Properties of fluids

1. Density (ρ) $\left[\frac{m}{\forall}\right]$, $\left[\frac{m}{L^3}\right]$, $\left[\frac{kg}{m^3}\right]$

2. Spesific Volume (v)

3. Specific Weight (γ)

$$\gamma = \frac{mg}{V} = \rho g$$

(SI) $\frac{\text{force}}{\text{Volume}} = \left[\frac{m}{L^3}\frac{L}{T^2}\right] = \frac{N}{m^3}$

4. Specific Gravity (S)

$$S = \frac{\gamma_{fluid}}{\gamma_{water}} = \frac{\rho_{fluid}}{\rho_{water}}$$

5. Viscosity

- Internal Resistance to flow

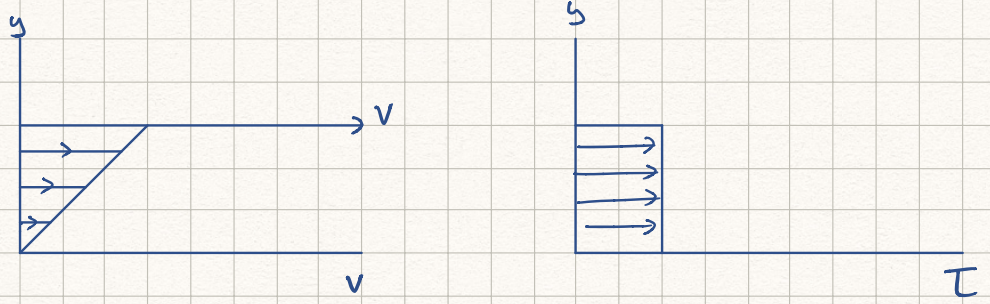
$\begin{cases} \mu \\ \nu \end{cases}$

$\mu = \rho\nu$

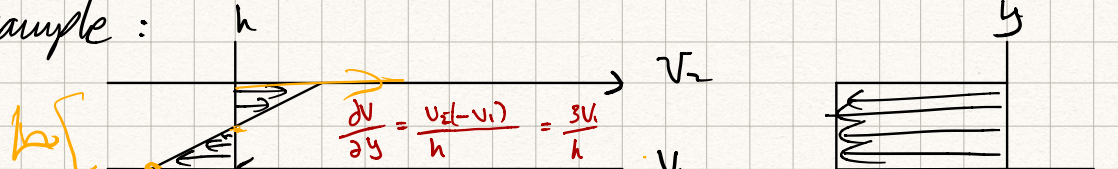
μ: Dynamic, ν: Kinematic

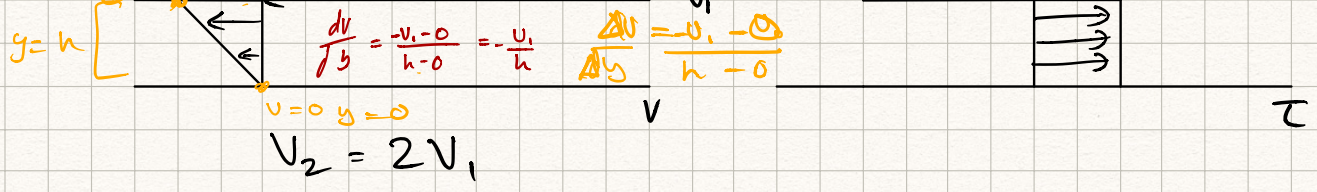
$\tau = \frac{F}{A} \Rightarrow \tau = \mu\left(\frac{dv}{dy}\right)$

(τ: Shear force)



Example:




y = h
$\frac{dv}{dy} = \frac{-v_1 - 0}{h - 0} = -\frac{v_1}{h}$
$\frac{\Delta v}{\Delta y} = \frac{-v_1 - 0}{h - 0}$
v = 0 y = 0
v
τ

$V_2 = 2V_1$