$$dp + \varrho V dV = 0$$

$$p + \frac{\varrho}{2}V^2 = \text{constant} = p_o$$

$$q = \frac{\varrho}{2}V^2$$

$$\frac{\Gamma}{2\pi} \equiv v_\theta r = \text{constant}$$

$$l = \varrho V_\infty \Gamma \qquad C_l = \frac{l}{q_\infty c}$$

$$\frac{dC_l}{d\alpha} \equiv C_{l_\alpha} \equiv m$$

$$C_l = 2\pi(\alpha - \alpha_{l_o})$$

$$C_x = \frac{f_z}{qc} = \oint C_p d\left(\frac{z}{c}\right)$$

$$C_z = \frac{f_x}{qc} = -\oint C_p d\left(\frac{x}{c}\right)$$

where $C_p = \dfrac{p - p_\infty}{qc}$

$$C_{m_{le}} \simeq \oint C_p \frac{x}{c} d\left(\frac{x}{c}\right)$$

$$C_{m_{ac}} = C_{m_{le}} + \frac{x_{ac}}{c} C_l \qquad C_m = \frac{m}{q_\infty c^2}$$

$$C_{m_{le}} = C_{m_{ac}} - \frac{x_{ac}}{c} C_l$$

$$C_l = C_z \cos\alpha - C_x \sin\alpha \simeq C_z$$

$$C_d = C_z \sin\alpha + C_x \cos\alpha \simeq C_z\alpha + C_x$$

$$\frac{l}{l_o} = \frac{C_l c_o}{C_{l_o} c_o} = \left[1 - \left(\frac{2y}{b}\right)^2\right]^{\frac{1}{2}}$$

$$\frac{w}{V_\infty} = \alpha_i = \frac{w_\infty}{2V_\infty} = \frac{C_L}{\pi AR} \text{ for small } \alpha_i$$

$$\alpha_{eff} = \alpha - \alpha_i \qquad \alpha_i = \frac{C_L}{\pi AR} = \frac{w}{V_\infty}$$

$$C_L \equiv \frac{L}{qS} = \frac{1}{S}\int_{-\frac{b}{2}}^{+\frac{b}{2}} C_l c dy$$

$$C_{D_i} = \frac{C_L^2}{\pi AR}$$

$$C_D = C_{D_p} + C_{D_i}$$

$$m = \frac{m_o}{1 + m_o/(\pi AR)}$$

$$m = \frac{m_o}{1 + \dfrac{m_o}{\pi\, eAR}}$$