Obtaining reliable simulations of industrial fluid flow applications

Ridgway Scott[1]

A new era in flight is emerging that requires a more effective simulation strategy. Many modes of transportation are being developed industrially, including air-taxi drones and ground-effect transport. Similarly, new modes of energy generation, such as blade-less wind farms have been proposed. All of these require a new level of reliability for simulations to be useful in engineering design. We will describe some computations we are doing and the flaws in standard algorithms that have been uncovered in the process. We will also describe some open problems related to these and some prizes being offered for their solution.

References:

[1] L. Ridgway Scott and Rebecca Durst. Chaotic dynamics of two-dimensional flows around a cylinder. Physics of Fluids 36, 024118 (2024), published online 16 Feb 2024.

[1]University of Chicago, Computational and Applied Mathematics
ridg@uchicago.edu