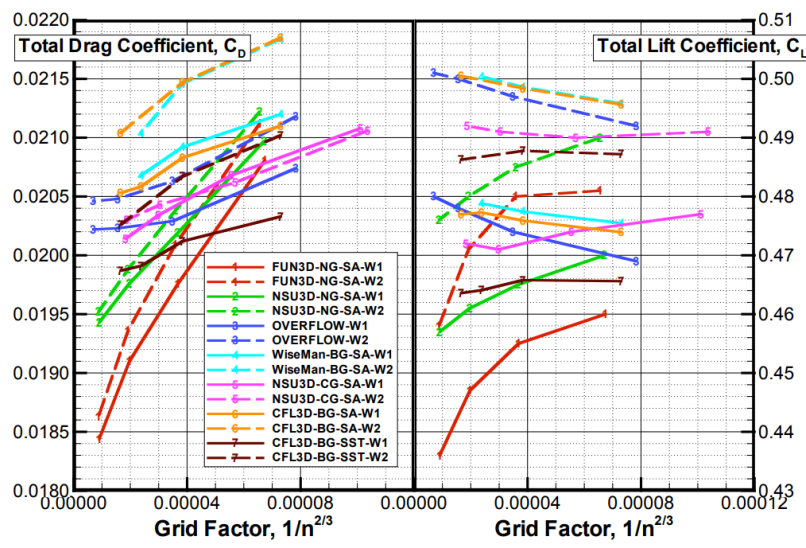


Test Case 3a: DPW-III W1 & W2 (20 years later)



- Grid Convergence Verification of steady CFD analysis
- Settings
 - Steady CFD RANS **French Vanilla SA-[neg]** (All terms!)
 - Adiabatic Wall (not isothermal)
 - Converge residuals to machine precision (~1e-10)
- Grids: https://dpw.larc.nasa.gov/DPW8/Scatter/Test_Case_3
 - DPW-III W1 wing-only geometry (with symmetry plane)
 - (L1:Tiny/L2:Coarse/L3:Medium/L4:Fine/L5:eXtra-fine/L6:Ultra-fine)
 - Six-member grid family; four are required, six are desirable
 - Encourage use of committee-supplied grids; user-generated grids are acceptable



<https://www.aiaa-dpw.org/Workshop3/presentations/S9-Zickhur-Case2-Summary.pdf>

Reference Units

Sref (semi-span grid)	Cref	Semispan	Moment Center
225.0 sq.in	7.7778 in	30.0 in	(6.0726, 0.0, 0.0)

Conditions

Mach	Re _c	α	T _{static} (120.33° F)	γ	Pr	Pr _t	Farfield χ = ν̃/ν
0.76	5 × 10 ⁶	0.50°	580.0 R 322.22 K	1.4	0.72	0.90	3

Sutherland's Law

$$\mu(T) = \mu_0 \left(\frac{T}{T_0}\right)^{3/2} \left(\frac{T_0 + S}{T + S}\right)$$

$\mu_0 = 1.716 \times 10^{-5} \frac{\text{kg}}{\text{m s}}$ $T_0 = 491.6^\circ \text{ R}$ $S = 198.6^\circ \text{ R}$

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