1135-35-574   **Pablo Raúl Stinga*** (`stinga@iastate.edu`). *How to approximate the fractional Laplacian by the fractional discrete Laplacian.*

We use the solution to the semidiscrete heat equation in combination with the language of semigroups to define and obtain the pointwise formula for the fractional powers of the discrete Laplacian on a mesh of size $h > 0$. It is shown that solutions to the continuous fractional Poisson equation $(-\Delta)^s U = F$ can be approximated by solutions to the fractional discrete Dirichlet problem $(-\Delta_h)^s u = f$ in B_R^h, $u = 0$ in $\mathbb{Z}_h \setminus B_R^h$. We obtain error estimates in the strongest possible norm, namely, the L^∞ norm, under minimal natural Hólder regularity assumptions. Key ingredients for the analysis are the regularity estimates for the fractional discrete Laplacian, which are of independent interest. (Received September 08, 2017)

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