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Luxemburg Norm Localisation for Nonlocal Differential Equations with Convolution Coefficients

I will discuss how a nonstandard cone together with topological fixed point theory can be used to deduce existence results for boundary value problems involving a nonlocal differential equation. A model case is the one-dimensional steady-state Kirchhoff-like equation

$$-A(\|u\|_{L^2}^2) u''(t) = f(t, u(t)), \quad 0 < t < 1$$

subject to the Dirichlet data $u(0) = 0 = u(1)$. I will discuss the various assumptions imposed on the functions A and f , and how these assumptions are affected by the use of the Luxemburg norm as part of the fixed point analysis.