
Mathematical and Numerical Analysis of Micro-Macro Simulations for Polymeric Fluid Flows

CLAUDE LE BRIS

Centre d'Enseignement et de Recherche en Mathématiques

École Nationale des Ponts et Chaussées, France

E-mail: `lebris@cermics.enpc.fr`

We shall review some recent contributions on the analysis of micro-macro models for polymeric fluid flows. The system of equations that needs to be simulated numerically is a coupled system consisting of the Navier-Stokes equations (at the macroscopic scale) together with some kinetic equations at the microscopic scale. The kinetic equations, of Fokker-Planck type, may be solved as such, or transformed into stochastic differential equations that are in turn discretized. Such a coupled system raises many questions, both of theoretical and numerical nature. Issues about the well-posedness of the system, as well as questions dealing with the convergence of finite elements methods in this framework will be dealt with. The talk will report on joint works with E. Cances, Y. Gati, B. Jourdain, T. Lelievre, P.L. Lions.