Laboratory on Net Force: Force Tables

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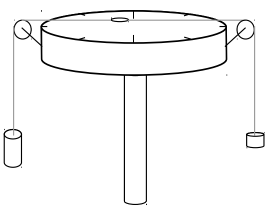

Figure 1: The force table setup includes a wheel with angles, strings and pulleys, and a central ring.

1 Memory Bank

1. The *weight* of a system is the mass times the gravitational constant, g. Written as an equation:

$$\vec{w} = -mg\hat{j} \quad (1)$$

   When a mass is suspended by a string or rope, the *tension* in the rope balances the weight.

2 Force Table Lab Setup

Obtain a set of weights, and a force-table, with ring and pulley system. Make the angle between two of the strings 60 degrees. Choose two different weights, m_1 and m_2. Set m_1 on 0 degrees, and set m_2 on 60 degrees. We will determine the mass m_3 that keeps the ring stationary if hung at the correct angle.

3 Details of the Measurement

1. Treating the tension $\vec{T}_1$ (with m_1) and the tension $\vec{T}_2$ (with m_2) as vectors, break them into components:

   $T_{1,x} =$ ______ (N) $T_{1,y} =$ ______ (N) $T_{2,x} =$ ______ (N) $T_{2,y} =$ ______ (N)

2. Determine $\vec{T}_3$ such that $\vec{F}_{\rm Net} = 0$:

Vector	x-component (N)	y-component (N)
$\vec{T}_1$		
$\vec{T}_2$		
$\vec{T}_3$		
$\vec{F}_{\rm Net}$		

Table 1: Break the vectors into components here.

3. Knowing that $|\vec{T}_3| = m_3 g$, solve for m_3 by finding $|T_3|$. Knowing the components of $\vec{T}_3$, solve for the angle it makes with the x-axis. Arrange $\vec{T}_3$ on the table. **Is the ring stationary?**