Answer on Question #69166-Physics-Classical Mechanics

What is the frequency of a second pendulum in an elevator moving up with an acceleration of g/2

Solution

For second pendulum frequency is

$$f = \frac{1}{2} Hz.$$

When elevator is moving up with an acceleration a, the effective acceleration due to the gravity is

$$g' = g + a = g + \frac{g}{2} = \frac{3}{2} g.$$

$$f = \frac{1}{2\pi} \sqrt{\frac{g}{l}} \to f^2 \sim g$$

$$\left(\frac{f'}{f}\right)^2 = \frac{g'}{g} = \frac{\frac{3}{2} g}{g} = \frac{3}{2}$$

$$f' = \sqrt{\frac{3}{2}} f = \frac{1}{2} \sqrt{\frac{3}{2}} = 0.612\ Hz.$$