GMGW 2.5 Presentation Template

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Problem Summary

A one slide intro, for people in the audience who are attending part of the session, but not all. Jim Masters, who is up first, will give a somewhat more in-depth description to get things going.

Flow Solver Characteristics

One or more slides, but this should be a summary of information that's already published about your solver

- Unstructured
- High-order (up to 4)
- Finite-volume with least-squares reconstruction
- Roe's Scheme for inviscid fluxes
- Etc, etc....

References as footnotes would be ideal.

Mesh Generation Approach

One or more slides with a summary of information that's already published about your mesh generator

- Advancing layer
- Merges edges in the front when aspect ratio reaches 1
- Continues to advance layers to far field.
- Etc, etc....

References as footnotes would be ideal.

Mesh Generation Approach

- One or more slides: specific parameter choices made, and why.
- For adaptive codes, this includes things like the error measure used, choices made in metric processing, adaptation parameters, etc.
- Essentially, all the special sauce that went into creating these meshes.

Turbulence Model Verification: Airfoil Near-Wake Verification Case

- https://turbmodels.larc.nasa.gov/airfoilwakeverif500c.html
- Note: this is a solver test, not a meshing test. Use the meshes provided @ TMR
- CFL3D and FUN3D data is available.
- Compare convergence of C_L, $C_{D,p}$, $C_{D,v}$, and min u/u_{ref} at x/c=1.01 and 1.80.

Wall-Normal Spacing

Single plot of Δy for the first cell, for both the top and bottom surfaces of all elements.

Chordwise Spacing

Single plot of Δs, for both the top and bottom surfaces of all elements.

Stretching Ratio

Field plot of size ratio. Definition:

$$r_i = \max_{\text{neighbors}} \left(\frac{A_i}{\min_n A_n}, \frac{\max_n A_n}{A_i} \right)$$

Convergence of Aerodynamic Coefficients with Refinement

At this angle of attack, a convergence study is specifically requested. Plot C_L, C_D, and C_M as functions of $1/N$.

Surface Pressure Coefficient

Top and bottom, all elements. Ideally, showing grid convergence.

Surface Skin Friction Coefficient

Top and bottom, all elements. Ideally, showing grid convergence.

Velocity Profiles

- Along lines normal to the surface, emanating from the upper surface at $x/c = 0.15$ (just aft of the WUSS) and $x/c = 1.0$ (about mid-chord on the flap). At both locations, the cut should be perpendicular to the surface and extend above the outermost wake.
- We expect that a TecPlot macro to extract this slice data will be available shortly.

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Overall Results

- C_L, C_M, and C_D overall, as functions of α
- Lift-drag polar

Per-Element Results

- Aerodynamic coefficients per element, as functions of α

Flow Characteristics

Plots illustrating how the character of the flow changes between the two angles of attack. Possibilities include visualization of the flow to show changes in flow separation characteristics.

Summary

- Lessons learned, including opinions on key flow features and required resolution for those
- Recommended best practices for generating meshes for this type of problem