51130, Physics, Other

Question   what changes could you make in a harmonic oscillator that would double the maximum speed of the oscillating object?

Solution   If you double the maximum speed of the oscillating object the energy of oscillation will increase in 4 times, because the are related as

$$E = \frac{mv_{max}^2}{2}$$

To change energy in 4 times you can increase the amplitude of oscillation in 2 times, because

$$E = k\frac{\Delta x^2}{2}$$

So answer is to increase the amplitude in 2 times.

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