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On the Well-posedness of Nonlocal Elliptic-Parabolic Difference Problems

The second order of accuracy difference scheme of the approximate solution of abstract nonlocal boundary value problem

$$\begin{cases} -\frac{d^2u(t)}{dt^2} + Au(t) = g(t), 0 < t < 1, \\ \frac{du(t)}{dt} - Au(t) = f(t), -1 < t < 0, \\ u(1) = u(-1) + \mu \end{cases}$$

for differential equations in a Hilbert space H with the self-adjoint positive definite operator A is considered. The well-posedness of this difference scheme in Hölder spaces is established. In applications, coercivity inequalities for the solution of a difference scheme for elliptic-parabolic equations are obtained.

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