

# C/DG-FEM solutions of a fourth-order nonlinear model for the confinement of fluid flows

Nuno D. Lopes<sup>1</sup>

<sup>1</sup> ISEL - Instituto Politécnico de Lisboa, Lisboa, Portugal

In this talk, we present a Continuous/Discontinuous Galerkin Finite Element Method (C/DG-FEM) with interior penalty terms to solve a nonlinear fourth-order problem that appears in the analysis of the confinement of fluid flows governed by the Stokes system. A detailed study of this numerical problem can be seen in Lopes and Oliveira [1], which is the basis for this talk. More specifically, the proof of the existence and uniqueness of weak solutions for the associated continuous and discrete problems along with the consistency, stability and convergence of the numerical method can be seen there. Here, we focus on the numerical solutions provided by the C/DG-FEM numerical scheme. To show the applicability and robustness of the numerical model, several test cases are shown along with a comparison with another well-known numerical scheme. Moreover, the effect of the nonlinear term in the system, which is given by a feedback forces field associated with the confinement property of the fluid flow, is illustrated in the last numerical example. This is a joint work with H. B. Oliveira.

## References

- [1] LOPES, N. D. AND DE OLIVEIRA, H. B., *Continuous/discontinuous Galerkin approximations for a fourth-order nonlinear problem*, submitted.