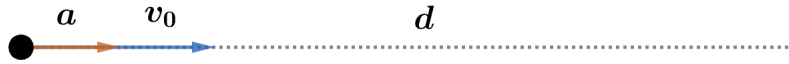


2019B F=ma Exam: Problem 18

Kevin S. Huang



Theory:

$$d = v_0 t + \frac{1}{2} a t^2 = t \left(v_0 + \frac{1}{2} a t \right)$$

For short races, we have

$$v_0 \gg a t$$

$$d \approx v_0 t$$

so the contribution from the uncertainty in v_0 dominates.

For long races, we have

$$v_0 \ll a t$$

$$d \approx \frac{1}{2} a t^2$$

so the contribution from the uncertainty in a dominates. Thus, the answer is \boxed{A} .