Answer on Question 65377, Physics, Mechanics, Relativity

Question:

How the speed of a transverse wave in the string will change if it's tension is made four times?

Solution:

The formula that relates the tension in the string and the speed of the transverse wave in the string can be written as follows:

$$v = \sqrt{\frac{T}{\mu}},$$

here, v is the speed of the transverse wave in the string, T is the tension in the string, μ is the mass per unit length of the string.

Let's assume that the mass per unit length of the string is constant. Then, if the tension in the string is made four times, we get:

$$v_{new} = \sqrt{\frac{4T}{\mu}} = 2\sqrt{\frac{T}{\mu}} = 2v.$$

Therefore, as we can see from the formula, the speed of the transverse wave in the string is doubled.

Answer:

If the tension in the string is made four times, the speed of the transverse wave in the string is doubled.