

Transfinite Version of the Program Iteration Method in a Game Problem of Approach for an Abstract Dynamical System

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Abstract—The game problem of approach of motions of an abstract dynamical system to a given target set within state constraints is considered. An arbitrary subset of real numbers acts as a time “interval.” The target set \mathcal{M} and the state constraints \mathcal{N} obey the inclusion $\mathcal{M} \subset \mathcal{N}$. Nonanticipative multifunctions defined on the histories of the disturbance are considered as admissible control strategies. A description of the solvability set and a construction of resolving control strategies based on the method of program iterations are given. At the same time, by increasing the “number” of iterations of the program absorption operator, it is possible to expand (compared to the original version of the method) the areas of applicability of the method due to the weakening or complete rejection of the topological requirements to the system dynamics, target set, and state constraints. The proposed constructions and their justification use the technique of fixed points of monotone mappings in partially ordered sets.

Keywords: approach game problem, program iterations, abstract dynamical system, nonanticipative strategies.

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