Superposition operators of mixed order and jumping nonlinearities

Serena Dipierro
University of Western Australia
`serena.dipierro@uwa.edu.au`

We discuss some recent results concerning a superposition operator of the form

$$\int_{[0,1]} (-\Delta)^s u \, d\mu(s),$$

for a signed measure μ on the interval of fractional exponent $[0, 1]$, joined to a nonlinearity whose term of homogeneity equal to one is "jumping", i.e. it may present different coefficients in front of the negative and positive parts.

The signed measure is supposed to possess a positive contribution coming from the higher exponents that overcomes its negative contribution (if any).

The problem taken into account is also of "critical" type, though in this case the critical exponent needs to be carefully selected in terms of the signed measure μ.