

Properties of a class of nonlocal evolution equations

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Abstract

Fractional calculus is as old as the classical differential calculus, but only during the past eighty years, starting with the seminal 1938 paper of M. Riesz, it has acquired a prominent role in mathematics and in the applied sciences. The last decade has seen an explosion of activity, following the pioneering 2007 work of Caffarelli and Silvestre on the extension problem for the fractional powers of the Laplacian.

I will discuss some significant examples in which fractional operators arise and, after giving a brief overview of the fractional Laplacian, I will present the main features of a general class of nonlocal operators, discuss a somewhat unexpected chain rule and point to some new isoperimetric inequalities.