

Meeting: 1002, Pittsburgh, Pennsylvania, SS 5A, Special Session on Multiscale Algorithms in Computational Fluid Dynamics

1002-65-95 **Qiang Du*** (qdu@math.psu.edu), Dept of Math, PSU, University Park, PA 16802, **Chun Liu**, Dept of Math, PSU, University Park, PA 16802, and **Peng Yu**, Dept of Math, PSU, University Park, PA 16802. *FENE dumbbell model for complex fluids and its closure approximations.*

We present some analytical and numerical studies on the macro-micro FENE model of polymeric fluids and its several moment-closure approximations. We establish the well-posedness of the FENE model under the influence of a steady flow field. The stability of the steady-state solution for general velocity gradient is illuminated by the analysis of the FENE-P closure approximation. We propose a new linear closure approximation utilizing higher moments, which is shown to generate more accurate approximations than other existing closure models for moderate shear or extension rates.

References:

1. Peng Yu, Qiang Du and Chun Liu, *From Micro to Macro Dynamics Via a New Moment Closure Approximation to the FENE Model of Polymeric Fluids*, to appear in SIAM Journal of Multiscale Modeling and Simulation.
2. Qiang Du, Chun Liu and Peng Yu, *FENE Dumbbell Model and Its Several Linear and Nonlinear Closure Approximations*, submitted (Received September 07, 2004)