

# Variation Formulas of Solution for one Class of Controlled Differential Equation with the Mixed Initial Condition and their Applications in Optimization Problems

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For the system of nonlinear controlled functional differential equation with constant delays, local variation formulas of solution are proved ( linear representations of the variation of solution with respect to perturbations in a neighborhood of the right end of the main interval). On the basis of variation formulas, optimal problems with incommensurable delays in controls and nonlinear boundary conditions and functional are investigated. Namely, necessary conditions of optimality are obtained: in the form of linearized integral maximum principle for control and initial functions, in the form of equalities and inequalities for initial and final moments.