Section 08: Ordinary Differential Equations and Dynamical Systems | Poster number 590

The Problem of the Adaptive Minimax Control for the Pursuit-Evasion Process in Discrete-Time Systems with Several Pursuers

Andrei F. Shorikov, Ural State University of Economics, Department of Information Systems in Economics, Ekaterinburg, Russia.

ABSTRACT

In this report we consider the problem of the adaptive minimax control for the pursuit-evasion process with incomplete information [1]-[6] in dynamical systems that consist of several controlled objects. The motions of all pursuers and the evader are described by a nonlinear and a linear vector discrete-time equations, respectively. The values of the signals with errors are generated by the discrete relationships, which is linear by the phase vectors of evader and depends on the phase vectors of pursuers via matrix transformation. It is assumed that the sets constraining the variation of all a priori undefined system parameters are known and are convex, closed and bounded polyhedrons (with finite numbers of tops). Under these assumptions, we formulate the problem of the adaptive minimax control for the pursuit-evasion process in discrete-time dynamical systems with several pursuers.

For organizing of minimax control pursuit in choosing class of adaptive strategies, we propose a recursive (backward) procedure each step of which is based on realization of minimax a posteriori filtering process [3], [4] and on solving of linear and convex programming problems.

The results obtained in this report are based on [1]-[4] and can be used for computer simulation of an actual dynamical process and for designing of optimal controlling and navigation systems. Mathematical models of such systems had considered, for example, in [1]-[6].

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Keywords: *discrete-time dynamical systems, pursuit-evasion process, adaptive minimax control*

Mathematics Subject Classification: *90C47, 93C55*

Contact Address: shorikov@usue.ru