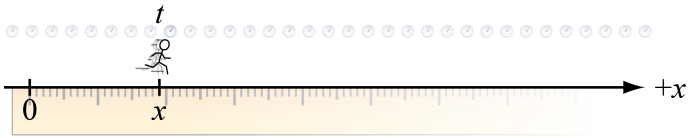
Describe 1-dimensional motion by labeling snapshots with times and positions

Frame of reference – placed meter stick(s) and fleet of synchronized clocks

Time t $[t] = \text{s}$

x-position x $[x] = \text{m}$



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x-displacement

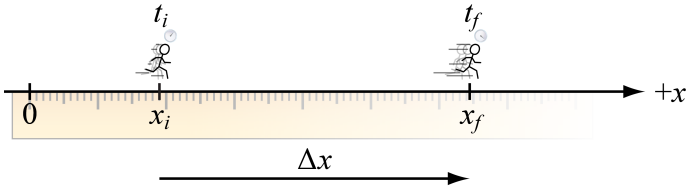
$$\Delta x := x_f - x_i$$

Distance

$$|\Delta x|$$

Until-now traveled path length

$$\ell := \Sigma_{\substack{\text{SEGMENTS} \\ \text{THUS FAR}}} |\Delta x_j|$$

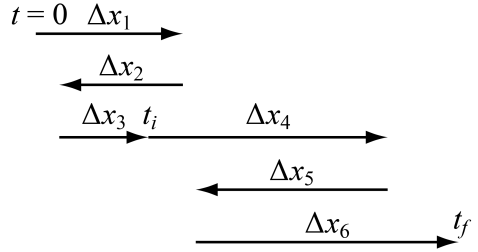


Average x-velocity

$$v_{x,\text{AVG}} := \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{t_f - t_i} \quad [v] = \frac{\text{m}}{\text{s}}$$

Average speed

$$v_{\text{AVG}} := \frac{\Delta \ell}{\Delta t}$$



Instantaneous x-velocity

$$v_x := \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t}$$

Instantaneous speed

$$v := |v_x|$$

UAM/Relationships

$$x_i + v_{x,\text{AVG}}\,\Delta t = x_f$$

Unmentioned

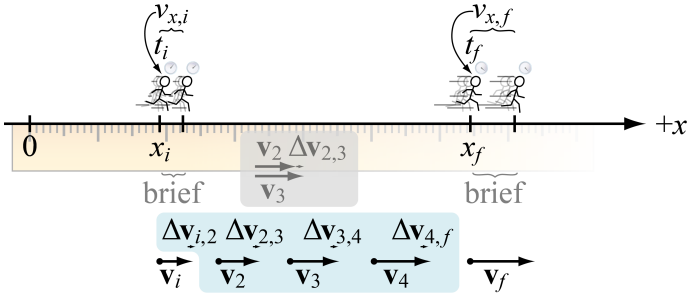
a

Average x-acceleration

$$a_{x,\text{AVG}} := \frac{\Delta v_x}{\Delta t} = \frac{v_{x,f} - v_{x,i}}{t_f - t_i} \quad [a] = \frac{\text{m}}{\text{s}^2}$$

Instantaneous x-acceleration

$$a_x := \lim_{\Delta t \to 0} \frac{\Delta v_x}{\Delta t}$$



$v_{x,i} + a_{x,\text{AVG}}\,\Delta t = v_{x,f}$	x
$v_{x,\text{AVG}} = \dfrac{v_{x,i} + v_{x,f}}{2}$	t, x, a
$x_i + v_{x,i}\Delta t + \dfrac{1}{2} a_x \Delta t^2 = x_f$	
$v_{x,i}^2 + 2a_x \Delta x = v_{x,f}^2$	t