

Complicated pendulum oscillation

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Solution: *We have half vibrations for two different wire lengths, l_1 e $l_2 = l_1 - d$. We know,*

$$\omega_{1,2} = \sqrt{\frac{g}{l_{1,2}}} \quad \text{and} \quad T_{1,2} = \frac{2\pi}{\omega_{1,2}} .$$

Thereby,

$$f = \frac{1}{T} = \frac{1}{T_1/2 + T_2/2} = \frac{\sqrt{g}}{\pi(\sqrt{l_1} + \sqrt{l_2})} .$$