**Answer on Question #58661-Physics-Classical Mechanics**

A box of mass m is pushed horizontally on a rough floor with an initial speed of 2 ms−1. The coefficient of kinetic friction between the surface and the box is μk = 0.1. Calculate the distance the box will move before stopping.

**Solution**

The friction force is

$$F = \mu_k N,$$

where $N$ is normal force. The normal force has the same magnitude but opposite direction as the weight of the box. It is because there is no motion in the vertical direction.

$$N = mg.$$

Thus,

$$F = \mu_k mg.$$

According the conservation of energy law the initial kinetic energy of the box is equal to the total work against the friction force:

$$\frac{mv^2}{2} = W = fd = \mu_k mgd.$$

The distance the box will move before stopping is

$$d = \frac{v^2}{2\mu_k g} = \frac{2^2}{2 \cdot 0.1 \cdot 10} = 2\ m.$$

**Answer: $2\ \boldsymbol{m}$.**