Mês de: Maio 2011

SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 26 de Maio (quinta-feira), às 13h30, na Sala B3-01

"On a free boundary problem of magnetohydrodynamics"

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Abstract:

We analyse the simplest free boundary problem of magnetohydrodynamics governing the evolution of an isolated mass of a viscous incompressible liquid in the presence of the magnetic field. The motion of the liquid is governed by the Navier-Stokes equations, and for the magnetic field we have the Maxwell equations with an excluded displacement current. The magnetic field should be determined not only in the domain filled with the liquid but also in the surrounding vacuum region. On the free boundary of the liquid standard jump conditions for the magnetic field are prescribed, as well as kinematic and dynamic boundary conditions where the magnetic stress tensor is taken into account. We prove that the problem is well posed, i.e., it has a unique solution for arbitrary initial configuration of the liquid and arbitrary initial data for the velocity of the liquid and for the magnetic field, satisfying only natural compatibility conditions. Under some additional assumptions, the solution can be extended in an infinite time interval t>0. The proofs are based on the analysis of the corresponding linear problems.

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