Maximal Regularity in Action on Free Boundary Problems

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In this talk, I plan to introduce the main ideas of the maximal regularity regime for linear systems arising in fluid mechanics. Our focus will be on the framework of Besov spaces and a nontrivial application of abstract semigroup theorems. A key example illustrating the importance of these techniques is free boundary problems. In particular, I will discuss the case of the Navier-Stokes equations. For further details, I refer to my papers:

1. Danchin, Raphael; Mucha, Piotr B.; Tolksdorf, Patrick: Lorentz spaces in action on pressureless systems arising from models of collective behavior. J. Evol. Equ. 21 (2021), no. 3, 3103–3127

2. Danchin, Raphael; Mucha, Piotr B.: Compressible Navier-Stokes system: large solutions and incompressible limit. Adv. Math. 320 (2017), 904–925.

3. Danchin, Raphael; Mucha, Piotr B.: Critical functional framework and maximal regularity in action on systems of incompressible flows. Mem. Soc. Math. Fr. (N.S.) No. 143 (2015),151 pp.

4. Danchin, Raphael; Hieber, Matthias; Mucha, Piotr B.; Tolksdorf, Patrick: Free Boundary Problems via Da Prato-Grisvard Theory arXiv:2011.07918, to appear in in Memoirs of the American Mathematical Society.

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