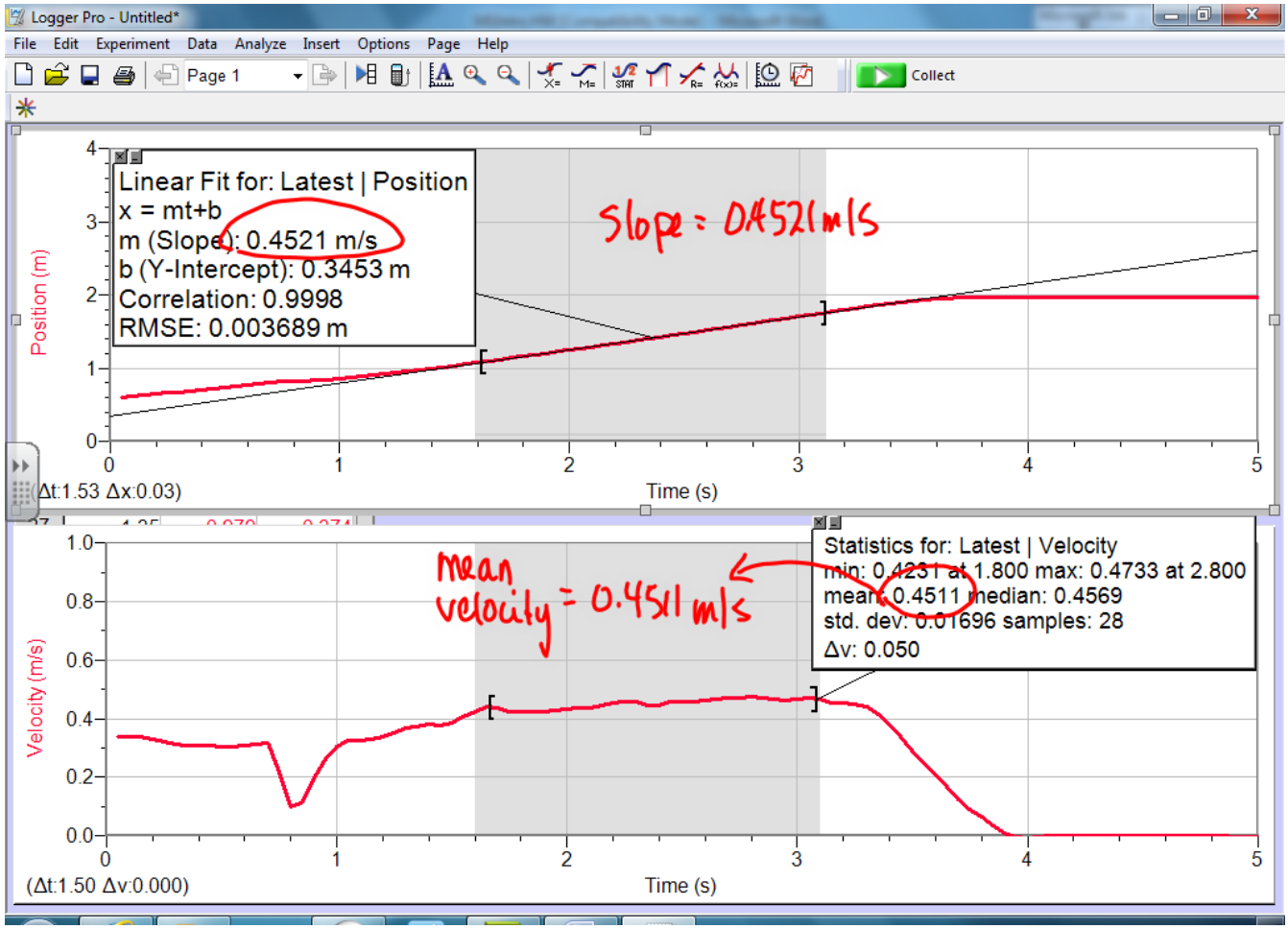

Logger Pro - Untitled*
File Edit Experiment Data Analyze Insert Options Page Help
Page 1
Collect
Linear Fit for: Latest | Position
x = mt+b
m (Slope): 0.4521 m/s
b (Y-Intercept): 0.3453 m
Correlation: 0.9998
RMSE: 0.003689 m
Slope = 0.4521 m/s
Position (m)
Time (s)
Δt:1.53 Δx:0.03)
Mean velocity = 0.4511 m/s
Statistics for: Latest | Velocity
min: 0.4231 at 1.800 max: 0.4733 at 2.800
mean: 0.4511 median: 0.4569
std. dev: 0.01696 samples: 28
Δv: 0.050
Velocity (m/s)
Time (s)
(Δt:1.50 Δv:0.000)

Motion Terms

Scalar - has only size (no direction) 25g, 3.2h, 150m

vector - has size + direction (magnitude) 2.5m/s [E], 150m [N 30° E]

position ($\vec{d}$) - where you are in relation to a reference point. (vector)

$\vec{d}$ = 5km [W]

distance (Δd) - how far you have travelled (scalar)

Δd = 115km

displacement ($\Delta \vec{d}$) - change in position; where you are now in relation to where you started. (vector)

$\Delta \vec{d}$ = 15km [E]

Speed (v) - the rate at which you cover the distance (scalar)

v = 100km/h

velocity ($\vec{v}$) - the rate at which your position changes (vetor)

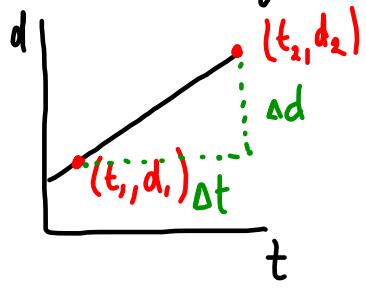
$\vec{v}$ = 25km/h [N]

Speed => use distance

Velocity => use displacement.

Velocity and Position-Time Graphs

Constant Velocity



$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

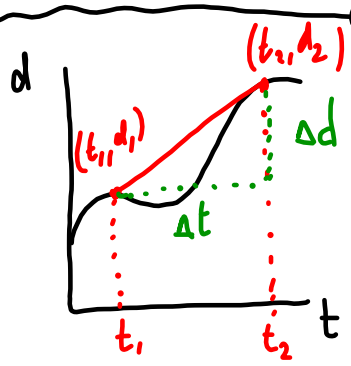
$$\text{slope} = \frac{\Delta d}{\Delta t}$$

from INV3: slope = velocity

$$\therefore \vec{v} = \frac{\Delta \vec{d}}{\Delta t} \quad \text{(velocity)}$$

$$v = \frac{\Delta d}{\Delta t} \quad \text{(speed)}$$

Non-Constant Velocity

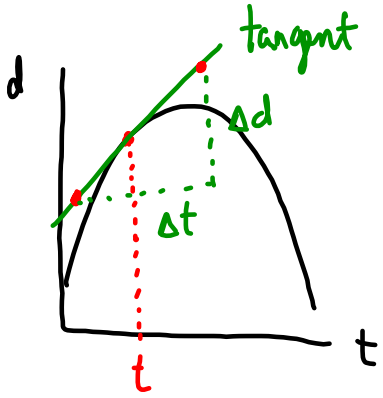


$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{Slope} = \frac{\Delta d}{\Delta t}$$

$$\vec{V}_{ave} = \frac{\Delta \vec{d}}{\Delta t}$$

Average velocity is the slope between two points on a d-t graph



$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{Slope} = \frac{\Delta d}{\Delta t}$$

$$\vec{V}_{inst} = \frac{\Delta \vec{d}}{\Delta t}$$

Instantaneous velocity is the slope of the tangent drawn at time t.

The velocity equation:

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$$

speed

$$v = \frac{\Delta d}{\Delta t}$$

Solve for $\Delta \vec{d}$:

$$\Delta \vec{d} = \vec{v}\,\Delta t$$

Solve for Δt:

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$$

$$\frac{\vec{v}\,\Delta t}{\vec{v}} = \frac{\Delta \vec{d}}{\vec{v}}$$

$$\Delta t = \frac{\Delta \vec{d}}{\vec{v}}$$