

Fractional power operators in Banach spaces: sharp extension problem characterizations

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We prove sharp extension problem characterizations for all fractional powers L^s , $s > 0$, of generators L of uniformly bounded C_0 -semigroups on Banach spaces in the spirit of Caffarelli–Silvestre, Stinga–Torrea and Galé–Miana–Stinga. We prove existence and uniqueness of the Banach-valued initial value extension problems and obtain new formulas for the solution that allow us to characterize L^s as a Dirichlet-to-Neumann map. Our results resolve the question of setting up the correct initial conditions that guarantee well-posedness of both extension problems. This is joint work with Animesh Biswas (Missouri State University).

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