Answer on Question #61021-Physics-Mechanics-Relativity

A particle m is suspended by a massless string inside a trolley of mass m. Force F is being applied on trolley to move it on friction less surface. The angle theta between the string and vertical when particle is in equilibrium with respect to trolley.

Solution



vertical by the string m = mass of the ball

 θ = constant angle with T= Tension in the string mg= ball's weight ma= pseudo force

$$a = \frac{F}{m+m} = \frac{F}{2m}.$$
$$\tan \theta = \frac{g}{a} = \frac{g}{\frac{F}{2m}} = \frac{2mg}{F}$$
$$\theta = \tan^{-1}\left(\frac{2mg}{F}\right).$$

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