

**Probability flows and behavior of the finite automata
in a random environment**

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Annotation. We consider the problem of the behavior of finite automata of a special class in a random environment, which is the problem of finding the optimal choice from a finite set of alternatives with random reinforcement under conditions of a priori uncertainty. A random environment reacts to the behavior of automata with responses that are perceived by automata as one of the following three classes: a class of favorable reactions (gain), a class of adverse reactions (loss), a class of neutral reactions (indifference). It should be noted that the automata do not have any information about in what random environment they have to function. The functioning of automata in such media is described by ergodic Markov chains, with the help of whose properties, in particular, the property of probability flows, it is shown that the considered automata are trained and their behavior in a random environment is expedient, and if additional conditions on the environmental parameters are met, some of them have the property asymptotic optimality.

Keywords: behavior of the automaton, ergodic chains of Markov, expedient behavior, learning automaton, probability flows, random environment.