Compressible Navier Stokes with embedded boundaries.

Compressible Navier-Stokes with embedded boundaries has several important computational challenges.

- Diffusion should be treated implicitly.
- The interaction of viscosity with energy equation (viscous dissipation) is challenging to discretize in a stable way in the presence of small cells.
- Refluxing must be done implicitly.
- Diffusive operators have variable coefficients.

Viscosity can significantly change the results of even simple 2D problems.

This 8-level calculation shows substantial changes from the inviscid case including

- Boundary layer separation.
- Substantially reduced Mach stem due to boundary layer effects.
DB: plt.ramp.nx.128.000385.2d.hdf5
Cycle: 385      Time: 9.24289e-06