

СЕКЦІЯ 2

Науково-технічний прогрес та іноземні мови

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INTELLECTUAL CONTROL AND IDENTIFICATION OF TECHNOLOGICAL PROCESS OF BENEFICIATION

Nowadays the problem of intellectual control over technological processes is considered rather actual. The reason for that is that application of classical methods of the automatic control theory, the optimal and adaptive control does not always allow us to reach the necessary quality of identification and regulation. It especially concerns controlling difficult objects in conditions of nonlinearity uncertainty, non-stationary and time delay [1].

Today such systems are initially nonlinear and possess such properties as generalization and greater robustness. Practice shows that in many cases intellectual approaches allow us to obtain a better quality of controlling real industrial objects. [2]. The problem of identification of technological processes (TP) of iron ore beneficiation in production conditions of a mining complex for further realization of an intellectual control system is considered.

Many researches have proved that the most high-quality identification of industrial and technological systems is performed by statistical methods (for example, functions of autocorrelation and autoregression [1-3, Fig.1].

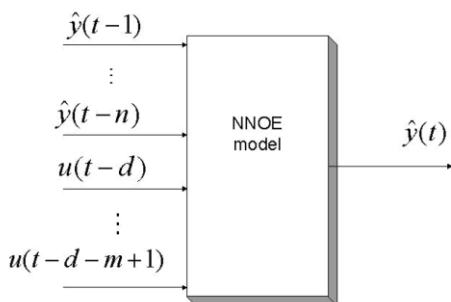


Fig.1. The NNOE model structure

Their absolute advantage is simplicity of realization, and the fact that their adequacy correction can be carried out rather easily by studying frequency characteristics and by

spectral analysis. However, as it is specified in [1], the use of statistical approaches does not always provide accuracy of identification of models of difficult nonlinear objects.

Modelling has been carried out on the basis of the models NNARX and NNOE with application of Neuro Solution software package (Fig.2). As internal modelling structure bases are based on multilayered perceptron (MLP) and networks of the Radial Basis Functions (RBF) have been analyzed. The parameters of the Southern Mining Complex (YuGOK, Kryvyi Rih, Ukraine) have been used.

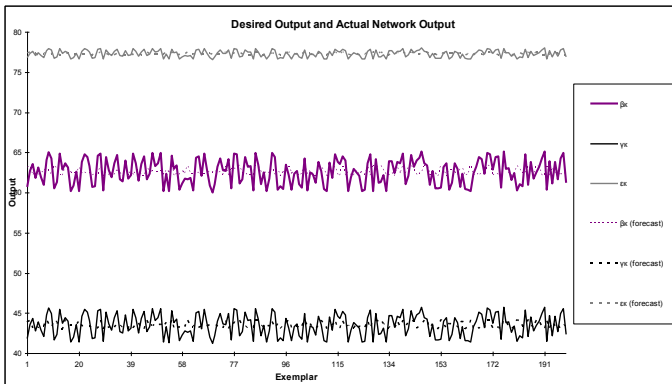


Fig.2. Computer modelling results

We can conclude that the prognosis based on multilayered perceptron provides a high quality of modelling at reasonable time of training. The network of radial basis functions provides the fastest training of the system. However, the accuracy of the prognosis is lower.

References

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