SU2: an Open-Source Suite for Multiphysics Simulation and Design

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Introduction

Computational analysis tools have revolutionized the way we design aerospace systems, but most established codes are proprietary, unavailable, or prohibitively expensive for many users. The SU2 team is changing this, making computational analysis and design freely available as open-source software and involving everyone in its creation and development.

The SU2 suite is an open-source collection of C++ / MPI based software for multi-physics simulation and design on unstructured meshes (i.e., CFD).

SU2 is under active development at Stanford University in the Department of Aeronautics and Astronautics and now in many places around the world.

Our Guiding Principles

1. Open-source (LGPL 2.1)
2. Portability and easy installation.
3. Readability, reusability, and encapsulation (C++)
4. Flexibility and automation (Python)
5. High performance.
6. Gradient availability for design, mesh adaptation, UQ, etc.

We believe that an open-source code supported by a large group of developers working in concert has tremendous potential…

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Development Practices

The SU2 project has a vibrant community developing the code all around the globe. We use scalable development practices to manage it all:

1. How do we avoid code conflicts?
   • Branching model in git for decentralized, parallel development.

2. How does one contribute code contributions to the repo?
   • Pull requests through GitHub.

3. Quality assurance?
   • Automatic, pre-merge regression testing (Travis CI) and code review.

4. How do we minimize the overhead of software development in a research environment?
   • All of the above + streamlined release process at regular, frequent intervals.

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Bibliography


Further Information

GitHub: https://github.com/su2code/SU2
Website: http://su2.stanford.edu
Twitter: @su2code