

Asymptotic Behavior and Stability of the Solutions of Functional Differential Equations in Hilbert Space

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Abstract: In the following article we present the results on the asymptotic behavior and stability of the strong solutions for functional differential equations (FDE). We also formulate several results on spectral properties (completeness and basisness) of exponential solutions of the above-mentioned equations. It is relevant to underline that our approach for researching FDE is based on the spectral analysis of the operator pencils which are the symbols (characteristic quasipolynomials) with operator coefficients. The article is divided into two parts. The first part is devoted to researching FDE in a Hilbert space, the second part to researching FDE in a finite-dimensional space.

Keywords: *Functional-differential equation; solvability; stability; operator-valued function; asymptotic behavior; basisness.*

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