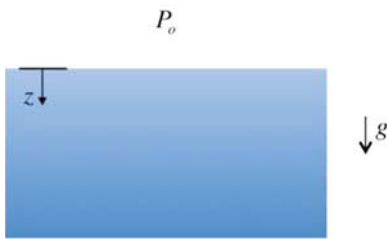


## Fluid statics

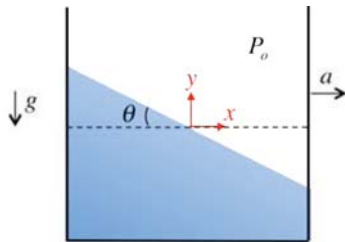


$$-\nabla P + \rho \bar{g} = \rho \bar{a}$$

with gravity,  $\bar{g} = g\hat{k}$  & no acceleration

$$P(z) = P_o + \rho gz$$

## Acceleration



with gravity,  $\bar{g} = -g\hat{j}$  & an acceleration,  $\bar{a} = a\hat{i}$

$$P(x, y) = -\rho ax - \rho gy + P_o$$

$$\tan \theta = \frac{a}{g}$$

## Buoyancy

$$F_B = \rho g V$$

where  $\rho$  is the density of a displaced liquid, and  $V$  is the volume of a displaced liquid.

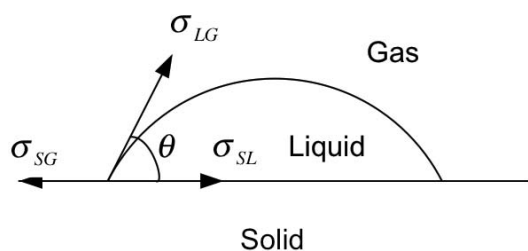
## Surface Tension

Young-Laplace equation

For a curved liquid-air interface, defined by two radii of curvature,  $R_1$  &  $R_2$

$$P_i - P_o = \sigma \left( \frac{1}{R_1} + \frac{1}{R_2} \right)$$

## Contact angle, $\theta$



$$\cos \theta = \frac{\sigma_{SG} - \sigma_{SL}}{\sigma_{LG}}$$

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2.06 Fluid Dynamics  
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