

CHAPTER 4

THE DEVELOPMENT OF METHODS OF LEARNING ARTIFICIAL
NEURAL NETWORKS OF INTELLIGENT DECISION-MAKING
SUPPORT SYSTEMS

ABSTRACT

A set of training methods for artificial neural networks of intelligent decision-making support systems has been developed. A distinctive feature of the proposed methods is that not only the synaptic weights of the artificial neural network, but also the type and parameters of the membership function are trained. If it is impossible to ensure the specified quality of functioning of artificial neural networks due to learning the parameters of the artificial neural network, the learning of the architecture of artificial neural networks takes place. The choice of the architecture, type and parameters of the membership function takes place taking into account the computing resources of the tool and taking into account the type and amount of information entering the input of the artificial neural network. Due to the use of the proposed methods, there is no accumulation of learning errors of artificial neural networks as a result of processing information received at the input of artificial neural networks. Also, a distinctive feature of the developed methods is that no preliminary calculation data is required for data calculation. The development of the proposed methods is due to the need to train artificial neural networks for intelligent decision-making support systems, with the aim of processing a larger amount of information, with the unambiguity of the decisions being made.

According to the results of the research, it was established that the specified training methods provide an average of 10–18 % higher training efficiency of artificial neural networks and do not accumulate errors during training. These methods will make it possible to conduct training of artificial neural networks, to determine effective measures to increase the efficiency of the functioning of artificial neural networks.

The use of the specified methods will allow to increase the efficiency of the functioning of artificial neural networks due to the learning of the parameters and architecture of artificial neural networks, to reduce the use of computing resources of decision-making support systems.

The developed methods will make it possible to develop measures aimed at increasing the effectiveness of learning artificial neural networks; increase the efficiency of information processing in artificial neural networks.