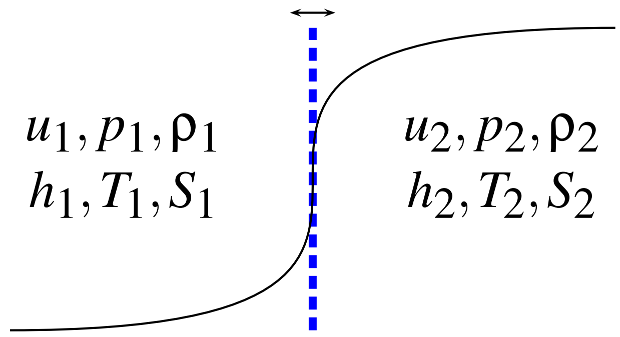
Normal shock



$$[\rho(\mathbf{u}-\tilde{\mathbf{v}})\cdot\tilde{\mathbf{n}}] = 0$$

$$\left[\left\{\rho\mathbf{u}(\mathbf{u}-\tilde{\mathbf{v}})-\boldsymbol{\tau}\right\}\cdot\tilde{\mathbf{n}}\right] = \mathbf{t}^{\sigma}$$

$$\left[\left\{\rho\left(e+\frac{1}{2}u^2\right)(\mathbf{u}-\tilde{\mathbf{v}})-\mathbf{u}\cdot\boldsymbol{\tau}+\mathbf{q}\right\}\cdot\tilde{\mathbf{n}}\right] = \mathbf{t}^{\sigma}\cdot\tilde{\mathbf{v}}$$

$$3\rho_1 u_1 = \rho_2 u_2$$

$$p_1+\rho_1 u_1^2 = p_2+\rho_2 u_2^2$$

$$\rho_1 u_1\left(e_1+\frac{p_1}{\rho_1}+\frac{1}{2}u_1^2\right) = \rho_2 u_2\left(e_2+\frac{p_2}{\rho_2}+\frac{1}{2}u_2^2\right)$$

$$M_2^2 = \frac{(\gamma-1)M_1^2+2}{2\gamma M_1^2+1-\gamma}$$

$$\frac{p_2}{p_1} = 1+\frac{2\gamma}{\gamma+1}(M_1^2-1)$$

$$\frac{\rho_2}{\rho_1} = \frac{u_1}{u_2} = \frac{(\gamma+1)M_1^2}{(\gamma-1)M_1^2+2}$$

$$\frac{T_2}{T_1} = 1+2\frac{(\gamma-1)}{(\gamma+1)^2}\frac{(\gamma M_1^2+1)}{M_1^2}(M_1^2-1)$$