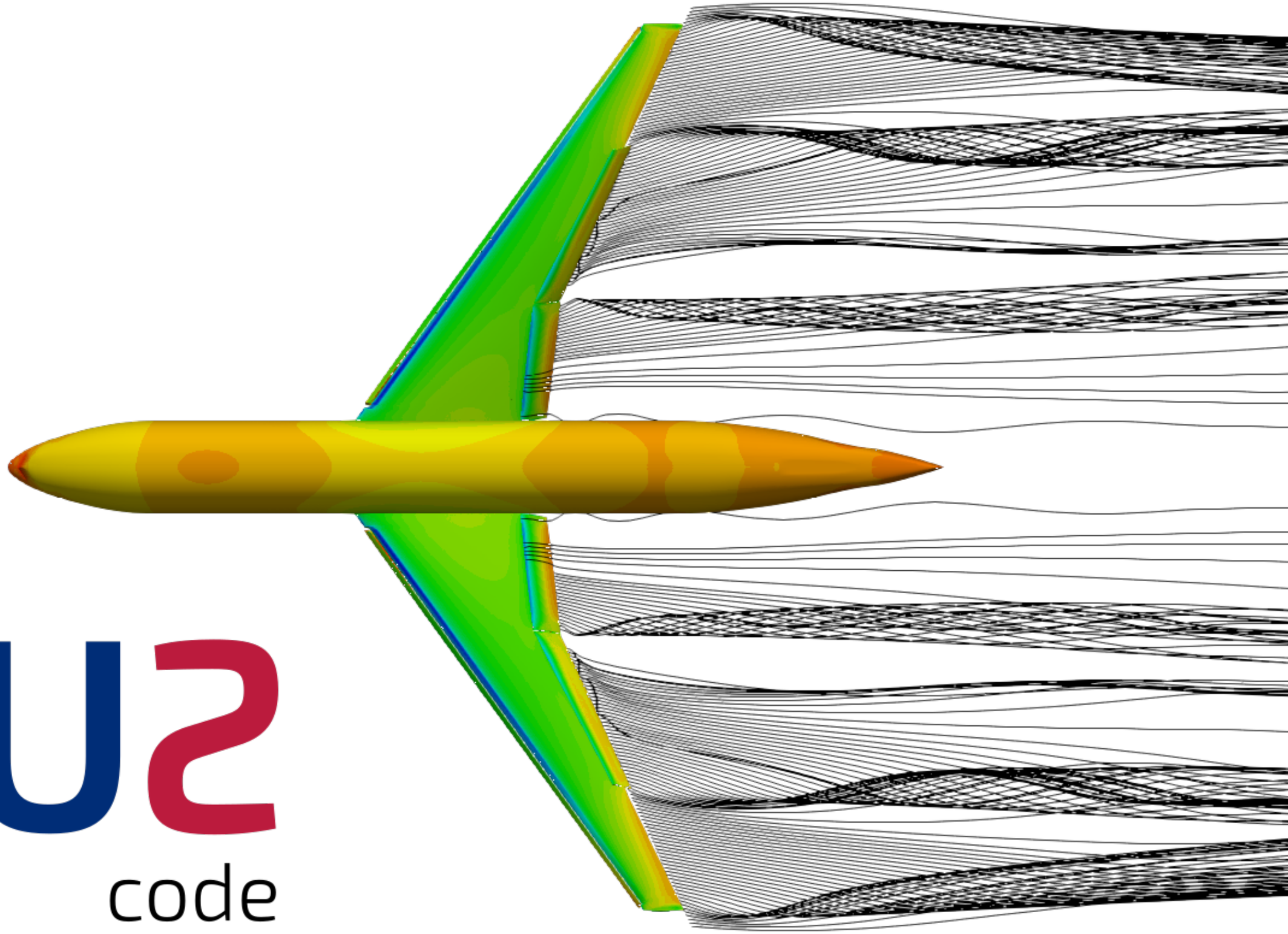


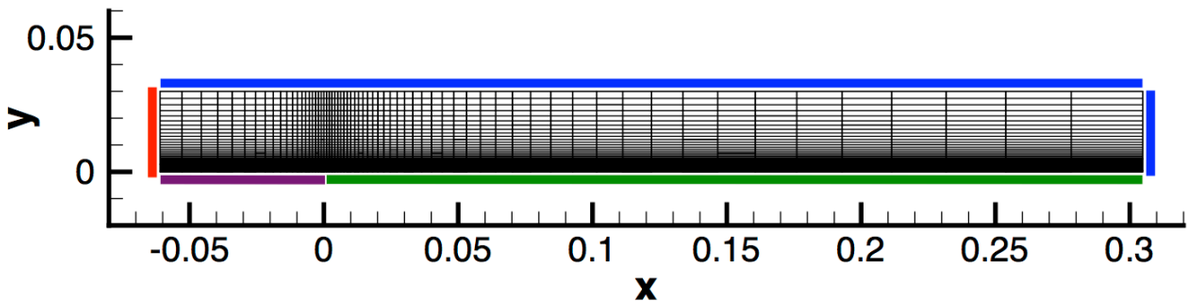
SU2 code

Time Convergence Study : Unsteady Flow

Corey Lynn Murphey, Fall 2021

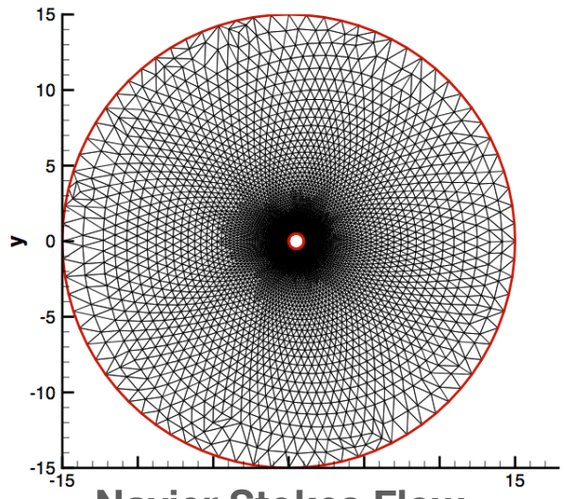
Contribution

- **Intended:** Vary time step, see where problem converges
- **Actual:**
  - Numerical Method (DG, JST, ROE, etc.)
  - Time Discretization Method (Euler Implicit, Euler Explicit, RK Explicit)
  - “Time Marching” (Dual - 1st and 2nd Order, and Time Stepping)



Boundary Conditions: Inlet, Outlet, Symmetry, Navier-Stokes Wall

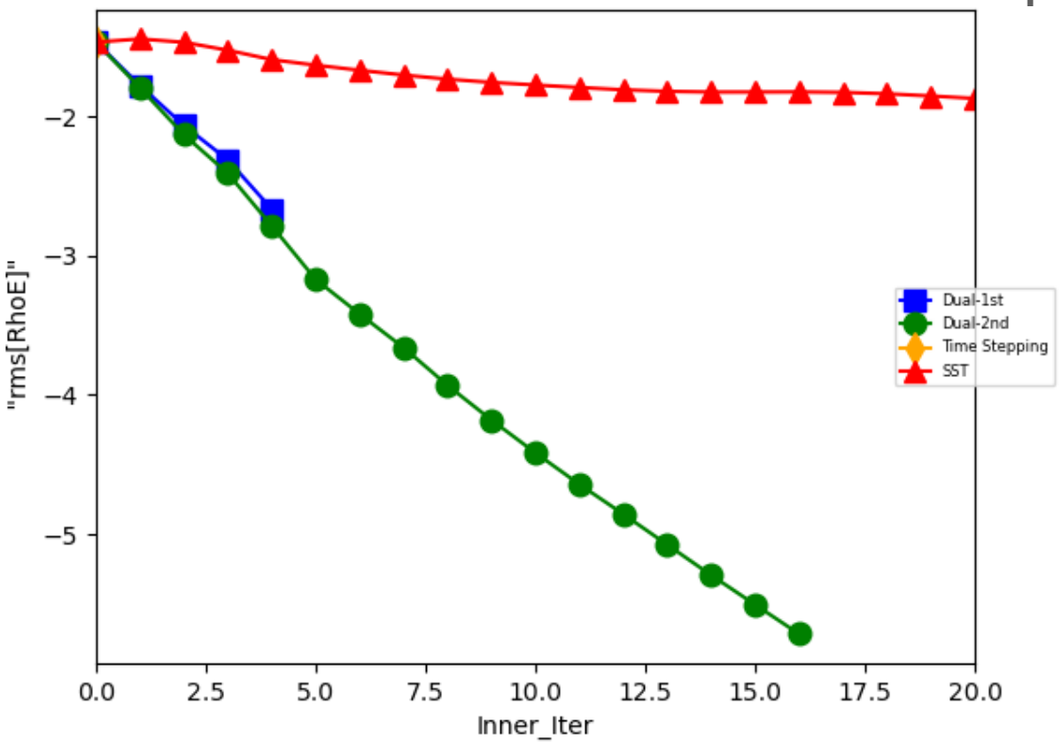
Laminar Flat Plate



Navier Stokes Flow over a cylinder

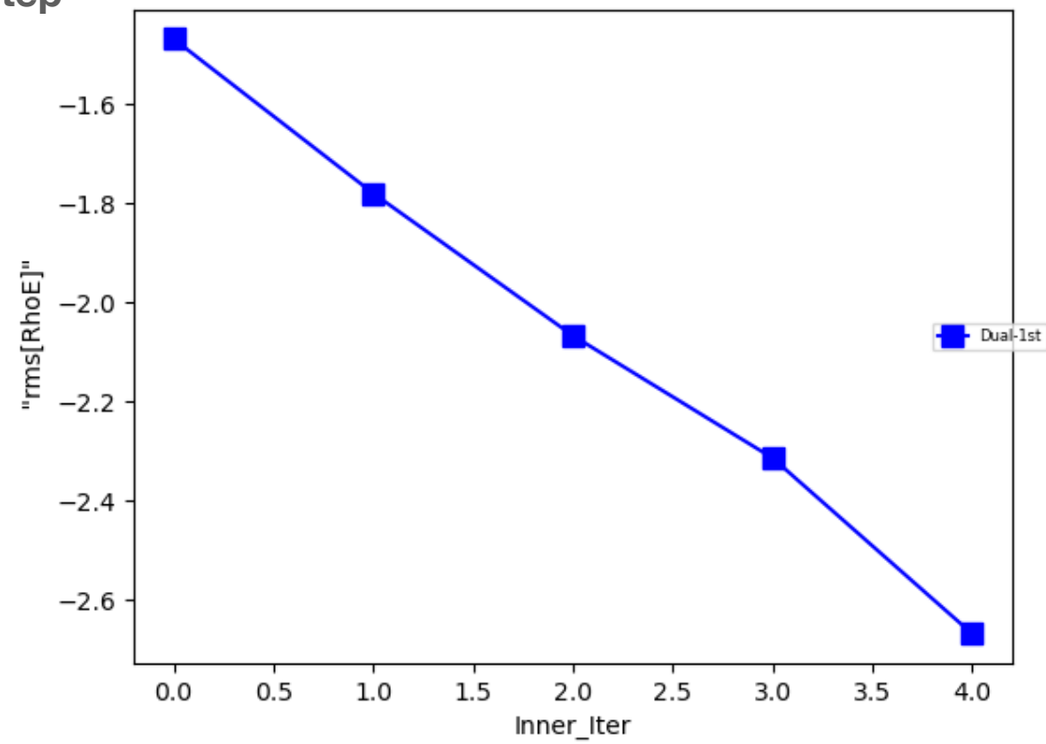
Laminar Flat Plate

All

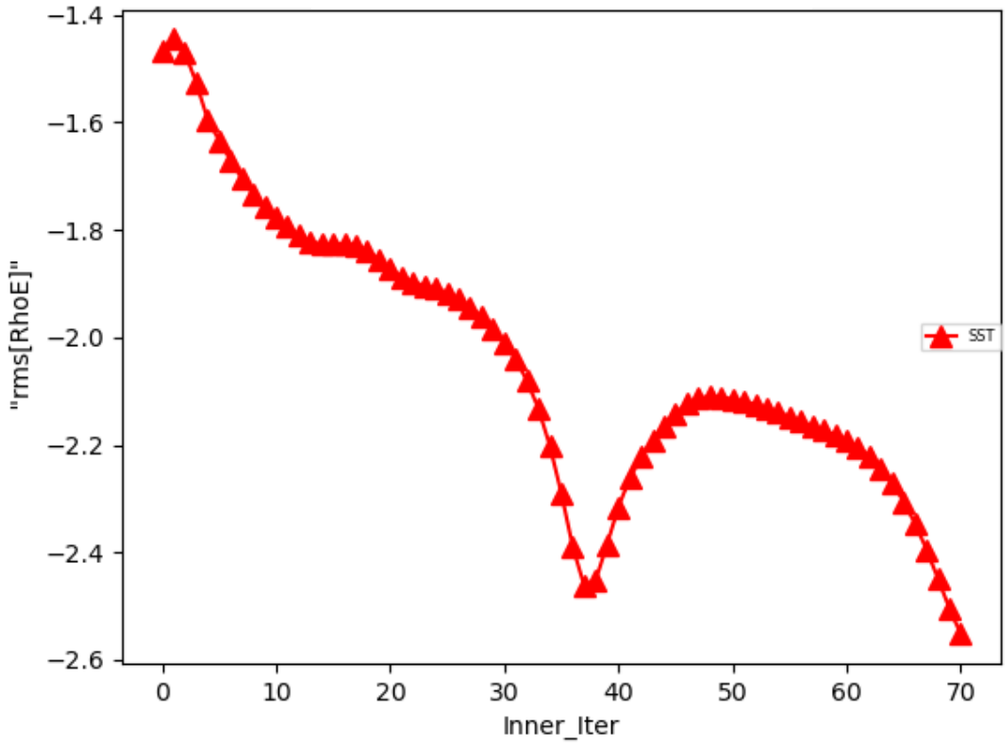


1 Time Step

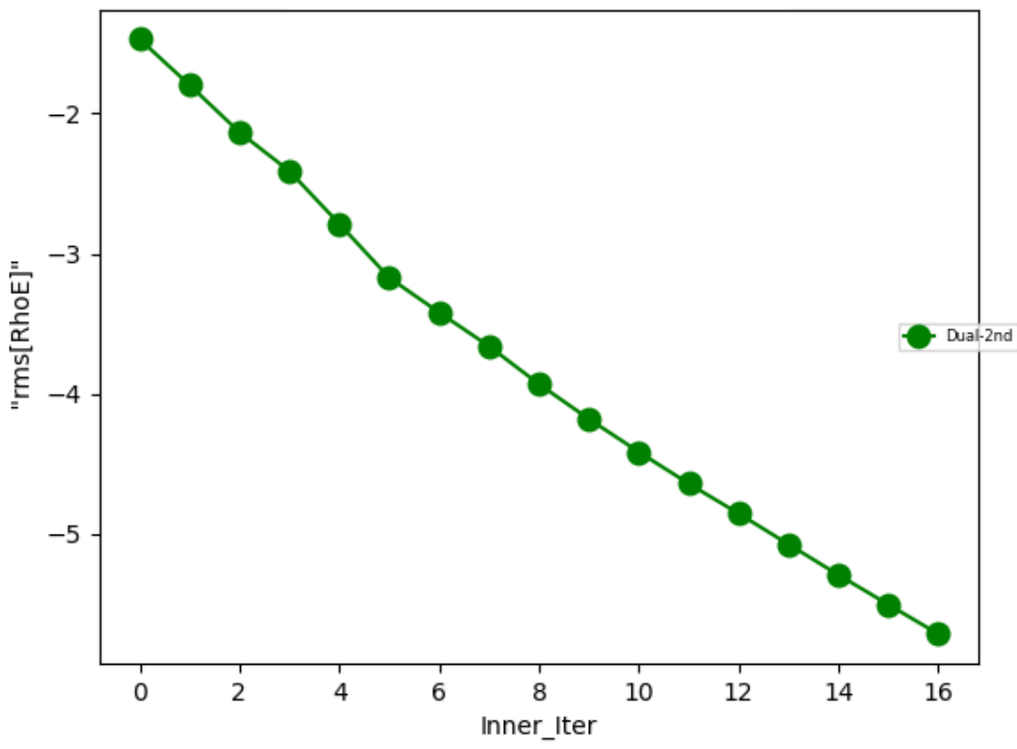
DUAL: 1ST Order



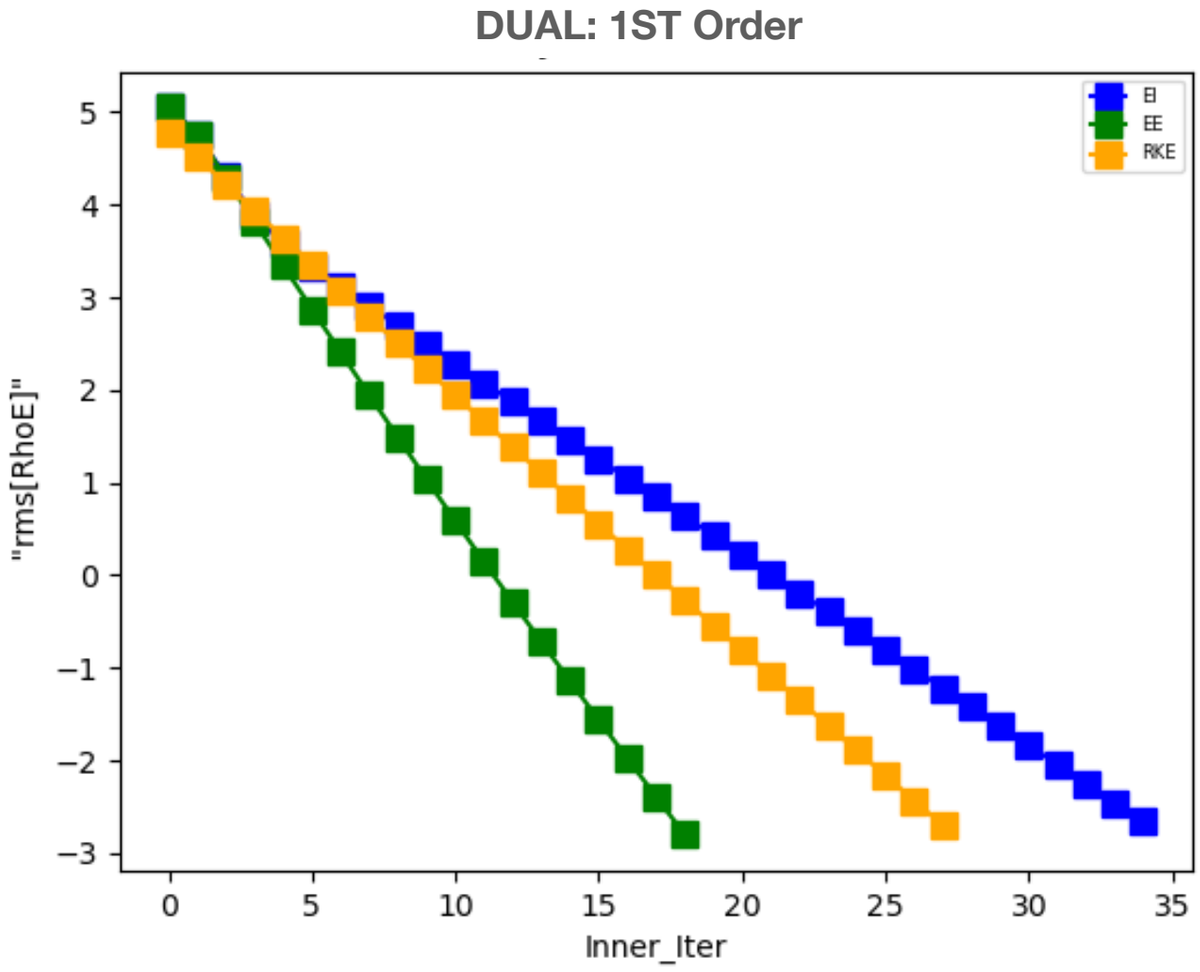
"Steady State"

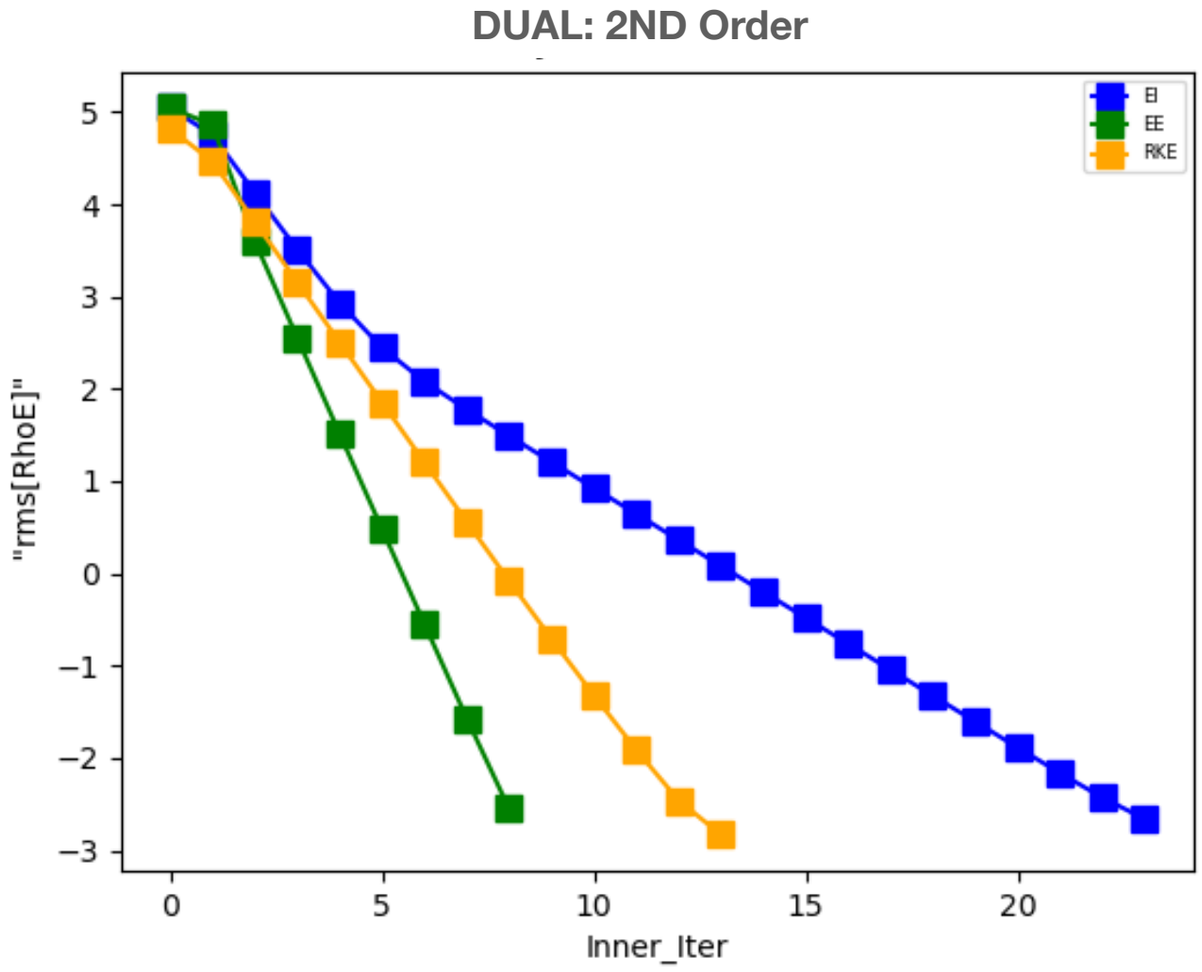


DUAL: 2ND Order



Cylinder + Compressible Navier Stokes : Dual Time Stepping, JST





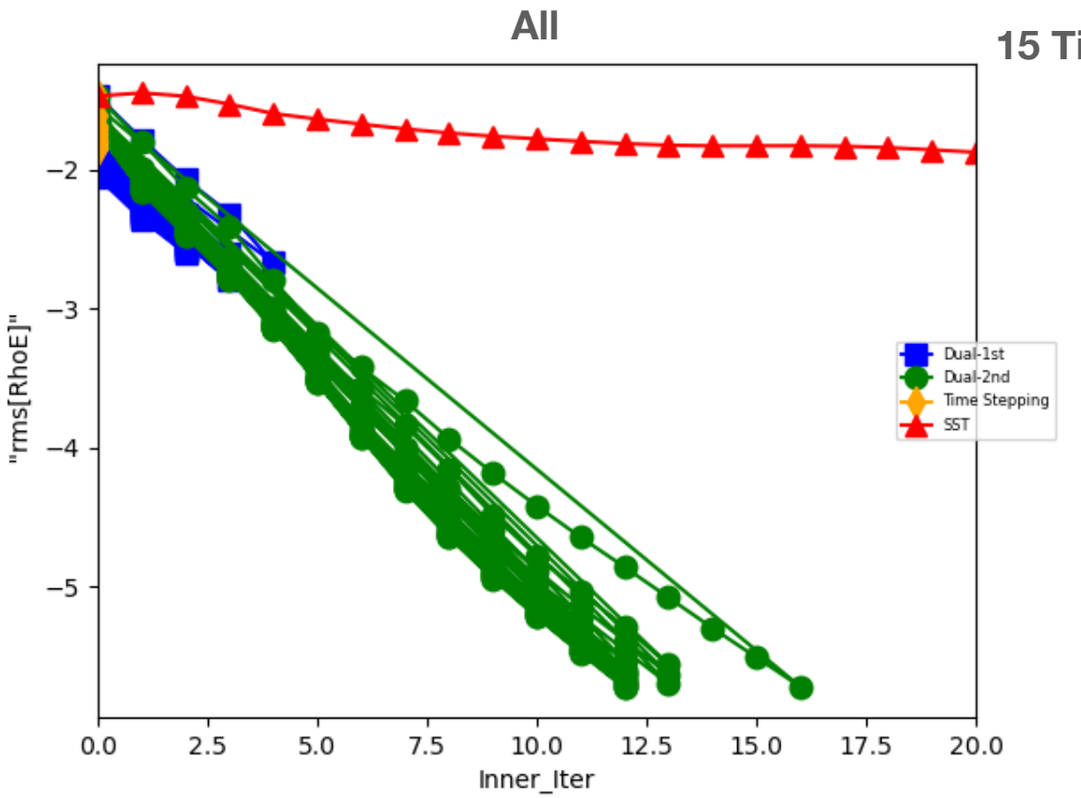
Discussion

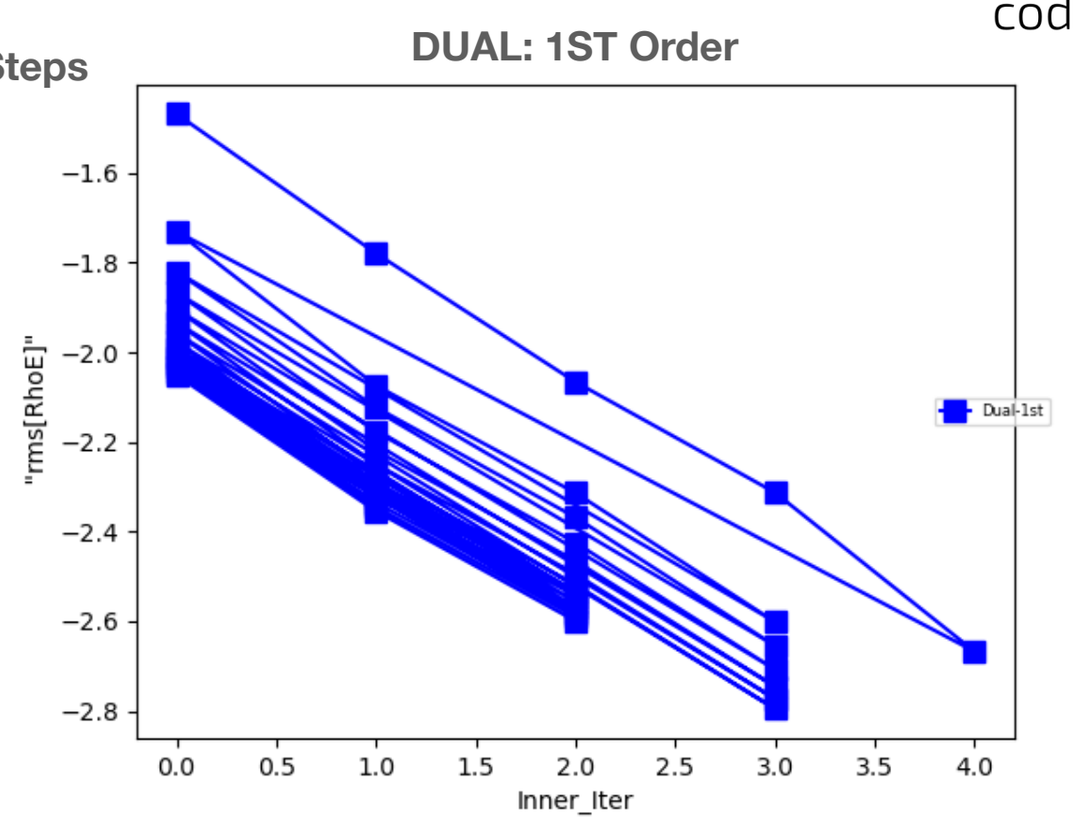
- Community:
  - Didn’t quite understand my contribution
- Library:
  - Modular - each module works well and efficiently
  - Not every “module” includes all marketed features

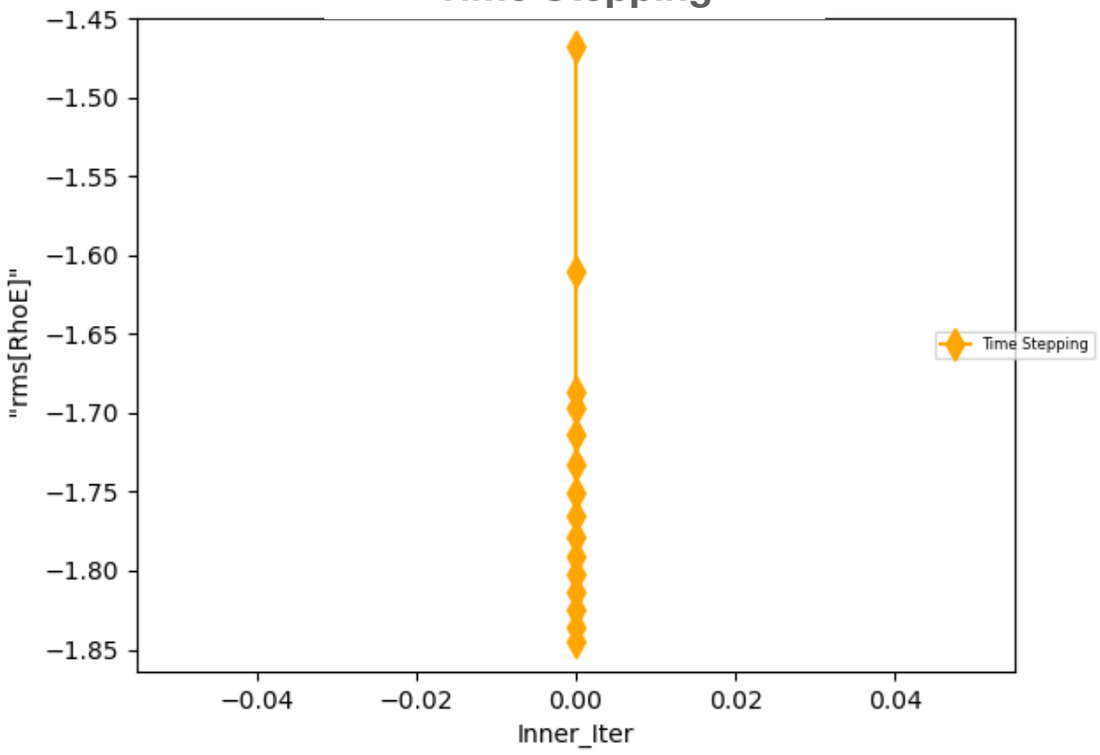
References

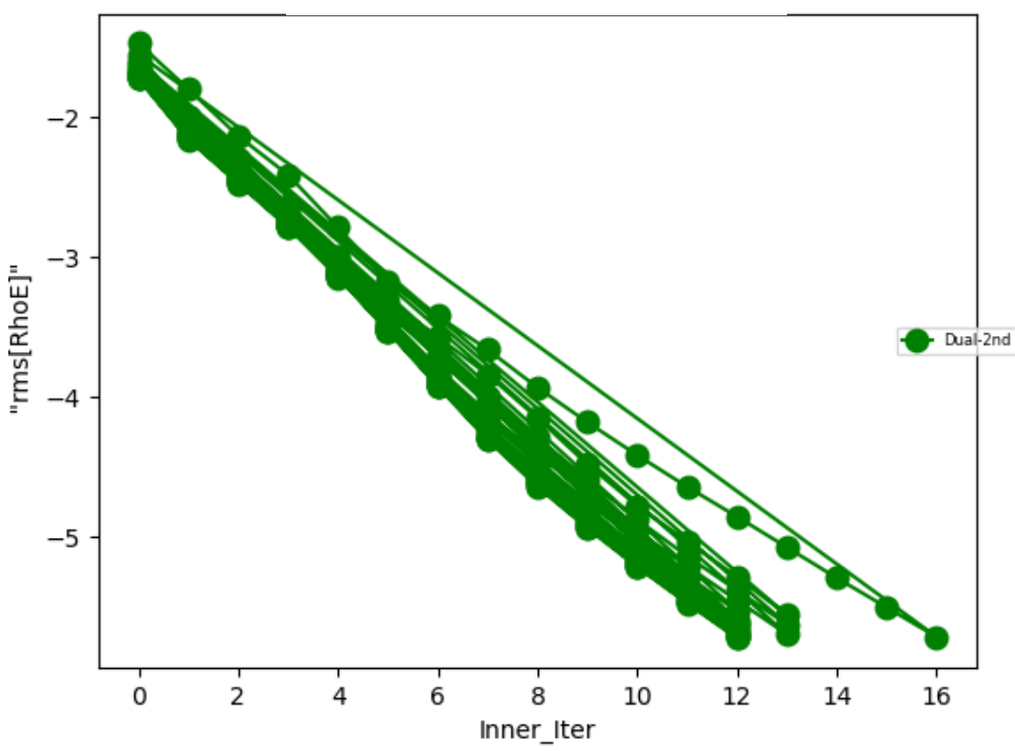
- SU2 GitHub
- SU2 Documentation
- V & V repository
- T. D. Economon, F. Palacios, S. R. Copeland, T. W. Lukaczyk, and J. J. Alonso, “SU2: An Open-Source Suite for Multiphysics Simulation and Design,” *AIAA Journal*, vol. 54, no. 3, pp. 828–846, Mar. 2016, doi: 10.2514/1.J053813.

Laminar Flat Plate

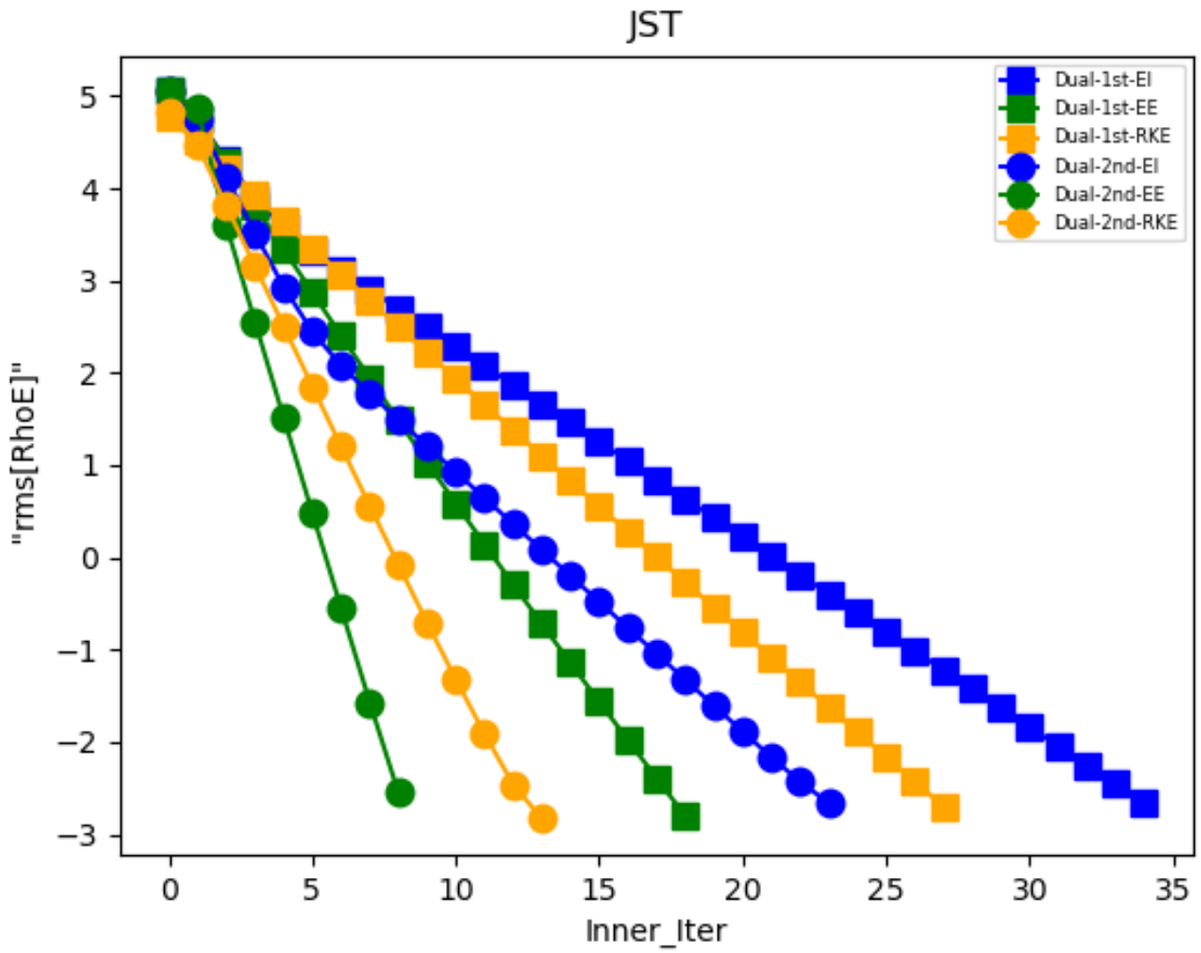


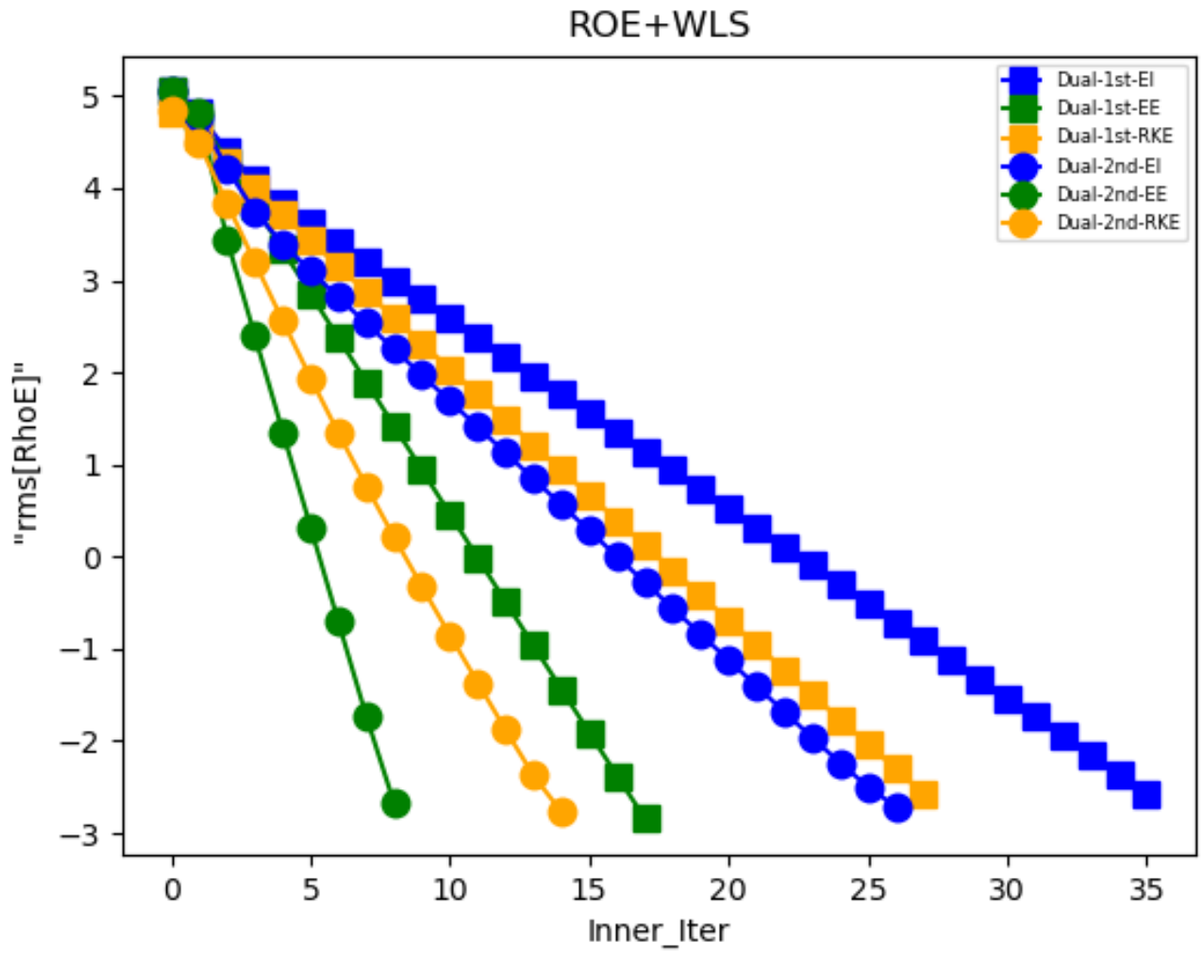






Cylinder + Compressible Navier Stokes





Cylinder + Compressible Navier Stokes