Journée EDP / PDE Day Lundi 26 mai 2014 / 2014, Monday May 26.

Poitiers.

Laboratoire de mathématiques et applications.

10:00 - 10-45. Gisèle Ruiz Goldstein (University of Memphis) "The Black-Scholes and Heat Equations: Chaos and the Zero Volatility Limit"

Résumé / Abstract. The Black-Scholes equation of mathematical economics and finance and the one dimensional heat equation are intimately related. We discuss these second order linear equations with various parameters and lower order terms. Each equation determines a chaotic semigroup on various supremum norm spaces, as do their limits when the positive coefficient of volatility (or the second order term in the case of the heat equation) goes to zero. As a corollary, we get significant extensions of ways to view the heat equation as chaotic. These results are joint with Hassan Emamirad, Jerry Goldstein and Philippe Rogeon.

Pause/Break

11:15 – 12:00. Maurizio Grasselli (Politecnico di Milano)

"Cahn-Hilliard-Navier-Stokes systems with nonlocal interactions"

Résumé *I* **Abstract.** We first give a brief overview on diffuse interface models for isothermal mixtures of two immiscible incompressible fluids with matched densities (model H). They consist of the Navier-Stokes system coupled with a convective Cahn-Hilliard equation. Then we discuss some recent results on a model which accounts for nonlocal interactions, nonconstant (possibly degenerate) mobility and singular potential. Such results are concerned with well-posedness issues as well as the longtime behavior of solutions.

14:00 – 14:45. Cecilia Cavaterra (Università degli Studi di Milano)

"Non-isothermal viscous Cahn-Hilliard equation with inertial term and dynamic boundary conditions"

Résumé / Abstract. We consider a non-isothermal modified viscous Cahn–Hilliard equation which was previously analyzed by M. Grasselli et al. Such an equation is characterized by an inertial term and it is coupled with a hyperbolic heat equation from the Maxwell–Cattaneo's law. We analyze the case in which the order parameter is subject to a dynamic boundary condition. This assumption requires a more refined strategy to extend the previous results to the present case. More precisely, we first prove the well-posedness for solutions with finite energy as well as for weak solutions. Then we establish the existence of a global attractor. Finally, we prove the convergence of any given weak solution to a single equilibrium by using a suitable Lojasiewicz–Simon inequality.

Pause/Break

15:15 – 16:00. Jerome A. Goldstein (University of Memphis)

"Asymptotic equipartion of energy for some non autonomous hyperbolic systems"

Résumé / **Abstract**. The wave equation u''(t)+Au(t)=0 for t real and A a positive injective selfadjoint operator has asymptotically equal potential and kinetic energies as t goes to infinity, for all solutions, provided A is spectrally absolutely continuous. We extend this to certain hyperbolic systems where A depends on t and {A(t)} are mutually commuting positive selfadjoint spectrally absolutely continuous operators, and this system reduces to the above wave equation when A is independent of t. This is new work in progress, in collaboration with Gisele Goldstein and Fabiana Travessini.