ZHEN SHUANG, Memorial University of Newfoundland
Fractional p-Laplacian and Signal Decomposition

The fractional p-Laplacian $(-\Delta)_p^{\frac{\alpha}{2}}$ can be recovered by a weighted Laplace operator

$$div_{x,\tau}\big(\tau^{1-\alpha p2^{-1}}\nabla_{x,\tau}u(x,\tau)\big)$$

through a limit of a function in the one-more-dimensional upper space. Hence an evolutionary equation with fractional p-Laplacian can be replaced with another one with the weighted Laplace operator to perform signal decomposition since it takes too much time to approximate the fractional p-Laplace evolutionary equation. The signal decomposition is to decompose a signal into different smoothness degrees.