

Practical 12 Standing waves in a string

Introduction

In this experiment you will measure the frequency of a power supply by analyzing the waves in a string. The frequency of the wave in a string is given by the equation

$$f = \frac{1}{\lambda} \sqrt{\frac{T}{\mu}}$$

Where

T = Tension

μ = mass per unit length

λ = Wavelength

Method

You are supplied with an alternating voltage supply of fixed frequency, a mechanical vibration generator and a string.



Any fixed string of length l will oscillate with its fundamental mode with a frequency given by $f = v/2l$ but if the string is forced to vibrate at this frequency the resulting amplitude will be large, this is called *resonance*.

Fix a known mass to the end of the string and switch on the ac supply to vibrate the string, adjust the length of the string until resonance is obtained. You will notice that this will happen at different lengths all multiples of $\frac{1}{2}\lambda$.

Analysis

Devise an appropriate method to find the frequency of the source.