Variation Formulas of Solution for a controlled Functional Differential Equation Considering Perturbations of Delay Parameters

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For the functional differential equation

$$\dot{x}(t) = f(t, x(t), x(t-\tau_{10}), ..., x(t-\tau_{s0}), u_0(t)), \ t \in [t_{00}, t_{10}]$$

with the continuous initial condition

$$x(t) = \varphi_0(t), \ t \le t_{00}$$

three types variation formulas of solution are proved for new classes of variations. In the variation formulas are detected the effects of the continuous initial condition and perturbations of delay parameters $\tau_{i0} > 0, i = \overline{1,s}$. The variation formulas of solution for various classes controlled functional differential equations without perturbation of delay are proved in [1,2].

References

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[2] G. L. Kharatishvili, T. A. Tadumadze, Variation formulas of solutions and optimal control problems for differential equations with retarded argument. *J. Math. Sci. (NY)* , **104**, 1(2007), 1-175 .