

Answer on Question #65633 - Physics – Mechanics

The time period of a simple pendulum, called 'seconds pendulum' is 2 s. Calculate the length, angular frequency and frequency of the pendulum. What is the difference between a simple pendulum and a compound pendulum?

Solution.

1. Calculate the pendulum length:

$$T = 2\pi \frac{L}{g}; \quad L = g \frac{T^2}{4\pi^2};$$

$$L = 9.8 \frac{2^2}{4 \cdot 3.14^2} = 0.993M.$$

2. Calculate angular frequency:

$$\omega = \sqrt{\frac{g}{L}};$$

$$\omega = \sqrt{\frac{9.8}{0.993}} = 3.14 \frac{rad}{s};$$

3. Calculate frequency of the pendulum:

$$F = \frac{1}{2\pi} \omega;$$

$$F = \frac{1}{2 \cdot 3.14} * 3.14 = \frac{1}{2} = 0.5Hz;$$

Answer.

The length used to calculate the period of the ideal simple pendulum in eq. above is the distance from the pivot point to the center of mass of the bob. Any swinging rigid body free to rotate about a fixed horizontal axis is called a compound pendulum