p-Adic Analogue of the Porous Medium Equation

Abstract

We consider a nonlinear evolution equation for complex-valued functions of a real positive time variable and a p-adic spatial variable. This equation is a non-Archimedean counterpart of the fractional porous medium equation. Developing, as a tool, an L^1-theory of Vladimirov's p-adic fractional differentiation operator, we prove m-accretivity of the appropriate nonlinear operator, thus obtaining the existence and uniqueness of a mild solution. We give also an example of an explicit solution of the p-adic porous medium equation.

The talk is based on collaborations with Andrei Khrennikov, Mathematical Institute, Linnaeus University, Sweden.