

Identification of Markovian automata sub-classes

Rafailovna N., Viktorovich S.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved. As of today topical are the tasks of synthesis and analysis of Markovian automata models that allows obtaining certain information about the automaton structure or nature by Markovian chains of the specified length that are generated by it. Significance of these tasks is determined by wide applied capabilities. In this paper the method of recognition (identification) of a Markovian automaton determined on the basis of ergodic stochastic matrices of cyclic class that are not reduced to normal form by the Markov chains executed by them is proposed. The recognition criteria have been formed on the basis of the characteristic attribute of the cyclic stochastic matrix and allow estimating probability of belonging of a Markovian automaton to the specified sub-class. According to the method proposed the algorithm and program of identification have been designed. Accuracy of the identification method has been validated by means of performance of experimental study of sampling of cyclic stochastic matrices. This method allows identifying presence or absence of cycles in the Markovian sequence of the specified length with certain confidence coefficient. The algorithm of identification of CSMr presented in the paper demonstrates good performance. The method proposed and implementation thereof at the algorithmic and software level allow solving the tasks of testing the specified sub-classes of generators of discrete stochastic Markovian processes. The results are topical in view of the fact that the known methods of analysis of Markovian automata are applied to a restricted class of objects being investigated and the issues related to extension of the class of objects under investigation, development of numerical methods and set of programs remain open.

Keywords

Cyclic stochastic matrix, Identification, Markov chain, Markovian automaton