

Seminário/Talk

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Numerical confinement of a viscous fluid by a feedback forces field

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Resumo/Abstract:

We consider a 2d flow of an incompressible viscous fluid in a semi-infinite strip governed by the Navier- Stokes system with a feed-back forces field which depends on the velocity field itself. Steady versions of this problem were analyzed by S.N. Antontsev, J.I. Díaz and H.B. de Oliveira [1, 2, 3] with respect to the existence, uniqueness and confinement of the solutions. However the confinement of the solutions to the time-dependent version of this problem remains open, although we conjectured the same effect has to occur. In a recent collaboration with Nuno Lopes from ISEL - Instituto Politécnico de Lisboa, we have started the numerical study of the steady problem by using a Continuous/Discontinuous Finite Element Method introduced by Engel, Garikipati, Hughes, Larson, Mazzei and Taylor [5] and subquently developed many authors amongst whom Brenner and Sung [4]. In this seminar, we will show the first results regarding the numerical confinement of the solutions we have obtained by using this method.

Referências/References

[1] S.N. Antontsev, J.I. Díaz and H.B. de Oliveira. On the confinement of a viscous fluid by means of a feedback external field. C. R. Méc. Acad. Sci. Paris, 330 (2002), 797–802.

[2] S.N. Antontsev, J.I. Díaz and H.B. de Oliveira. Stopping a viscous fluid by a feedback dissipative field: I. The stationary Stokes problem. J. Math. Fluid Mech. 6 (2004), n. 4, 439–461.

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[4] S.C. Brenner and L.-Y. Sung. C0 interior penalty methods for fourth order elliptic boundary value problems on polygonal domains. J. Sci. Comput. 22-23 (2005), 83–118.

[5] G. Engel, K. Garikipati, T.J.R. Hughes, M.G. Larson, L. Mazzei and R.L. Taylor. Continuous/discontinuous finite element approximations of fourth-order elliptic problems in structural and continuum mechanics with applications to thin beams and plates, and strain gradient elasticity. Comput. Methods Appl. Mech. Engrg. 191 (2002), n. 34, 3669–3750.

