REGULARIZATION METHODS FOR SIMULTANEOUSLY DETERMINING OF UNKNOWN SOURCES IN A PARABOLIC EQUATION

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In this talk we consider an inverse problem of simultaneously finding unknown sources \(f, g\) and function \(u(t)\) that satisfy the equation:

\[
u'(t) + Au(t) = f, \quad 0 < t < T_2, \quad u(0) = g,
\]

and the additional specifications:

\[
\mathcal{B}_1(u) = u(T_1) = \varphi_1, \quad \mathcal{B}_2(u) = u(T_2) = \varphi_2,
\]

where \(A\) is a self-adjoint positive definite linear operator with dense domain \(D(A)\) in the Hilbert space \(H\), \(\varphi_1\) and \(\varphi_2\) are two known functions in \(H\).

Problem (1), (2) is not well-posed in the sense of Hadamard. In this work, we will use the quasi-boundary-value method to form an approximate non-local problem depending on a small parameter \(\alpha\). We show that the approximate problem is well-posed, and the convergence of this method.