Mathematics, Statistics, and Computer Science **@ UIC**

Analysis and Applied Mathematics Seminar

Improved estimates for thermal fluid equations

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Abstract: We consider a model for three-dimensional fluid flow on the torus that also keeps track of the local temperature. The momentum equation is the same as for Navier-Stokes, however the kinematic viscosity grows as a function of the local temperature. The temperature is, in turn, fed by the local dissipation of kinetic energy. Intuitively, this leads to a mechanism whereby turbulent regions increase their local viscosity and dissipate faster. We prove a strong a priori bound (that would fall within the Ladyzhenskaya-Prodi-Serrin criterion for ordinary Navier-Stokes) on the thermally weighted enstrophy for classical solutions to the coupled system.

Monday, February 20 at 4:00 PM in SEO 636