等加速度直線運動

$$\begin{cases} v = v_0 + at & (1) \\ s = v_0 t + \frac{1}{2}at^2 & (2) \\ v^2 - v_0^2 = 2as & (3) \end{cases}$$

(3)式の誘導

(1)式より $t = \dfrac{v - v_0}{a}$

(2)式に代入

$$s = v_0\left(\frac{v - v_0}{a}\right) + \frac{1}{2}a\left(\frac{v - v_0}{a}\right)^2$$

$$= \frac{(v - v_0)(2v_0 + v - v_0)}{2a}$$

$$= \frac{v^2 - v_0^2}{2a}$$

$\therefore \quad v^2 - v_0^2 = 2as$