I FLUIDI

	FORMA PROPRIA	VOLUME PROPRIO	
→ liquidi	NO	SI	→ densità
gas	NO	NO	

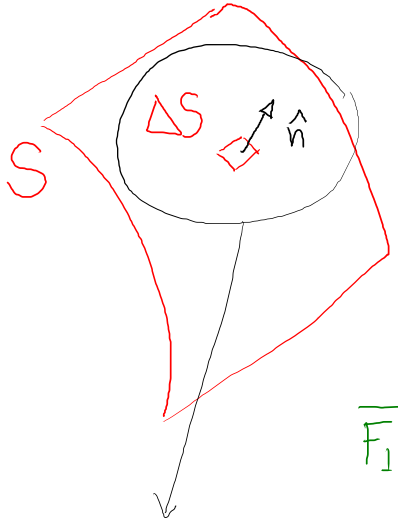
Densità $\rho = \frac{m}{V}$

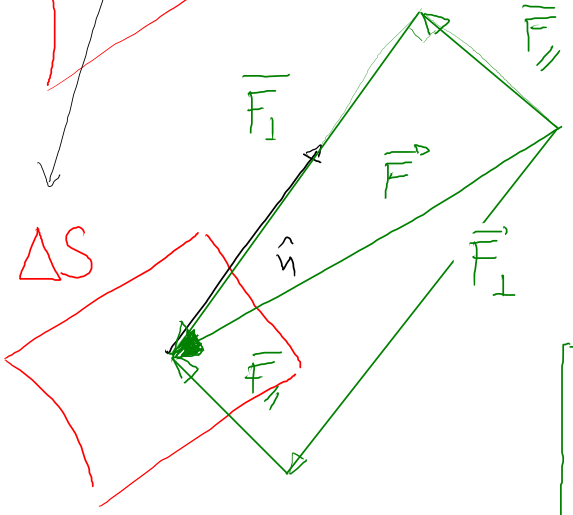
$\rho_{H_2O} = 1000 \frac{kg}{m^3}$

$= 1 \frac{g}{cm^3}$

$\rho_{aria} \cong 1 \frac{kg}{m^3}$

PRESSIONE





$\hat{n}$ è versore $\perp$ a ΔS

$$\vec{\Delta S} = \Delta S \cdot \hat{n}$$

$$\vec{F} = \vec{F}_{\perp} + \vec{F}_{\parallel}$$

$$F_n = |\vec{F}_{\perp}|$$

$$p = \frac{F_n}{\Delta S}$$

p è scalare

$$[p] = \frac{N}{m^2} = Pa$$

$1\ Pa = 1\ \frac{N}{m^2}$ SI

barìa

$1\ Pa = 1\ \frac{N}{m^2} = \frac{10^5\ dyne}{(10^2\ cm)^2} = \frac{10^5\ dyne}{10^4\ cm^2} = 10\ \frac{dyne}{cm^2}$

cgs $1\ Pa = 10$ barie

1 barìa $= 0,1\ Pa$

$1\ atm = 101\,300\ Pa = 760\ mm\,Hg = 760$ Torr

$1\ bar = 10^5\ Pa = 10^6$ barie $\cong 1\ atm$

$1\ mbar = 10^{-3}\ bar$

psi

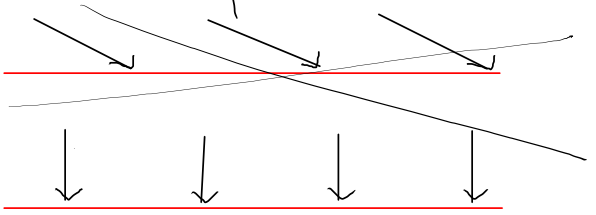
FLUIDOSTATICA

"ogni volumetto di fluido è in equilibrio"

- sulla superficie limite di un liquido

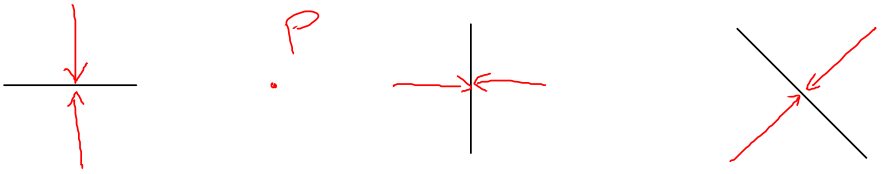
  NO forze tangenti

  SOLO forze normali

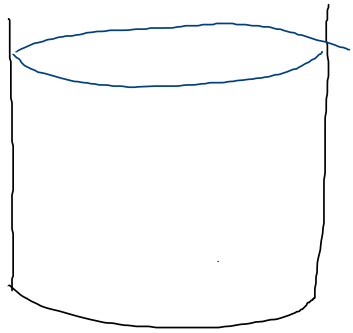


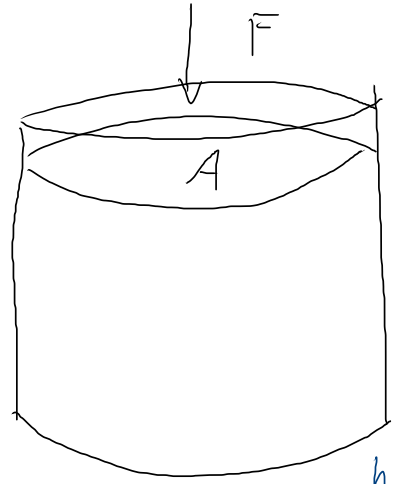
- principio di isotropia della pressione

  ⇒ valore della pressione in un punto P



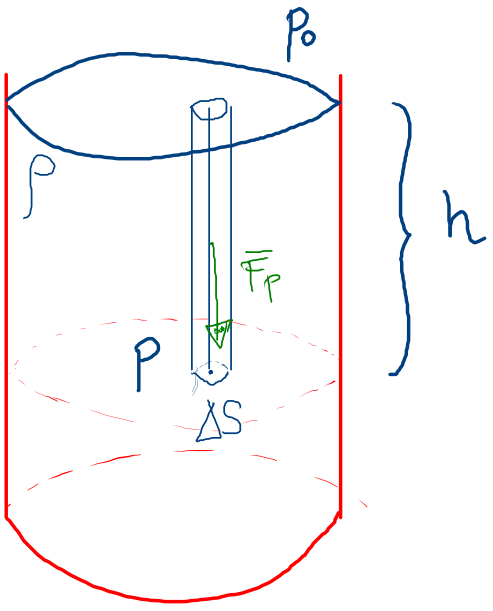
- principio di Pascal
  una variazione di pressione sulla superficie limite di un fluido chiuso si trasmette inalterata in ogni punto del fluido





$$\Delta p = \frac{F}{A}$$

LEGGE DI STEVINO



$$V = \Delta S \cdot h$$

$$m = \rho V = \rho \Delta S h$$

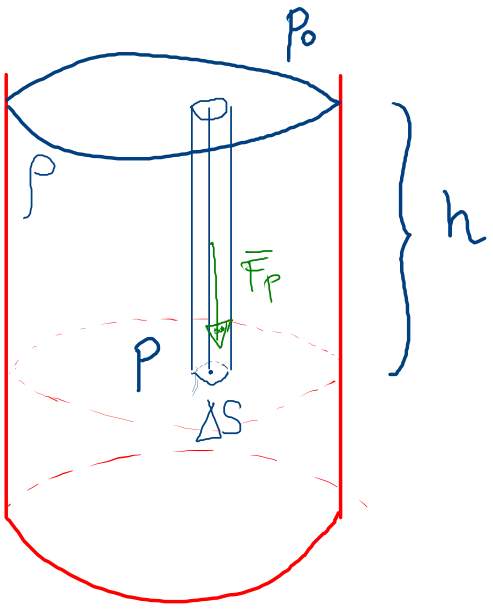
$$\vec{F}_p = m\vec{g} = \rho \Delta S \cdot h \vec{g}$$

$$p = p_0 + \frac{F_p}{\Delta S}$$

$$= p_0 + \frac{\rho \Delta S \cdot h g}{\Delta S}$$

$$\boxed{p = p_0 + \rho g h}$$

LEGGE DI STEVINO



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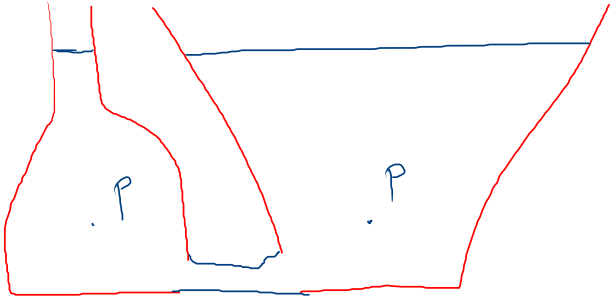
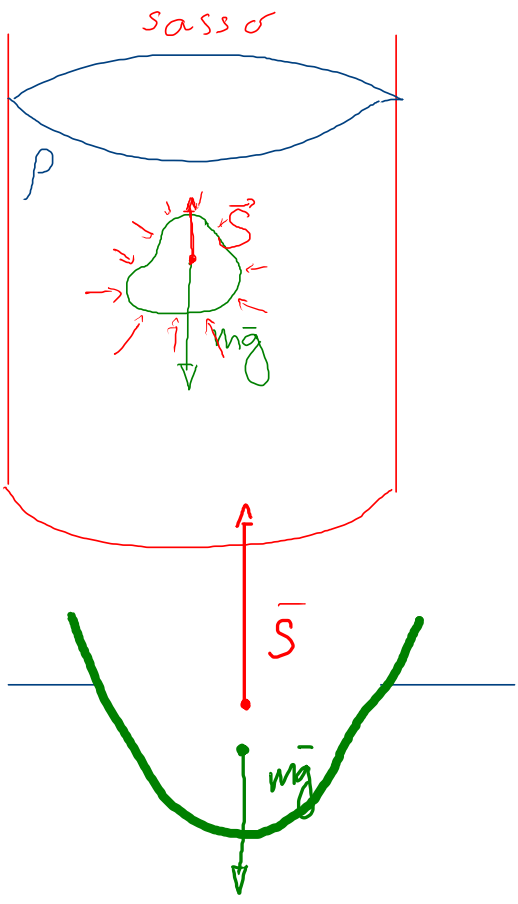
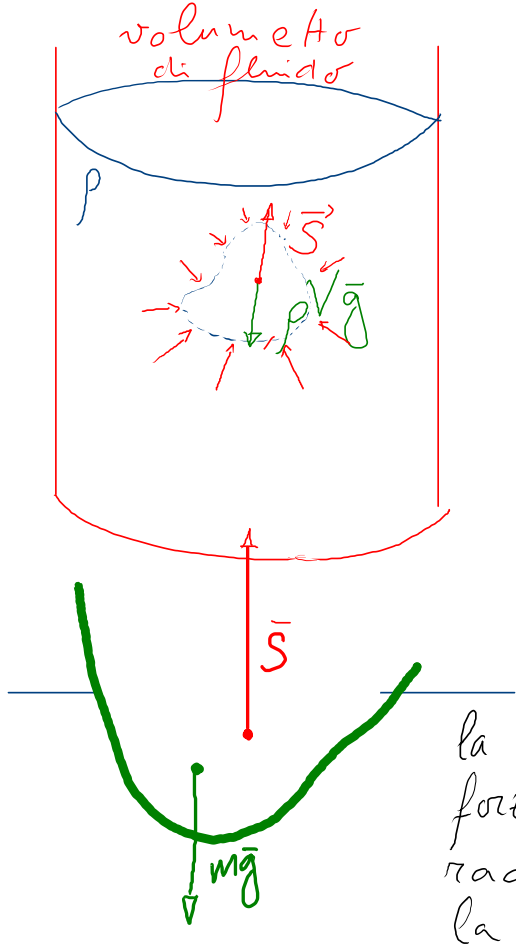


paradosso idrostatico

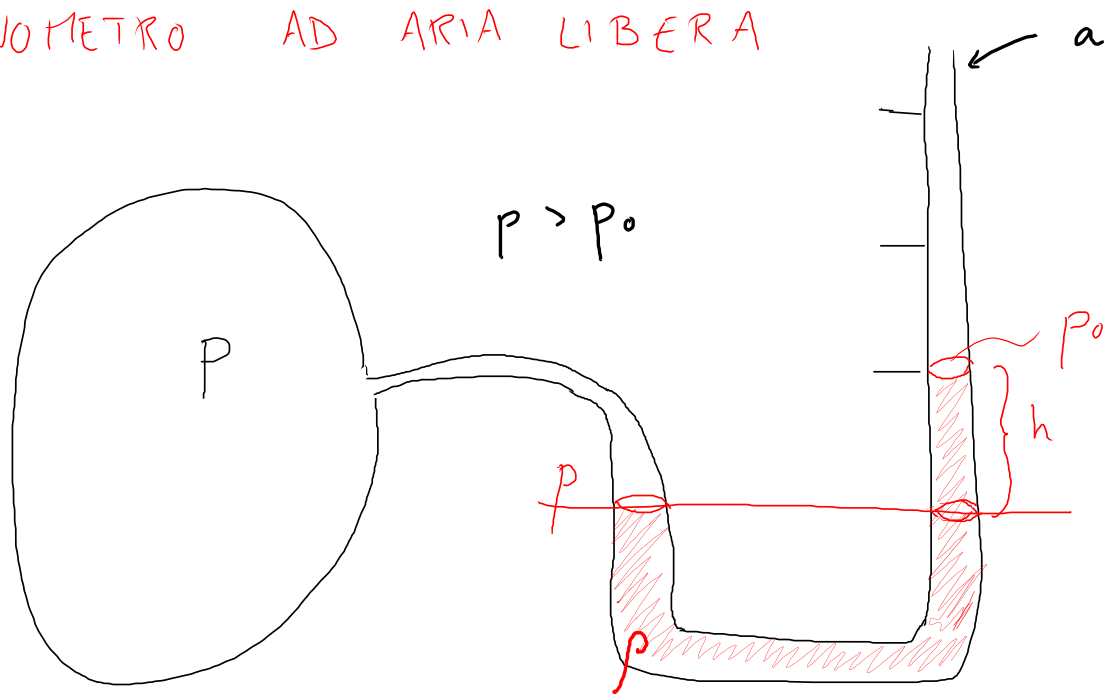
PRINCIPIO DI ARCHIMEDE





la coppia di forze tende a raddrizzare la nave

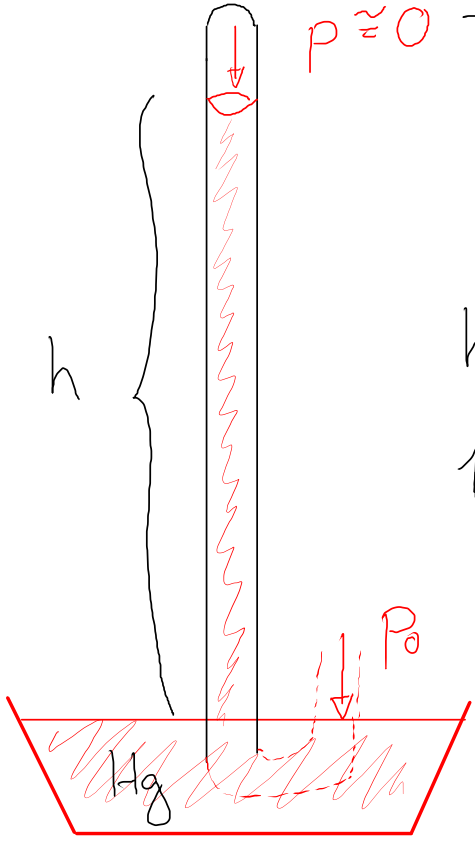
MANOMETRO AD ARIA LIBERA



$\rho = 13{,}5 \frac{g}{cm^3}$

$P = p_0 + \rho g h$

ESPERIENZA DI TORRICELLI

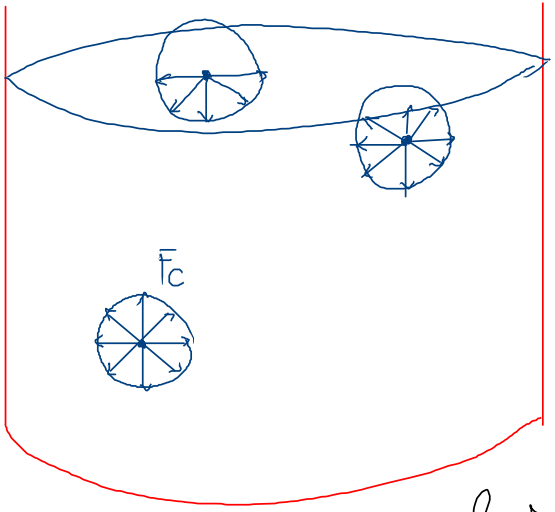


$p \simeq 0$ (sin) → (dx) $0 + \rho g h = p_0$

$h = 760$ mm

1 atm = 760 mm Hg

TENSIONE SUPERFICIALE



le molecole superficiali sono soggette ad una forza di richiamo

F_C forze di coesione

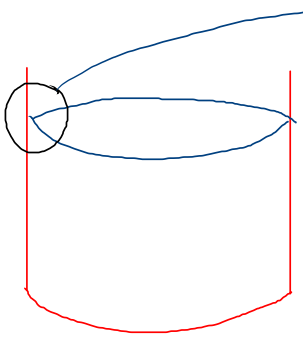
$$\tau = \frac{\mathcal{L}}{\Delta S}$$

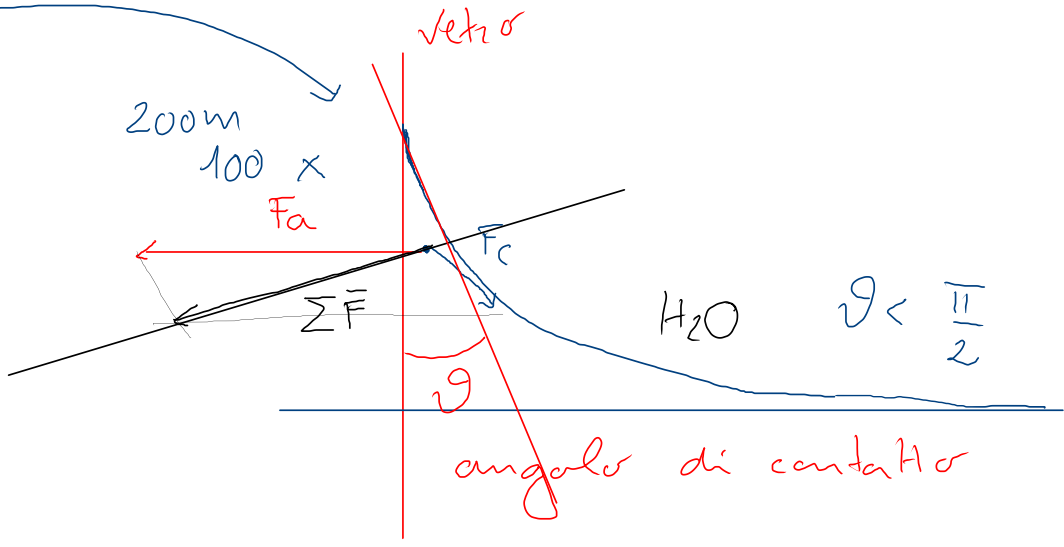
$\mathcal{L}$ ← lavoro necessario a tale aumento ΔS

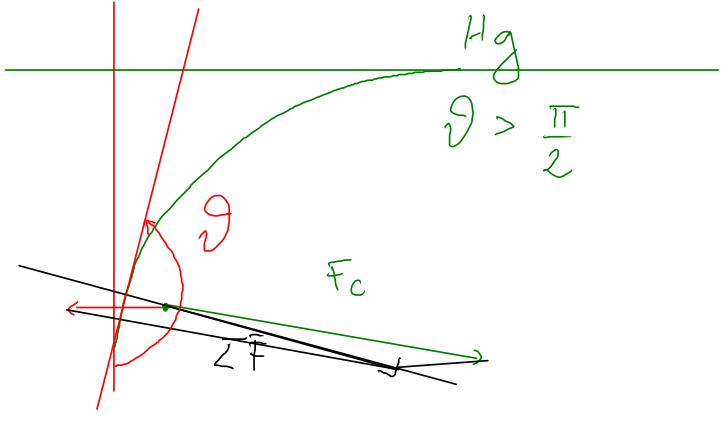
ΔS ← aumento della superficie libera

$$[\tau] = \frac{[\mathcal{L}]}{[\Delta S]} = \frac{J}{m^2} = \frac{N \cdot m}{m^2} = \frac{N}{m}$$

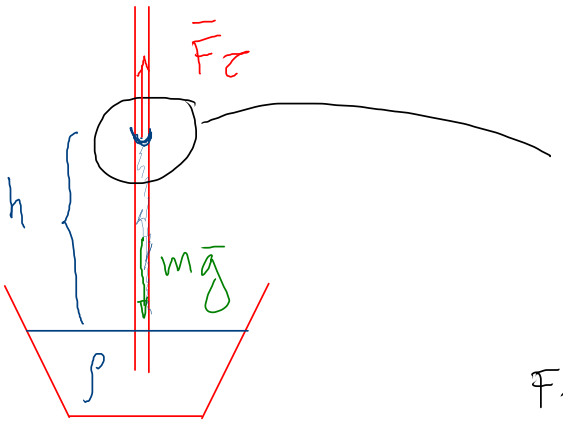
FORZE DI COESIONE / ADESIONE

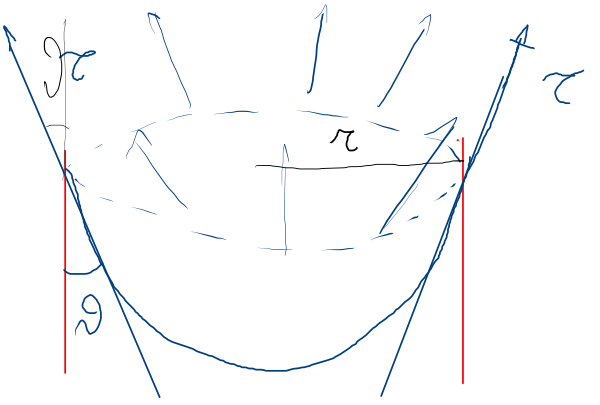






CAPILLARI





$$F_\tau = \tau \cdot 2\pi r \cos\vartheta$$

$$mg = \rho V g = \pi r^2 h \rho g$$

$$F_\tau = mg$$

$$\tau 2\pi r \cos\vartheta = \pi r^2 h \rho g$$

$$h = \frac{2}{r} \frac{\tau \cos\vartheta}{\rho g}$$

Legge di Jurin