Oberseminar Numerik am: 11.12.12

Dr. habil. Jörg Wolf

"On the local pressure of the equations of Non-Newtonian fluids"

Abstract:

In various models of incompressible viscous fluids one of the most challenging problem is the existence of a pressure function, which can be regarded as a Lagrangian multiplier of the system due to the restrain of divergence free condition of the velocity of the fluid. While for the well-known Navier-Stokes equations this problem can be solved by using the L^p theory for the Stokes operator similar results for the Non-Newtonian case are unknown. However, by introducing a new method of constructing a local pressure we are able to prove the existence of a weak solution to such systems, satisfying a new form of local energy identity involving the local pressure. This eventually will lead new results of partial regularity of weak solutions to the equations of non-Newtonian fluids.