Grey-Box Modeling with Applications in Data-driven Turbulence Modeling

by Nicolas R. Gauger from TU Kaiserslautern, Germany

with contributions from
Emre Özkaya, Rohit Pochampalli, Guillermo Suarez from TU Kaiserslautern, Germany

The "grey-box modeling" approach cleverly combines insights from simulations ("white-box modeling") on high-performance computing (HPC) architectures with data-driven approaches ("black-box modeling") using artificial intelligence (AI) methods.

As an example, we consider here the so-called "field inversion" method in data-driven turbulence modeling for the Navier-Stokes equations. For the field inversion, classical methods from the area of optimization with partial differential equations are used.