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Siwei Duo* (sddy9@mst.edu) and **Yanzhi Zhang**. *Numerical methods for non-local diffusion equation.*

In recent years, the non-local diffusion equation arises much attention which has been widely used in various areas. The fractional Laplacian is a non-local operator which serves as a prototype operator for modeling non-local diffusion processes and can be used to describe new phenomena that are absent from the standard diffusions. However, the nonlocality introduces considerable challenges in both mathematical analysis and numerical simulations. In this talk, we present two numerical methods for solving the non-local diffusion equation with fractional Laplacian. The accuracy and convergence of these methods are analyzed. Also, some numerical examples are presented to compare the accuracy of these methods with other available methods in the literature. (Received September 03, 2016)