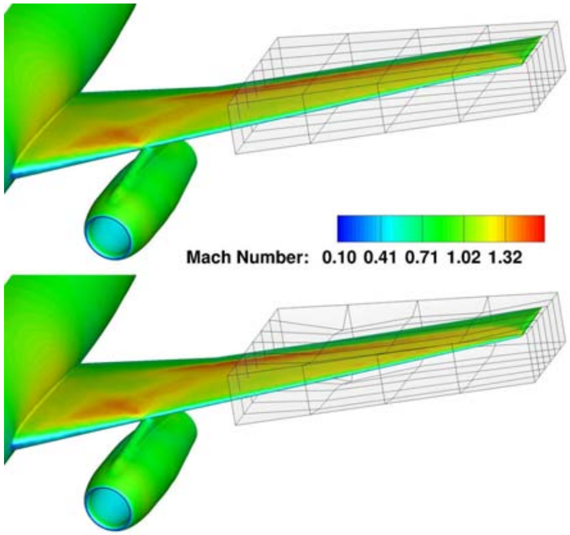


About SU^2

SU^2 is an open-source software suite for Partial Differential Equation (PDE) analysis and for the solution of PDE-constrained optimization problems on unstructured grids.

The suite includes a series of C++ modules, linked via Python scripts, that:

- Solve the PDE system
- Decompose the domain for parallel computations
- Determine sensitivities of desired objective functions (e.g. lift, drag)
- Deform the model and grid to perform shape optimization
- Perform adaptive grid refinement

Source code and Mac OS X, Linux and Windows binary executables can be downloaded from: **http://su2.stanford.edu**

http://su2.stanford.edu

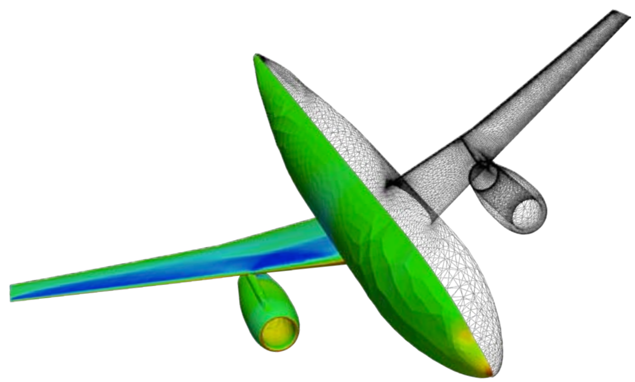
SU^2 is a cutting-edge, flexible, open-source tool that can be used for:

- High-fidelity analysis
- Adjoint-based design
- Multi-physics simulations
- Adaptive, goal-oriented mesh refinement and sliding meshes

Documentation and a full description of current and upcoming features are available on the SU^2 website:

http://su2.stanford.edu

Email the development team:
susquared-dev@lists.stanford.edu



DLR-F6 static pressure contours

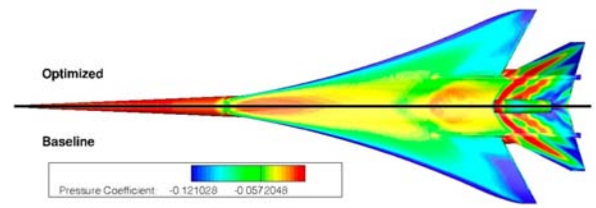
STANFORD
AERONAUTICS & ASTRONAUTICS

SU^2 is under active development by the Aerospace Design Laboratory at Stanford University. Visit the ADL at: **http://adl.stanford.edu**

SU^2
STANFORD UNIVERSITY
Unstructured Code

The New Open-Source CFD code – V2.0

Analyze. Optimize. Design!



Sample Unstructured High-Fidelity Analysis and Optimization
Baseline and Final N+2 surface pressure

aerospace**designlab**

High-Fidelity Analysis

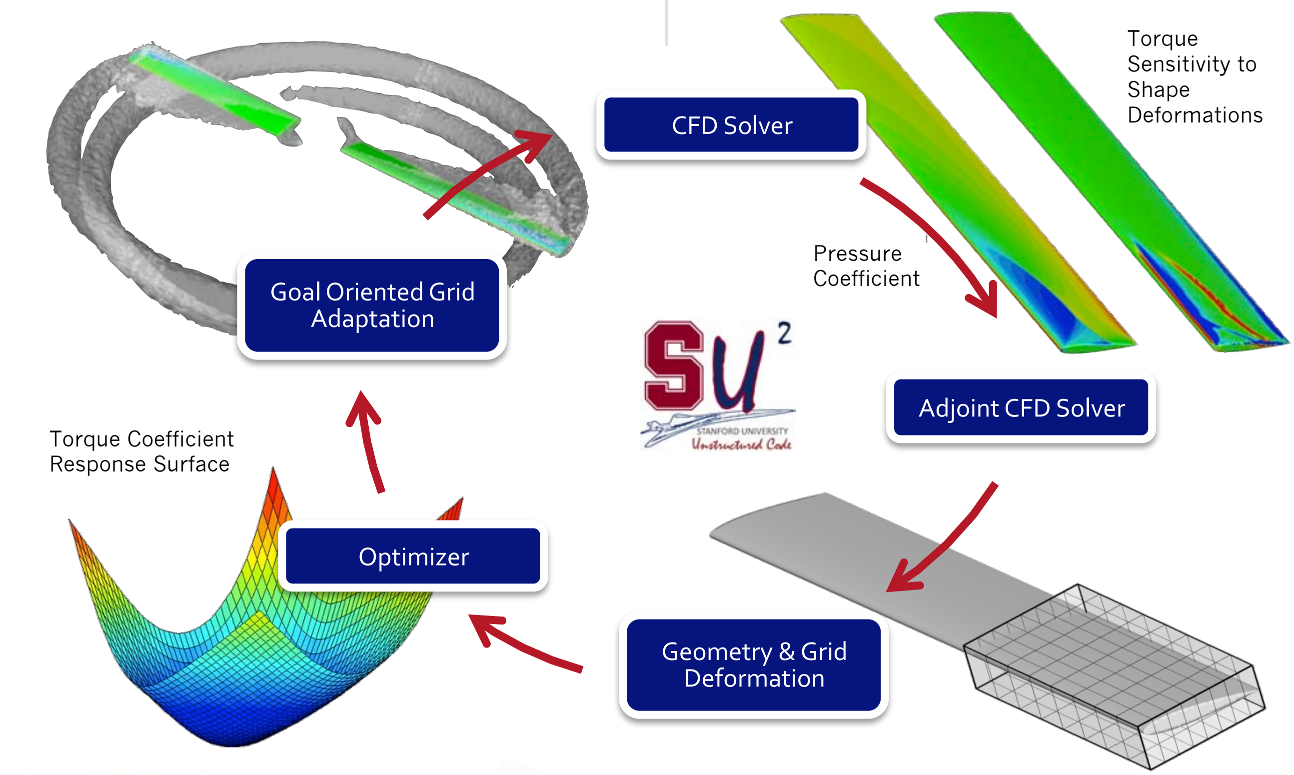
- Able to handle internal and external flows
- Works on arbitrary unstructured grids and includes a Pointwise® plugin for mesh generation
- Euler, Navier-Stokes, RANS, rotating frame, axisymmetric and incompressible solvers
- Steady and time-accurate analyses
- Convergence acceleration with agglomeration multi-grid & preconditioning
- Parallelism using MPI
- Sliding mesh capabilities

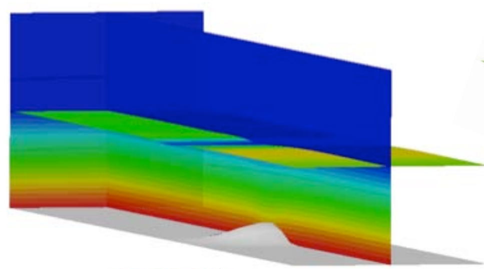
Shape Optimization

- Self-contained optimization environment using standard Python libraries, such as NumPy and SciPy
- Gradient computation using the adjoint approach
- 3D shape parameterization using free-form deformation boxes
- Built-in geometry and mesh deformation
- Goal oriented mesh adaptation

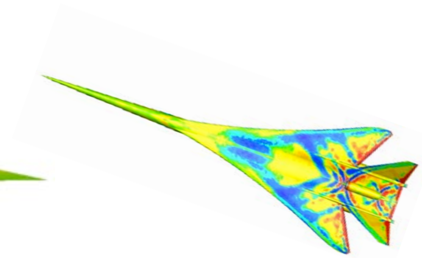
Multi-Physics Simulations

- Flexible C++ based architecture for rapid implementation of new equations, numerical schemes and source terms
- “Solution containers” allow for simultaneous analysis of different equation sets with tight coupling
- Free surface simulations of air-water interfaces using the level-set method
- Multi-species plasma solver for simulating ionized flows in strong electric fields and behind hypersonic shock waves coupled with catalytic walls and with Gauss’ Law

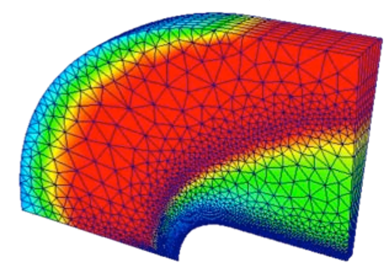




Free-surface Simulations
Water flow over a bump in a channel

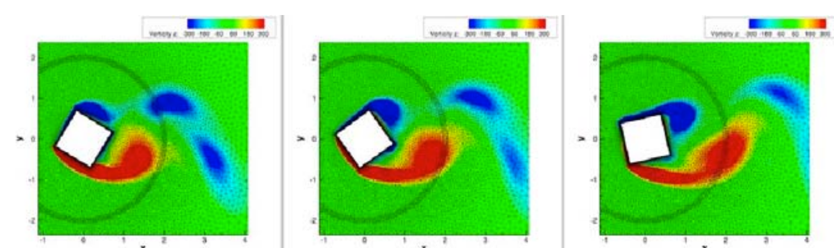


Sensitivity Computation
Sensitivity of lift to geometric variations



Reacting Plasma Simulations
Flow of low-Mach electrons over a solid body

Unsteady Laminar Simulations
Streaklines behind cylinder at Re=100



Sliding Meshes
Unsteady analysis and design of surfaces in relative motion