1000-76-217   **Edriss S Titi*** (`etiti@math.uci.edu`), Department of Mathematics, University of California, Irvine, CA 92697-3875. *Mathematical Analysis of Certain Analytic Sub-grid Scale Models of Turbulence.*

In this talk I will prove the global regularity of certain analytic sub-grid scale models of turbulence. This will include the Smagorinsky, the Navier–Stokes-alpha, the Leray-alpha and the Clark-alpha models of turbulence. Upper explicit bounds for the number of degrees of freedom, in terms of the relevant physical parameters, for these models will also be presented. In addition, I will also prove the global regularity for the "shell model" of turbulence, and show that it has a finite dimensional invariant inertial manifold. (Received August 24, 2004)