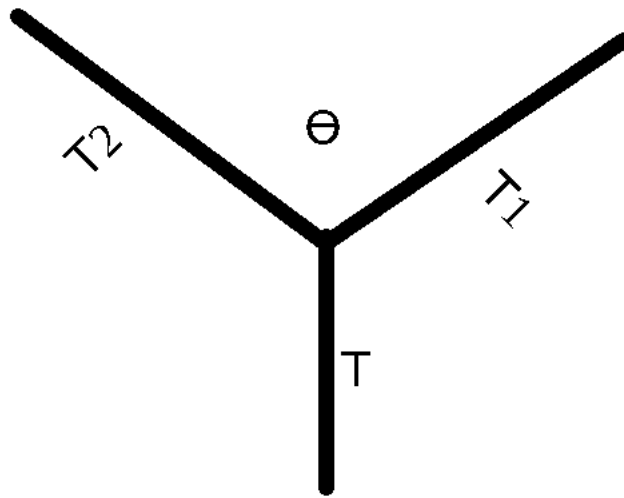


Sample Calculation for Lab 04

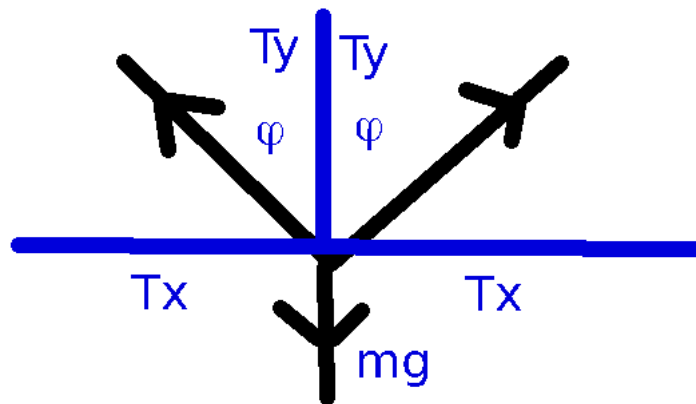
Repeat in great detail the following derivation



In the image above, we have the following tensions

$$T=mg: T_2=mg: T_1=mg \quad .$$

We assume that the angle Θ is equally divided up the bisector. So that in fact the angle we will use is divided by 2, and I will call that ϕ .



$$\text{along } x: T_x = -T \sin \phi + T \sin \phi = 0$$

$$\text{along } y: 2 T_y - mg = 0 \Rightarrow T_y = \frac{mg}{2} = T \cos \phi \Rightarrow \cos \phi = \frac{mg}{2T}$$

But we know that

$$T = mg$$

because the strings on either side are holding up the same mass m . So:

$$\cos \phi = \frac{mg}{2mg} = \frac{1}{2} \Rightarrow \phi = 60^\circ$$

This gives us the expected angle between the two strings to be a total of

$$\theta = 2\phi = 120^\circ$$