

Numerical Methods for Fractional Diffusion

Ricardo Nochetto¹

We present three schemes for the numerical approximation of fractional diffusion, which build on different definitions of such a non-local process. The first method is a PDE approach that applies to the spectral definition and exploits the extension to one higher dimension. The second method is the integral formulation and deals with singular non-integrable kernels. The third method is a discretization of the Dunford-Taylor formula. We discuss pros and cons of each method, error estimates, and document their performance with a few numerical experiments.

¹ University of Maryland, Institute for Physical Science and Technology,
rhn@math.umd.edu