

P3 Ecuaciones que gobiernan el sistema

$$P_{\text{inicial}} (V_{\text{inicial}})^k = P_{\text{final}} (V_{\text{final}})^k \quad (1)$$

$$V_{\text{inicial}} = 2 \cdot \left[\frac{4}{3} \pi R_0^3 \right] \quad (2)$$

$$V_{\text{final}} = \frac{4}{3} \pi R_1^3 \quad (3)$$

$$\text{Burbuja inicial : } P_{\text{inicial}} - P_{\text{atm}} = \frac{4\gamma}{R_0}$$

$$\text{Burbuja final : } P_{\text{final}} - P_{\text{atm}} = \frac{4\gamma}{R_1}$$

$$\Rightarrow P_{\text{inicial}} = \frac{4\gamma}{R_0} + P_{\text{atm}} ; P_{\text{final}} = \frac{4\gamma}{R_1} + P_{\text{atm}} \quad (4)$$

Uniendo todo en (1):

$$\left(\frac{4\gamma}{R_0} + P_{\text{atm}} \right) \cdot \left[\frac{4}{3} \pi R_0^3 \right]^k = \left(\frac{4\gamma}{R_1} + P_{\text{atm}} \right) \left[\frac{4}{3} \pi R_1^3 \right]^k$$

$$\frac{\frac{4\gamma}{R_0} + P_{\text{atm}}}{\frac{4\gamma}{R_1} + P_{\text{atm}}} = \left[\frac{1}{2} \left(\frac{R_1}{R_0} \right)^3 \right]^k$$

$$\frac{\frac{4\gamma}{P_{\text{atm}} R_0} + 1}{\frac{4\gamma}{P_{\text{atm}} R_1} + 1} = \left[\frac{1}{2} \left(\frac{R_1}{R_0} \right)^3 \right]^k$$