

Review 10-1-08

Bernoulli's Equation

$$P + \rho g y + \frac{1}{2} \rho v^2 = \text{const}$$

We derived two ways
Balancing forces
Energy conservation

Magnus Effect

$$N_A = 6.02 \times 10^{23} \quad \text{Avogadro's \#}$$

$$\text{mol} = N_A \text{ atoms}$$

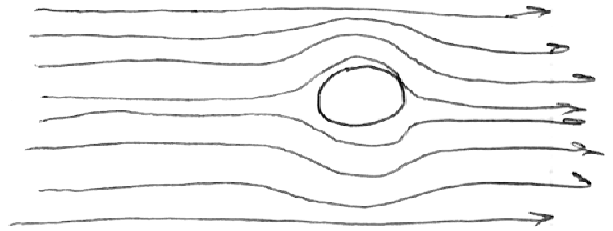
$$n_{\text{mol}} = \frac{N}{N_A}$$

Magnus Effect Gustav Magnus, 1850s

Spinning Object like a baseball

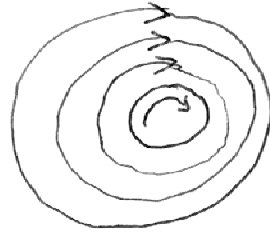
Fluid flow around
not rotating

no force everything
symmetric

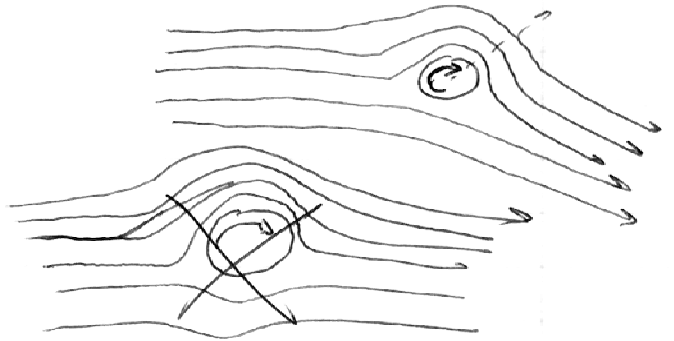


Spinning ball

Will tend to drag
the air with it



Fluid flow
around
spinning ball



There are frictional losses at the boundary so on top air pulled along, as the ball rotates. Eventually the air separates from the ball. On the bottom the separation occurs earlier. Thus the air flows ~~on top~~ and is deviated.