

$$\{y_B = 7.999999991, \alpha = 6.928203222, s = 21.85640645\}$$

> **fsolve((s/2)*((sqrt(3)-1)*(sqrt(3)/2-1)-1)+12,s);**

$$21.85640647$$

> $S_B := \sqrt{y_B^2 - \alpha^2}$

> $S_C := \sqrt{y_C^2 - \alpha^2}$

> $L := s + y_C + S_B + S_C$

> **soluL:=subs(solu,L);**

$$soluL := -12\,\frac{1}{\cos(\phi)\,(\mu\cos(\phi)-\sin(\phi)-\mu)} - \frac{12\,(\mu\cos(\phi)-\sin(\phi))}{\mu\cos(\phi)-\sin(\phi)-\mu} + 12$$
$$+\sqrt{144\,\frac{(\mu\cos(\phi)-\sin(\phi))^2}{\cos(\phi)^2\,(\mu\cos(\phi)-\sin(\phi)-\mu)^2} - \frac{144\,(\mu\cos(\phi)-\sin(\phi))^2}{(\mu\cos(\phi)-\sin(\phi)-\mu)^2} + 2\sqrt{-72\,\frac{\mu\cos(\phi)-\sin(\phi)}{\mu\cos(\phi)-\sin(\phi)-\mu}}}$$

> **evalf(subs(datos,soluL));**

$$62.39928756$$

> **evalf(subs(solu,datos,T[C]=q*y[C]));**

$$T_C = 18.92820322$$