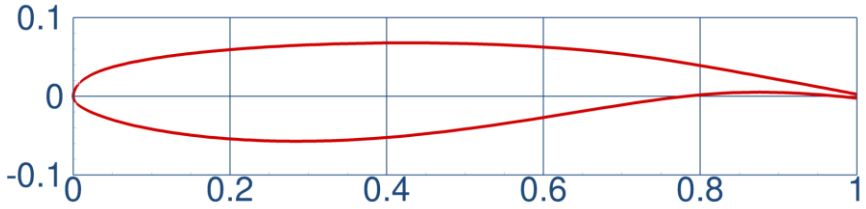
Test Case 1c: ONERA OAT15A Airfoil

- **Verification of steady CFD analysis, required**
- **Settings**
  - Steady CFD RANS **French Vanilla SA-[neg] (All terms!)**
    - Adiabatic Wall (not isothermal)
    - Characteristic Farfield (***1000 chords away***)
    - Use periodic boundary conditions for sidewall boundary conditions
  - Converge residuals to machine precision (~1e-10)
- **Grids**
  - Six-member grid family; four are required, six are desirable
  - Encourage use of committee-supplied grids; user-generated grids are acceptable
- **Conditions**

Jaquin, et al. "Experimental Study of Shock Oscillation over a Transonic Supercritical Profiles." AIAA Journal, Vol. 47, No. 9, 2009. Pages 1985-1994.



ONERA OAT15A Transonic Airfoil

Mach	Re_c	T_{static}	α	γ	Pr	Pr_t	Farfield $\chi = \tilde{\nu}/\nu$
0.73	3×10^6	271 K (487.8 R)	1.5°	1.4	0.72	0.9	3

- **Sutherland's Law**

$$\mu(T) = \mu_0 \left(\frac{T}{T_0}\right)^{3/2} \left(\frac{T_0 + S}{T + S}\right) \quad \mu_0 = 1.716 \times 10^{-5} \frac{\text{kg}}{m\,s} \quad T_0 = 491.6°\ R \quad S = 198.6°\ R$$

$$\frac{\mu(T)}{\mu_{ref}} = \left(\frac{T}{T_{ref}}\right)^{3/2} \left(\frac{1 + S/T_{fef}}{T/T_{fef} + S/T_{fef}}\right)$$