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Spectral analysis and correct solvability of abstract integrodifferential equations arising in thermo physics and acoustics

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ABSTRACT: In the present paper, we study integrodifferential equations with unbounded operator coefficients in Hilbert spaces. The principal part of the equation is an abstract hyperbolic equation perturbed by summands with Volterra integral operators. These equations represent an abstract form of the Gurtin-Pipkin integrodifferential equation describing the process of heat conduction in media with memory and the process of sound conduction in viscoelastic media and arise in averaging problems in perforated media (the Darcy law). The correct solvability of initial-boundary problems for the specified equations is established in weighted Sobolev spaces on a positive semiaxis. Spectral problems for operator-functions are analyzed. Such functions are symbols of these equations. The spectrum of the abstract integrodifferential Gurtin-Pipkin equation is investigated. © 2013 Springer Science+Business Media New York.

Vlasov, V.V., Rautian, N.A., Correct solvability and spectral analysis of abstract hyperbolic integrodifferential quaitons Tr. Sem. im., Petrovskogo, to appear;

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ISSN: 10723374
LANGUAGE OF ORIGINAL DOCUMENT: English
DOCUMENT TYPE: Article
SOURCE: Scopus