

AN IDENTIFICATION PROBLEM FOR AN ABSTRACT SYSTEM OF LINEAR EVOLUTION EQUATIONS IN A BANACH SPACE

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ABSTRACT. We prove both the existence and uniqueness of a solution to the identification problem: *find an element $z \in X$ and a function $u : [0, 1] \rightarrow X$ satisfying*

$$(JP) \quad \begin{cases} u'(t) = Au(t) + F(t)z, & t \in [0, 1] \\ u(0) = u_0, \\ \mu([0, 1])^{-1} \int_0^1 d\mu(t)u(t) = u_1, \end{cases}$$

where A is the infinitesimal generator of a C_0 -semigroup in a Banach space X , $F \in C^1([0, 1]; \mathcal{L}(X))$ and μ is countably additive $\mathcal{L}(X)$ -valued measure on $[0, 1]$ with $\mu([0, 1])$ being invertible.

We stress that the present result extends to the case of C_0 -semigroups the explicit representation formulae for the solution of problem (JP) obtained by Yu. Anikonov and A. Lorenzi [1] in the specific case when A is the infinitesimal generator of an analytic semigroup of contractions and $\mu = \lambda I$, λ being a finite Borel measure on $[0, 1]$. So, our abstract result handles both parabolic and hyperbolic equations and systems.

REFERENCES

- [1] Yu. Anikonov, A. Lorenzi, Explicit representation for the solution to a parabolic differential identification problem in a Banach space, in print.

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