

## MODEL OF A DISTRIBUTED TRANSPORT CONVEYOR SYSTEM WITH THE USE OF A NEURAL NETWORK

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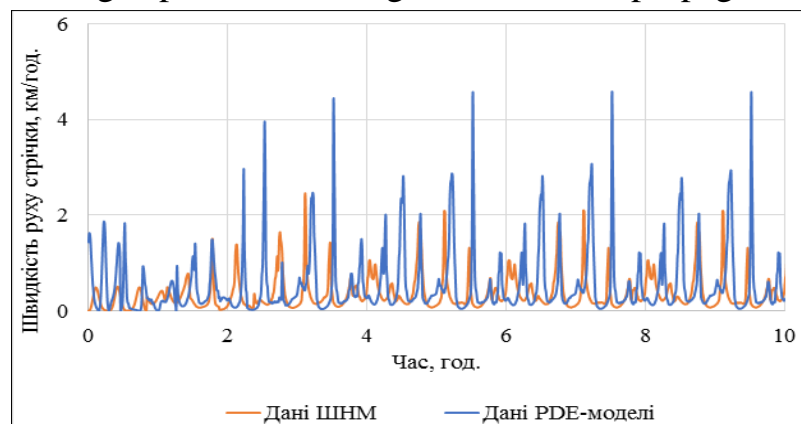
The economic state of the transportation industry is characterized by a rapid increase in the volume of supply and production, and in order to guarantee the stable operation of conveyor systems used in this industry without accidental failures and downtime, it is necessary to analyze and forecast the working situations of industrial transport systems [1].

The paper presents a comparative analysis of the possibilities of modeling complex transport systems by traditional analytical methods depending on the branching and complexity of the system indicators.

The model of neural network of the distributed conveyor transport system is proposed, the input data for training of which is obtained from the PDE model [2], the feasibility of using a PDE model for generating input data is substantiated.

Artificial neural network training is performed using the error back propagation algorithm and the associated gradient descent method. The results of the study are shown in Fig. 1.

The estimation of the quality of the obtained model is carried out according to the criterion for minimizing the mean-squared error (MSE). The analysis confirmed the correct choice of the ANN architecture.



**Figure 2 - Change of conveyor belt speed based on PDE-model and ANN model**

### References:

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2. Model of conveyor with the regulable speed / O.M.Pihnastyi, V.D.Khodusov // Bulletin of the South Ural State University. Ser.Mathematical Modelling, Programming & Computer Software, 2017, vol.10, no.4, pp.64-77. <https://doi.org/10.14529/mmp170407>.