Well-posedness and asymptotic behaviour for the Boussinesq equations in R^n.

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Resumen

I will talk on my recent work with L.C.F. Ferreira [2], on the well-posedness of the initial value problem for the Boussinesq equations [1], in R^n :

$$\begin{aligned}
\frac{\partial u}{\partial t} + u\nabla u - \nu\Delta u + \frac{1}{\rho}\nabla p &= \beta\theta f + f_1, \qquad x \in R^n, \quad t > 0, \\
\nabla \cdot u &= 0, \qquad x \in R^n, \quad t > 0, \\
\frac{\partial \theta}{\partial t} + u\nabla\theta - \chi\Delta\theta &= h, \qquad x \in R^n, \quad t > 0, \\
\theta(x,0) &= \theta_0(x), \qquad x \in R^n \\
u(x,0) &= u_0(x), \qquad x \in R^n.
\end{aligned}$$

Mild solutions are obtained in the weak-L^p spaces and the existence of self-similar solutions is shown. We prove that the only self-similar solution in the strong L^p space is the null solution while infinitely many self-similar solutions do exist in weak-L^p spaces. The asymptotic stability of solutions is analyzed and as a consequence, a criterium of self-similarity persistence at large times is obtained.

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Referencias

[1] S. Chandrasekhar, *Hidrodinamic and Hydromagnetic Stability.* Dover, New york, 1981.

[2] L.C.F. Ferreira. *Well-posedness and asymptotic behaviour for the convection problem in* R^n. Nonlinearity, 19(2006), 2169-2191.