Global in time results for some semilinear integrodifferential identification problems

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Abstract

We investigate some abstract integrodifferential inverse problems that can be applied to the heat equation with memory, to the strongly damped wave equation with memory and to a model of the type:

$$u_t(t,x) = \Delta u(t,x) + \int_0^t k(t-s)\Delta u(s,x)\,ds + \int_\Omega u_t(t,x)\,dx + e^{u(t,x)},$$

given suitable initial–boundary conditions.

Since we simultaneously identify the convolution memory kernel k and the temperature u, we associate the additional restriction on u:

$$\int_\Omega \varphi(x)u(t,x)\,dx = g(t),$$

where φ and g are given functions.