A NONLOCAL CONVECTION DIFFUSION EQUATION

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In this talk we will present some nonlocal evolution problems that involve operators of the type:

$$Lu(x) = \int_{\mathbf{R}^d} K(x-y)(u(x)-u(y))dy$$

We study the asymptotic behaviour of the solutions of the following nonlocal convection-diffusion equation

$$u_t = Lu + \int_{\mathbf{R}^d} G(x-y)f\Big(\frac{u(t,y)+u(t,x)}{2}\Big)dy$$

in the particular case when $f(u) = u^2$.

We prove that under smallness assumption on the initial data the solutions behave as the self similar profiles of the Burgers equation with Dirac mass as the initial datum. The first term in the asymptotic expansion of the solutions is obtained by rescaling the solutions and probe the compactness of the trajectories.