SU^2 Pre-Release Workshop

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Hosted by the SU^2 Development Team

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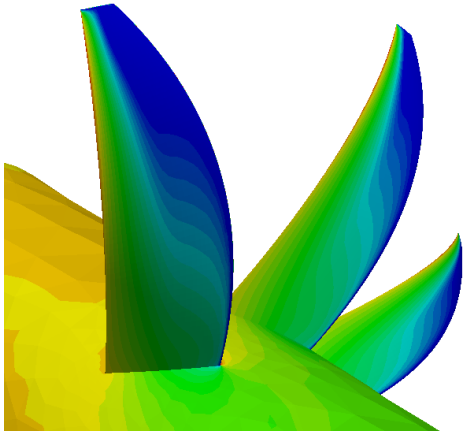
What is the SU^2 suite?

- Stanford University Unstructured
- Open source suite for the analysis and control of arbitrary PDEs using unstructured grids
  - Computational Fluid Dynamics (CFD)
  - Optimal Shape Design (OSD)
  - Mesh tools: adaptation, smoothing, deformation



Our medium-term goal: Develop a leading solver in the unstructured CFD community

- Written in a friendly C++ style with an object-oriented structure, and MPI parallelization
- Python driver scripts for coupling multiple SU^2 tools

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Some features of the SU^2 flow solver

Unstructured, vertex-based solver for multiphysics simulations. SU^2 can handle an arbitrary number of equations.

- Direct, adjoint, and linearized solvers for multiple equation sets
- Compressible and incompressible solvers
- Space integration (3D, and "real" 2D): JST, Roe, AUMS, HLLC
- Time integration: Euler explicit and implicit, dual time stepping, Runge-Kutta
- Turbulence models: SA and SST (on going activity).
- Convergence acceleration via agglomeration Multigrid
- Fully parallelized with MPI

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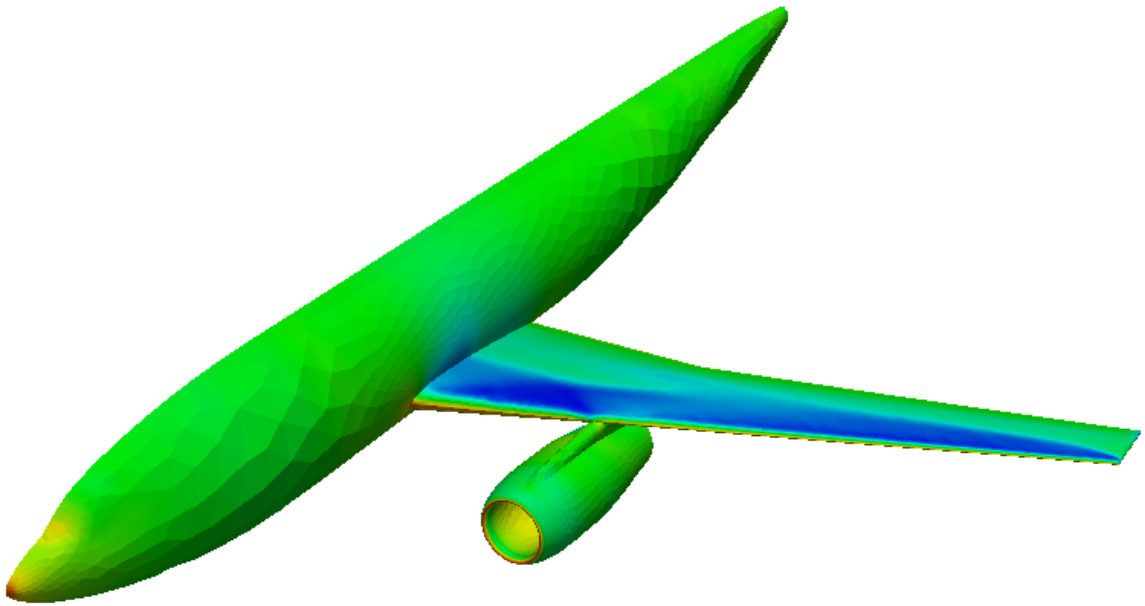
What can the SU^2 suite do?

Analysis: Euler, Laminar Navier-Stokes, RANS, Multi-Species N-S, Rotating Frame Euler, Potential, Linearized and Adjoint Equations, Two phase flows...



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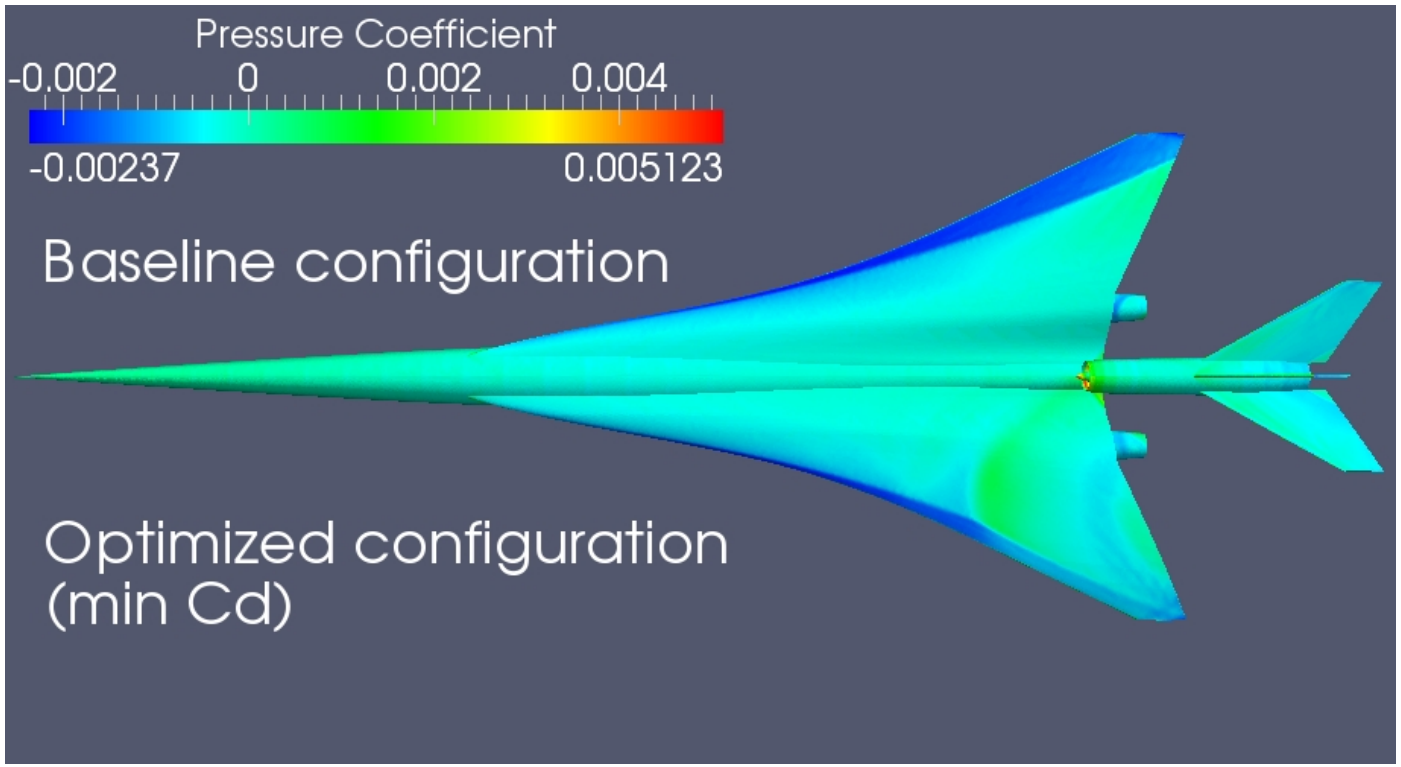
What can the SU^2 suite do?

Design: Continuous Adjoint, Gradient Projection, Design Variable Definition, Mesh Deformation, Free Form Deformation, Shape Optimization (complete design loop)...



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SU^2 Release Details

Why an open-source license?

- To promote further research by providing a proven platform
- To improve and grow the code based on the experience of users and the additions from developers

Why use SU^2?

- Available to **ANYONE** for **FREE**
- Code maintenance and support provided by our lab and the open-source community
- Developer-friendly C++ structure, it is very simple to modify and build upon, including adding new equations

Workshop Agenda

Introduction to SU^2

Hands-on Session:

Download & Build on Your Machine

Run the Quick Start Tutorial

Work Through Remaining Tutorials

Attempt the Workshop Challenge

Submit Feedback Before Leaving

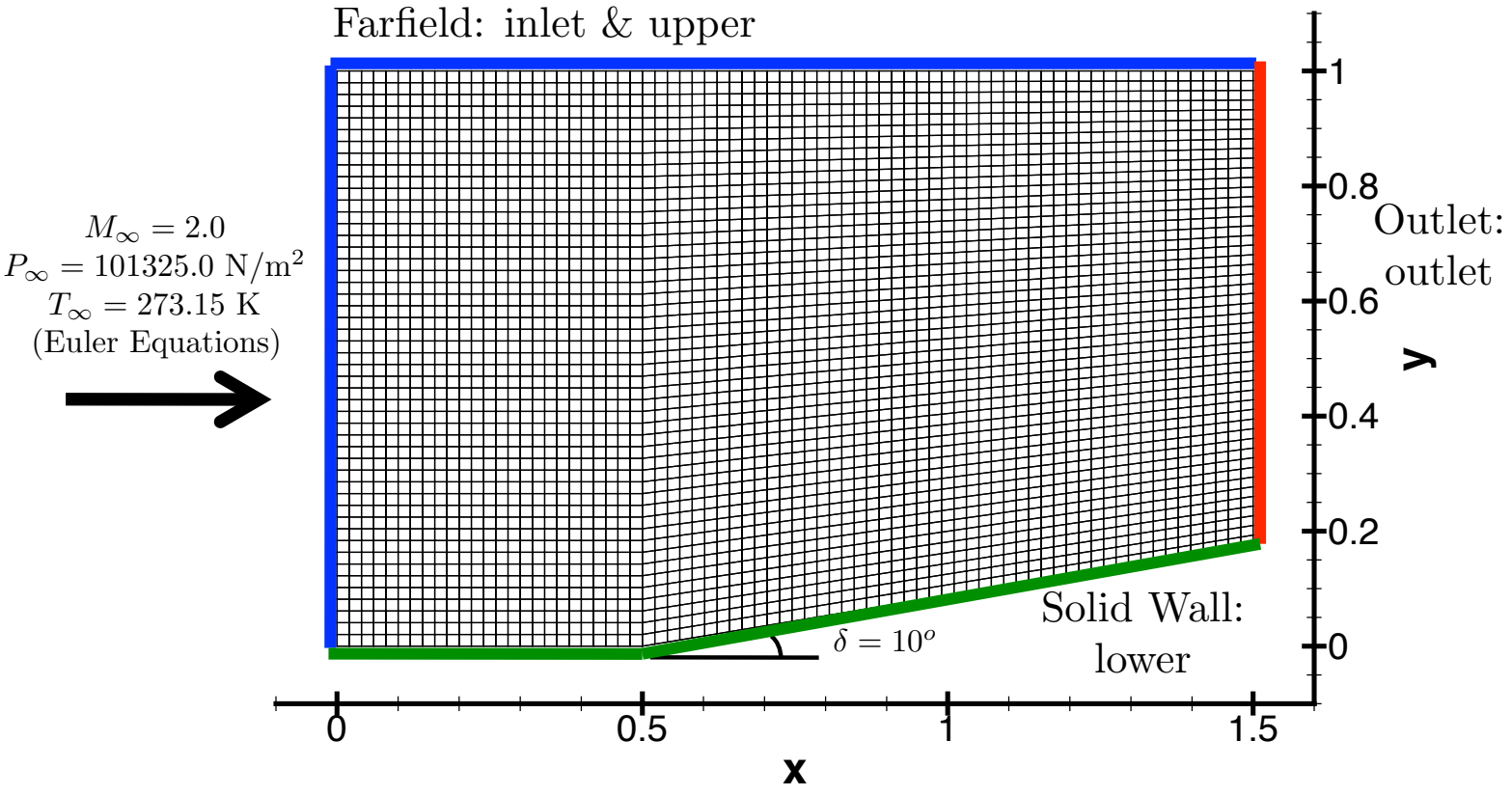
Workshop Goals

Our goals for the workshop are the following:

1. Introduce SU^2 and begin growing the user base
2. Test the readiness of the code prior to release
3. Evaluate the effectiveness of the documentation

Your feedback is vital to the success of this workshop! Please rate your experiences and add your comments in the embedded surveys. The SU^2 team will be available around the room during the hands-on session to help with the code and hear about your experience.

Workshop Challenge: 2-D Supersonic Wedge



After performing the tutorials, try to get this simple problem working on your own.

Download the mesh from within the documentation and start with the template configuration file.

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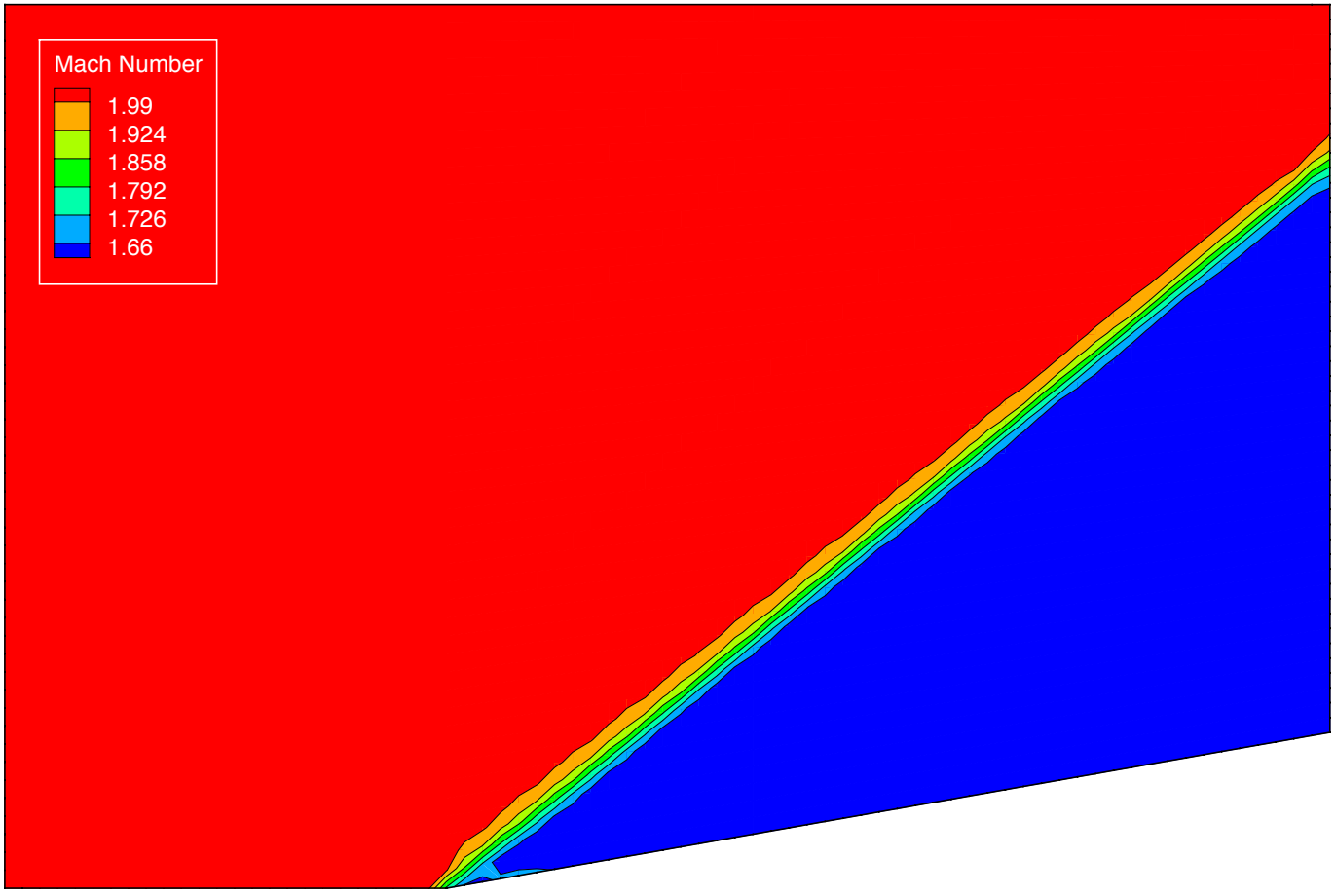
Workshop Challenge: 2-D Supersonic Wedge



Can you converge 5 orders of magnitude in fewer than 75 iterations?

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DIE LUFT DER FREIHEIT WEHT
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SU^2 Release: January 19, 2012

The code, all of the documentation, and instructions for joining the user's mailing list can be found on the SU^2 home page:

su2.stanford.edu

Users are encouraged to join the SU^2 user's email list. This list will be used to communicate important information to users such as new releases and bug fixes.

Contact the SU^2 Team at *susquared-dev@lists.stanford.edu*.
We appreciate any feedback!