

Task:

Two pucks have identical masses. The frequency of the spark timer is 20 sparks/second. Puck 2's spark timer was damaged by the collision and didn't leave a trace after the collision. Assuming conservation of momentum, what is the speed and direction of puck 2 after the collision.

Solution:

$$p_{\text{puck } 1} = m\overline{v_{\text{puck } 1}}$$

$$p_{\text{puck } 2} = m\overline{v_{\text{puck } 2}}$$

$$\Sigma p = \text{const},$$

$$m\overline{v_{\text{puck } 1}} + m\overline{v_{\text{puck } 2}} = m\overline{v_{\text{puck } 1}'} + m\overline{v_{\text{puck } 2}'}$$

$$\overline{v_{\text{puck } 1}} + \overline{v_{\text{puck } 2}} = \overline{v_{\text{puck } 1}'} + \overline{v_{\text{puck } 2}'}$$

$$\overline{v_{\text{puck } 2}'} = \overline{v_{\text{puck } 1}} + \overline{v_{\text{puck } 2}} - \overline{v_{\text{puck } 1}'}$$

We don't know the initial speeds and directions, the frequency of the spark timer without data doesn't show anything about the motion. Use the given data in the equation and your answer will be more certain

Answer:

$$\overline{v_{\text{puck } 2}'} = \overline{v_{\text{puck } 1}} + \overline{v_{\text{puck } 2}} - \overline{v_{\text{puck } 1}'}$$