GLOBAL ATTRACTOR AND NON HOMOGENEOUS EQUILIBRIA FOR A NON LOCAL EVOLUTION EQUATION IN AN UNBOUNDED DOMAIN

ANTÔNIO LUIZ PEREIRA

We consider the non local evolution equation

$$\frac{\partial u}{\partial t}(x,t) = -u(x,t) + \tanh\left(\beta J * u(x,t) + h\right)$$

where $u(x,t)$ is a real function on $\mathbb{R} \times \mathbb{R}_+$, $J \in C^1(\mathbb{R})$ is a non negative even function with integral equal to 1 supported in the interval $[-1,1]$, β, h are positive constants. and $*$ denotes the convolution product.

This equation arises as a continuum limit of one-dimensional Ising spin systems with Glauber dynamics and Kac potentials; u represents then a magnetization density and β^{-1} the temperature of the system.

We show the problem is well-posed in some weighted spaces and the associated flow admits a global compact attractor. We also prove the existence of a distinguished non homogeneous equilibrium called a 'bump solution' or 'critical droplet' in the literature

(A. L. Pereira) Departamento de Matemática, Instituto de Matemáticas e Estatística, Universidade de São Paulo, Rua do Matão 1010, CEP 05508-090 São Paulo SP, Brazil

E-mail address: alpereir@ime.usp.br