1171-35-186 **Hayley Anne Olson*** (`hayley.olson@huskers.unl.edu`), University of Nebraska-Lincoln, Dept. of Math 203 Avery Hall, Box 880130, Lincoln, NE 68588, and **Mikil Foss** and **Petronela Radu**. *Nonlinear Diffusion in the Nonlocal Setting.*

Nonlinear diffusion can model phenomena where diffusivity is dependent on, for example, temperature or concentration. We consider the nonlocal analogue to nonlinear diffusion – the same structure but with nonlocal versions of divergence and gradient in place of the classical operators – which allows for a larger set of possible solutions including discontinuous and otherwise non-differentiable functions. We assess the well-posedness of the nonlocal system and provide convergence results comparing the classical and nonlocal systems. In particular, showing the convergence of the action of the nonlocal operator and convergence of the solutions to boundary value problems with the nonlocal operator to the standard analogues as the interaction horizon of the nonlocal operator shrinks to zero. (Received August 10, 2021)