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Simple Mathematical Models related to Fluids and heat conduction: the Boussinesq problem

The purpose of this course is to discuss the resolution of an evolution parabolic system. This simplified system presents the same dificulties as the full models of Navier-Stokes coupled with the heat equation (with or without the Boussinesq approximation). We shall first recall some basic tools in Functional Analysis and the mathematical background for the Navier-Stokes coupled with the heat equation.

July 1st: 1.) Some mathematical problems in fluids "closed" to the simple system (BS): motivation. 2.) Basic spaces: Lebesgue spaces L^p, $p > 1$, Sobolev spaces H^s, s in R, and their properties (definitions, inclusions, interpolations).

July 3rd: 3.) End of 2.). 4.) Evolution time spaces $L^p(0; T; V)$; $C([0; T]; V)$, (here generally, V is a Hilbert space for our purpose): Definition, Compactness theorem, imbedding.

July 8 th: 5.) Assumptions, A priori analysis, main theorem for the simple model. 6.) Mathematical resolution.

July 9 th: 7.) Qualitative properties. 8.) Recalling the resolution of Navier-Stokes equations.

July 11 th: 9.) Example of resolution of a full coupled system.

No tiene gastos de matriculación, siendo libre la asistencia. Se expedirá un certificado de asistencia.

Organizado por MOMAT (Grupo de Investigación de la UCM) con la colaboración de la Facultad de Matemáticas y del Instituto de Matemática Interdisciplinar de la UCM.

Este curso se inscribe en el doctorado del Programa Oficial de Posgrado en Investigación Matemática, con mención de Calidad (MCD2006-00482).

1-11 de julio de 2008
Facultad de CC. Matemáticas de la UCM, Aula 209
Primera sesión: 1 de julio 11:30-12:30 horas