Classical dynamics of incompressible fluids: the Euler and the Navier-Stokes equations

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The class will cover the following topics:

• Derivation of the Euler and Navier-Stokes equations from conservation principles in the continuum hypothesis;
• Conserved quantities and special solutions;
• Local existence of solutions for regular initial data via energy methods;
• Yudovich theorem on existence and uniqueness of two-dimensional solutions with bounded vorticity;
• Leray-Hopf solutions of the Navier-Stokes equations;
• Strong solutions and weak-strong uniqueness;
• Serrin’s regularity result.