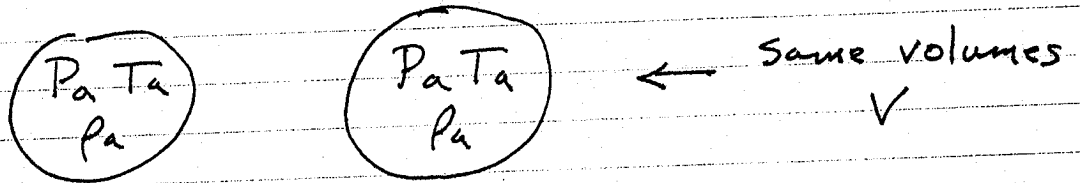
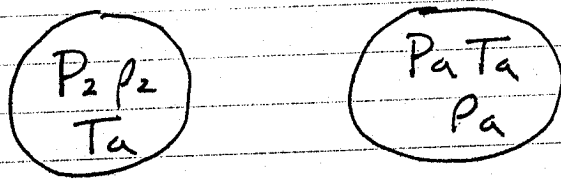


5\*

initial state



pump left tank isothermally to



$$\frac{P_2}{P_a} = \frac{\cancel{\rho_2 R T_2}}{\cancel{\rho_a R T_a}} = \frac{\rho_2}{\rho_a}$$

$$\rho_2 = \rho_a \frac{P_2}{P_a}$$

after opening connecting line get isentropic compression / decompression, i.e.

$$\frac{P_f}{P_i} = \left( \frac{\rho_f}{\rho_i} \right)^{\gamma} \quad \frac{P_f}{P_i} = \left( \frac{T_f}{T_i} \right)^{\frac{\gamma}{\gamma-1}}$$