Spectral analysis and representation of solutions of Volterra integro-differential equations with fractional exponential kernels

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We study integro-differential equations with unbounded operator coefficients in Hilbert space. The equations under consideration are abstract hyperbolic equations perturbed by terms containing Volterra integral operators. The kernels of these Volterra operators are sums of fractional exponential Rabotnov functions (see [1]). These integro-differential equations can be realized as partial integro-differential equations arising in the theory of viscoelasticity (see [1]) and also as Gurtin-Pipkin integro-differential equations (see [2]), which describe heat transfer with a finite rate in media with memory.

We establish the existence of strong and generalized solutions of the above integro-differential equations and the spectral analysis of operator functions being symbols of these equations is performed. This makes it possible to obtain representations and estimates of solutions of the equations in question (see [3]).

References

