

PHY138 - Mechanics - Class 4 - Sept 20/06

von Neumann: father of
computer science.

CHAPTER 2

§2.1 - 1-dimension done it

§2.2 - Uniform Motion

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t} = 0$$

1 dimension' generic direction s .

$$v_s = \frac{\Delta s}{\Delta t}$$

§2.3 - Instantaneous Velocity

$$v_{s, \text{avg}} = \frac{\Delta s}{\Delta t}$$

$$v_{s, \text{inst}} = \lim_{\Delta t \rightarrow 0} \frac{\Delta s}{\Delta t} = \frac{ds}{dt}$$

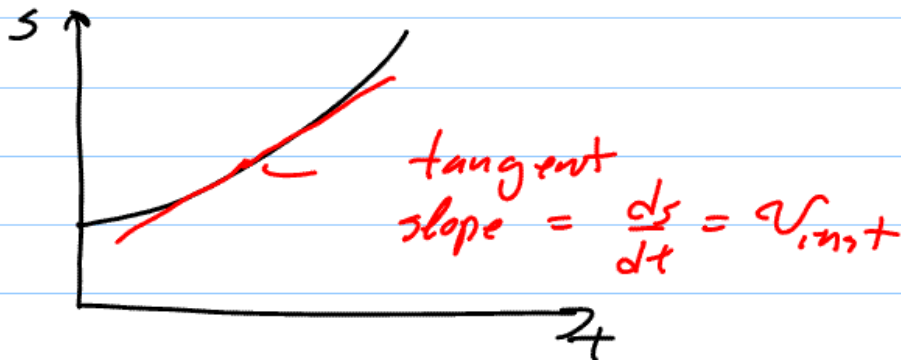
- slope of tangent on
s-t graph.

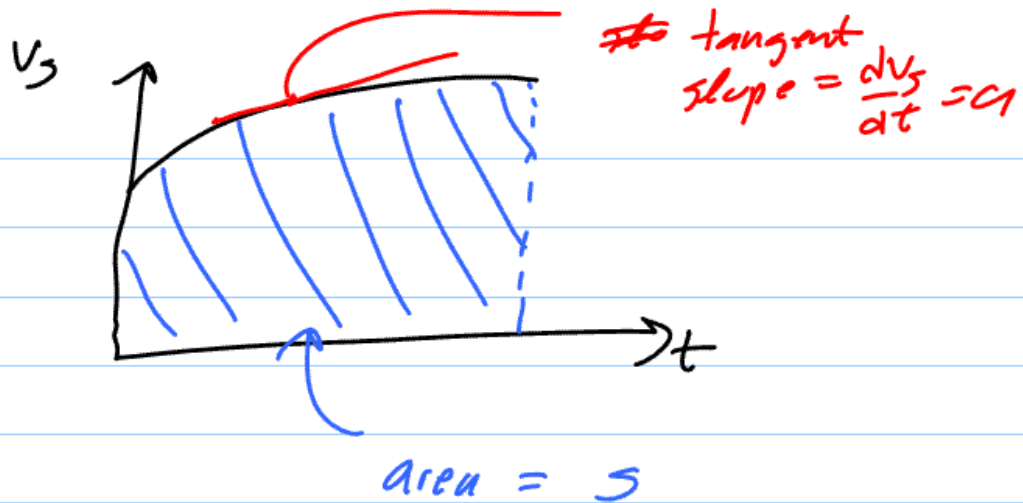
Direct measurement of v_{avg}

World is continuous.

Math - talk - distance must
differentiable everywhere

{ §2.4 - Posⁿ from Velocity }
{ §2.5 - Const. Accel }





Subsection "A Little More Cal'culus!
 Integrals"

OMITTED

Finding area under curves

Integration! Language

{ §2.5 - Const Accel }
 { §2.6 - Free Fall }

$$a_s = \text{const}$$

$$v_{s,t} = v_{s,i} + a_s t$$

$$s_f = s_i + v_{s,i} t + \frac{1}{2} a_s t^2$$

Free Fall



$$a_y = -g$$

$$= -9.80 \text{ m/s}^2$$

§2.7 - Inclined Plane



frictionless

Use radian measure.

$a_s = f(\theta)$ - continuous

simplest function $a = g \sin(\theta)$

Brief review of Vectors

Useful notation: \hat{i} , \hat{j} , \hat{k}
 x y z

"hat" $\hat{\quad}$ \equiv vector of length 1