# Manolo, Kisko and other young people

E. Fernández-Cara*

In this talk, I will first recall some "old" works in collaboration with M. González-Burgos concerning control results for nonlinear PDEs and with F. Guillén, dealing with the mathematical analysis of viscous (but not necessarily Newtonian) fluids.

Then, I will speak of other more recent related results that hopefully will lead to new achievements in the next future. Among others, I will refer to the multi-objective and hierarchic control of several PDEs and also to several geometric inverse problems for parabolic systems.

## Acknowledgements

## References

[1] F. D. Araruna, E. Fernández-Cara, S. Guerrero, M. C. Santos, *New results on the Stackelberg-Nash exact control of linear parabolic equations*. Systems Control Lett. 104 (2017), 78–85.

[2] F. D. Araruna, E. Fernández-Cara, L. C. da Silva, *Hierarchical exact controllability of semilinear parabolic equations with distributed and boundary controls*. Commun. Contemp. Math. 22 (2020), no. 7, 1950034.

[3] J. Apraiz, A. Doubova, E. Fernández-Cara, M. Yamamoto, *Some inverse problems for the Burgers equation and related systems*. Commun. Nonlinear Sci. Numer. Simul. 107 (2022), Paper No. 106113.

[4] J. Apraiz, A. Doubova, E. Fernández-Cara, M. Yamamoto, *Uniqueness in determining multidimensional domains with unknown initial data*. To appear.

[5] E. Fernández-Cara, M. González-Burgos, *A result concerning controllability for the Navier-Stokes equations*. SIAM J. Control Optim. 33 (1995), no. 4, 1061–1070.

[6] E. Fernández-Cara, M. González-Burgos, L. de Teresa, *Boundary controllability of parabolic coupled equations*. J. Funct. Anal. 259 (2010), no. 7, 1720–1758.

[7] E. Fernández-Cara, F. Guillén, *The existence of nonhomogeneous, viscous and incompressible flow in unbounded domains*. Comm. Partial Differential Equations 17 (1992), no. 7-8, 1253–1265.

[8] E. Fernández-Cara, F. Guillén, R. R. Ortega, *Mathematical modeling and analysis of viscoelastic fluids of the Oldroyd kind*. Handbook of numerical analysis, Vol. VIII, 543–661, North-Holland, Amsterdam, 2002.

*EDAN and IMUS, Universidad de Sevilla, Campus Reina Mercedes, 41012 Sevilla (SPAIN). Email: cara@us.es