

# Global Regularity for Three-dimensional Navier-Stokes Equations and Other Relevant Geophysical Models

Edriss S. Titi

Department of Computer Science and Applied Mathematics

Weizmann Institute

Rehovot, 76100, Israel

ALSO

Departments of Mathematics, Mechanical and Aerospace Engineering

University of California

Irvine, CA 92717-3875, USA.

etiti@math.uci.edu

## Abstract

The basic problem faced in geophysical fluid dynamics is that a mathematical description based only on fundamental physical principles, the so-called the “Primitive Equations”, is often prohibitively expensive computationally, and hard to study analytically. In this talk I will survey the main obstacles in proving the global regularity for the three-dimensional Navier–Stokes equations and their geophysical counterparts. Even though the Primitive Equations look as if they are more difficult to study analytically than the three-dimensional Navier–Stokes equations I will show in this talk that they have a unique global (in time) regular solution for all initial data.

This is a joint work with Chongshen Cao.