

$$1. (1) \quad \Delta x_i = \frac{1}{2} v_i \Delta t$$

$$\Delta x_j = \frac{1}{2} v_j \Delta t$$

$$\frac{\Delta x_i}{\Delta x_j} = \frac{v_i}{v_j}$$

$$\frac{v_i}{A_i} = \Delta t_{ij}$$

$$\frac{|\Delta x_i|}{|\Delta x_j|} \cdot \frac{v_j}{A_i} = \Delta t_{ij}$$

$$(2) \quad |\Delta x_j| = \frac{1}{2} (0 + v_j) \cdot t_{ij} \times 2 + v_j \cdot \Delta t_{ij}$$

$$|\Delta x_j| = v_j \cdot \Delta t_{ij} + v_j \cdot \Delta t_{ij}$$

$$\frac{|\Delta x_j|}{v_j} = \Delta t_{ij} + \Delta t_{ij}$$

$$\Delta t_{ij} = \frac{|\Delta x_j|}{v_j} - \Delta t_{ij}$$

2. (1) $\therefore$ 加速度图与x轴的面积即为速度在这段时间的变增量.

$\therefore$ 由加速度图像有: $\frac{1}{2} (t_1 - t_0) A_x = V_x$, 即 $t_1 - t_0 = 2 \frac{V_x}{A_x}$

$$(2) \text{ 由图像知, } a(t) = A_x - \frac{A_x}{\Delta t_1} \cdot t$$

$$\text{即 } \int_0^t a(t) dt = \int_0^t A_x - \frac{A_x}{\Delta t_1} \cdot t dt$$

$$v(t) = A_x \cdot t - \int_0^t \frac{A_x}{\Delta t_1} \cdot t dt = A_x \cdot t - \frac{A_x}{\Delta t_1} \cdot \frac{1}{2} t^2$$

$$\int_0^{t_1} v(t) dt = \int_0^{t_1} A_x \cdot t dt - \int_0^{t_1} \frac{A_x}{\Delta t_1} \cdot \frac{1}{2} t^2 dt$$

$$\Delta x = A_x \cdot \frac{1}{2} \Delta t_1^2 - \frac{A_x}{\Delta t_1} \times \frac{1}{2} \times \frac{1}{3} \Delta t_1^3$$

$$= \frac{1}{2} A_x \cdot \Delta t_1^2 - \frac{1}{6} A_x \cdot \Delta t_1^2 = \frac{1}{3} A_x \cdot \Delta t_1^2$$

$$|\Delta x| = 2 \Delta x_1 + V_x \cdot \Delta t_2$$

$$= 2 \times \frac{1}{3} A_x \cdot \Delta t_1^2 + V_x \cdot \Delta t_2 = \frac{2}{3} A_x \cdot \Delta t_1 \cdot \Delta t_1 + V_x \cdot \Delta t_2$$

$$= \frac{2}{3} \cdot 2 V_x \cdot \Delta t_1 + V_x \cdot \Delta t_2$$

$$\frac{|\Delta x|}{V_x} = \frac{4}{3} \Delta t_1 + \Delta t_2 \Rightarrow \Delta t_2 = \frac{|\Delta x|}{V_x} - \frac{4}{3} \Delta t_1$$