

On Modeling a Solution of Systems with Constant Delay Using Controlled Models

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Abstract—The problem of modeling a solution is studied for a nonlinear system of differential equations with constant delay, inexactly known right-hand side, and inaccurately given initial state. The case is considered when the right-hand side of the system is a nonsmooth (it is only known that it is Lebesgue measurable) unbounded function (belonging to the space of square integrable functions in the Euclidean norm). An algorithm for solving this system that is stable to information noises and calculation errors is constructed. The algorithm is based on the concepts of feedback control theory. An estimate of the convergence rate of the algorithm is established. The possibility of using the algorithm to find an approximate solution to a system of ordinary differential equations is mentioned.

Keywords: system with delay, approximate solution.

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