Define $c, \alpha, V_\infty, \rho_\infty$

get θ from

$$x = \frac{1}{2} c (1 - \cos\theta)$$

get local vorticity

$$\gamma(\theta) = 2\alpha V_\infty \frac{1+\cos\theta}{\sin\theta}$$

w/ BC: $\gamma(0) = 0$ LE

$\gamma(\pi) = 0$ TE

lift:

$$L' = \rho V_\infty \int_0^c \gamma \cdot \frac{1}{2} c \sin\theta \, d\theta$$

$$C_\ell = \frac{L'}{\frac{1}{2}\rho V_\infty^2 c}$$

check: $C_\ell(\alpha = 0) = 2\pi$

moment:

$$M'_{LE} = -\rho V_\infty \int_0^c \gamma \, x \, dx$$

check: $C_{m_{LE}}(\alpha = 0) = -\frac{\pi}{2}$

$$C_{m_{LE}} = \frac{M'_{LE}}{q_\infty c^2}$$

pressure:

$$\Delta C_p = \frac{\rho V_\infty \gamma(\theta)}{q_\infty}$$