Saint Venant-Wantzel

- $h_0 = h + \dfrac{1}{2}u^2, \quad c_p T_0 = c_p T + \dfrac{1}{2}u^2$

$\Rightarrow$

$$\dfrac{T_0}{T} = 1 + \dfrac{u^2}{2c_p T} = 1 + \dfrac{u^2(\gamma - 1)}{2\gamma R T} = 1 + \dfrac{\gamma - 1}{2}M^2$$

- $\dfrac{p_0}{p} = \left(\dfrac{T_0}{T}\right)^{\gamma/(\gamma-1)} = \left[1 + \dfrac{\gamma - 1}{2}M^2\right]^{\gamma/(\gamma-1)}$

- $\dfrac{\rho_0}{\rho} = \left(\dfrac{T_0}{T}\right)^{1/(\gamma-1)} = \left[1 + \dfrac{\gamma - 1}{2}M^2\right]^{1/(\gamma-1)}$

- $\dfrac{T_0}{T_\star} = \dfrac{\gamma + 1}{2}$

- $\dfrac{p_0}{p_\star} = \left[\dfrac{\gamma + 1}{2}\right]^{\gamma/(\gamma-1)}$

- $\dfrac{\rho_0}{\rho_\star} = \left[\dfrac{\gamma + 1}{2}\right]^{1/(\gamma-1)}$