

**Секція: КОМП'ЮТЕРНО-ІНФОРМАЦІЙНІ ТЕХНОЛОГІЇ ТА СИСТЕМИ  
ЗВ'ЯЗКУ**

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**DEVELOPMENT OF PROGRAM MODULE PLACED ON MULTI-LAYER  
CONCEPT IN MATLAB**

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**РОЗРОБКА ПРОГРАМНОГО МОДУЛЯ У СКЛАДІ БАГАТОШАРОВОЇ  
СТРУКТУРИ MATLAB**

Accurate predication of different parameters is very important in our daily life starting with predication of the weather parameters and finishing with prediction of economical indices. The analysis of the existing solutions on predication methods showed that the best adaptability and prediction accuracy provides artificial neural networks.

The matlab mathematical software is very popular now within scientists and practioners because it has a lot of embedded functions, including Neural Network Toolbox. Embedded function sin(x) provides one-step prediction only and this mode could be enhanced because it will be more accurate to do re-training on each predication step within one-step predication method. Therefore the development of a software module for one-step and multi-step predication using multilayer concept in matlab is a very urgent topic.

The goals of this research is to develop a software module for one-step prediction with re-training and multi-step predication in matlab. The following tasks should be fulfilled in other to reach the goal of this work.

Analysis of the existing prediction methods and software systems, which can be used for predication and set the task for the work. How to describe the mathematic, algorithmic and information bases of software module which implement the multi-step predication and one-step predication with re-training in matlab. Develop a software of the predication module, in particular, an architecture of the software and describe the software submodules of the system, the user interface and provide the result of experimental research of multi-step predication and one-step predication with re-training in Matlab.

In conclusion thus, two predication methods, the MULTI-STEP predication and ONE-STEP prediction with re-training were developed and experimentally tested in this research. The following results are obtained in this work. The existing predication methods and software systems, which can be used for predication, are analysed and the task for the work is set. The mathematic, algorithmic and information bases of software module which implements the MULTI-STEP predication and ONE-STEP predication with re-training in Matlab are developed. The multi-layer perceptron model used for the prediction is described theoretically, the developed module allows the further use of this Matlab based software for the experimental research of different prediction tasks on different time series with the better quality in comparison with a standard prediction method implemented in matlab. For example, the results of experimental research have showed, that the developed ONE-STEP prediction method with re-training provides a sustainable better prediction results in comparison with two others methods.