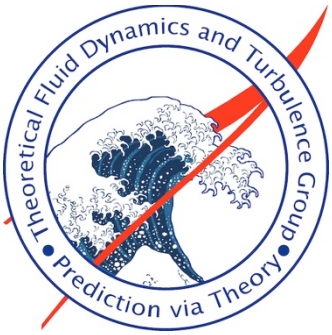
A New Course: Modeling Inhomogeneous Turbulence with a Historical Perspective



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A new graduate class is developed at the University of Florida called Modeling Inhomogeneous Turbulence with a Historical Perspective. The course covers in-depth concepts of the science and mathematics of turbulence modeling. Major topics of the class include statistics for modeling, the Russian school, law of the wall, chaos, compressible Navier-Stokes equations, mean kinetic energy, Reynolds stress transport equation, boundary layer equations, two-dimensional laminar flows, mixing length concepts, Baldwin-Lomax, Cebeci-Smith, one-half equations, one-equations, Prandtl's model, Spalart-Allmarus, k-omega, k-epsilon, Boussinesq, nonlinear relations, stress transport models, closure, Morkovin hypothesis, and studies in particular flows. These topics are related to turbulent flows that are observed in our daily lives and within various fields of engineering. Student assessment is conducted via analysis assignments, term papers, and a presentation on a topic of their choice. A four part programming project involves creating a parabolic boundary layer marching code with an algebraic closure. Feedback from students and progress on making the course publicly available are presented. Portions of the course appear on online. Course notes and assignments are available freely within a 351 page handout.

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N/A.