Numercial Analysis of Fractional Nonlinear Diffusion Equation on Bounded Domain

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This talk will discuss a numerical method for a nonlinear fractional diffusion equation, which arises by combining nonlocal diffusion with a porous medium or fast diffusion type nonlinearity. The continuous solutions of this equation exhibit energy decays that imply a characteristic asymptotic behaviour: finite-time extinction in the fast diffusion case, algebraic decay in the porous medium case. Based on a discretization of the fractional Laplacian recently introduced by Huang and Oberman, we will present a scheme that preserves, at the discrete level, these decay estimates.