Algorithms for coupling two turbulent incompressible fluids by a non linear interface law

Roger Lewandowski[1]

[1]IRMAR, UMR CNRS 6625, University of Rennes and ODYSSEY Team, INRIA Rennes, France, E-mail: Roger.Lewandowski@univ-rennes1.fr

We aim to develop algorithms which make it possible to couple two turbulent incompressible fluids through an interface by a non linear friction law between the two fluids, a Manning-type law. This is an ocean-atmosphere coupling "toy-model". A variational formulation written in product spaces allows the use Picard iteration methods based on linearizations, easier to code than traditional Schwartz methods and adapted to nonlinear models. The purpose of this work is to prove convergence results of these algorithms depending on the friction coefficient C_s, and implement them in FreeFem 2D codes to test their feasibility.