IN FAULT DETECTION AND RELIABILITY ENHANCEMENT ALGORITHM FAILURE CALCULATION METHODS

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ABSTRACT

The development and forecasting of electric motor maintenance requirements is related to a model-based fault detection system and method. Since the method and system of the model are based on software and use the information obtained as a result of uncertain measurements, the implementation phase requires much less cost than the previous maintenance methods.

Keywords: weaving machine, neural network, electric motors, reliability, textile machine, methodology, differential and algebraic equations.

After choosing the architecture of the artificial neural network (SNT), the process of installation in the MATLAB software environment begins, and cyclic adjustments are introduced to its basis by choosing the coefficient of synoptic weights in such a way that, according to it, the differences between the signal of the rotor angular speed sensor and the reaction of the SNT to the relevant incoming data are minimized.

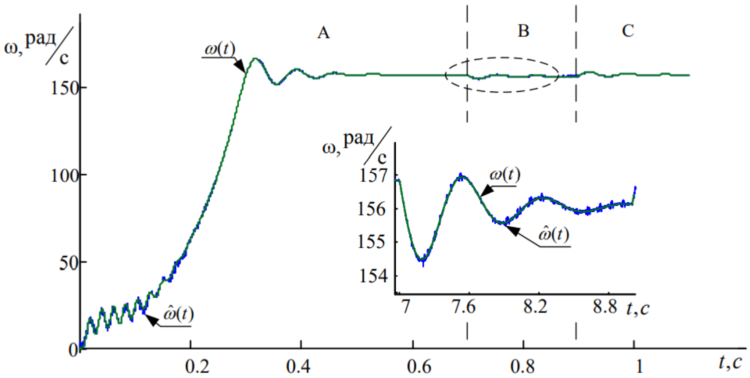

Figure 1. Checking the suitability of SNT for work

The error in SNT work was checked by the integral error of estimation:

$$I_\omega = \frac{\int_{t_{бош}}^{t_{туг}} |\omega(t) - \widehat{\omega}(t)| dt}{\int_{t_{бош}}^{t_{туг}} |\omega(t)| dt} \cdot 100\%$$

where ttug, tbosh are the initial and final integration time, ω(t) is the angular speed of rotation of the asynchronous motor shaft, ωˆ(t) is the estimation of the angular speed of the asynchronous motor.

The evaluation of SNT operability and performance error is shown in Figure 1. Modes A, V, C are suitable for starting, raising and lowering the load, respectively.

According to the comparative analysis [1,2], SNT is successful in this case. Validation of the artificial network is performed on a test selection that does not include a set, and based on the integral error of the evaluation, it can be concluded that the program does not need to re-introduce the SNT. According to it, the electrical drive of the weaving machine is activated by the integration time.

Taking into account the above equations and the artificial network monitor, a mathematical model of the machine of the textile enterprise was developed in the Matlab program (Fig. 2). Processes in the controller system with discrete variable parameters adjusted by the method of inverse problems of electrical conductivity and dynamics with variable moment of inertia of the axis in the executable program are absolutely stable when the following condition is fulfilled:

$$K_{1min}K_{1max}(|W_{л}(jw)|^2 + \beta_2 ReW_{л}(jw) + w^2 + \\ wImW_{л}(jw)(K_{1min} + K_{1max}) \neq 0, \\ (-\infty < w < \infty),$$

$$W_{л}(jw) = \frac{-(T_{м}T_{э}T_{e}T_{m} + K_{2min}RT_{э}T_{p})w^2 + \left(T_{м}T_{e}T_{m} + T_{p}T_{e}T_{m} + K_{2min}RT_{p}\right)jw + K_{e}K_{m}}{-T_{p}RT_{э}jw^2 + RT_{p}jw} \quad (3.3)$$

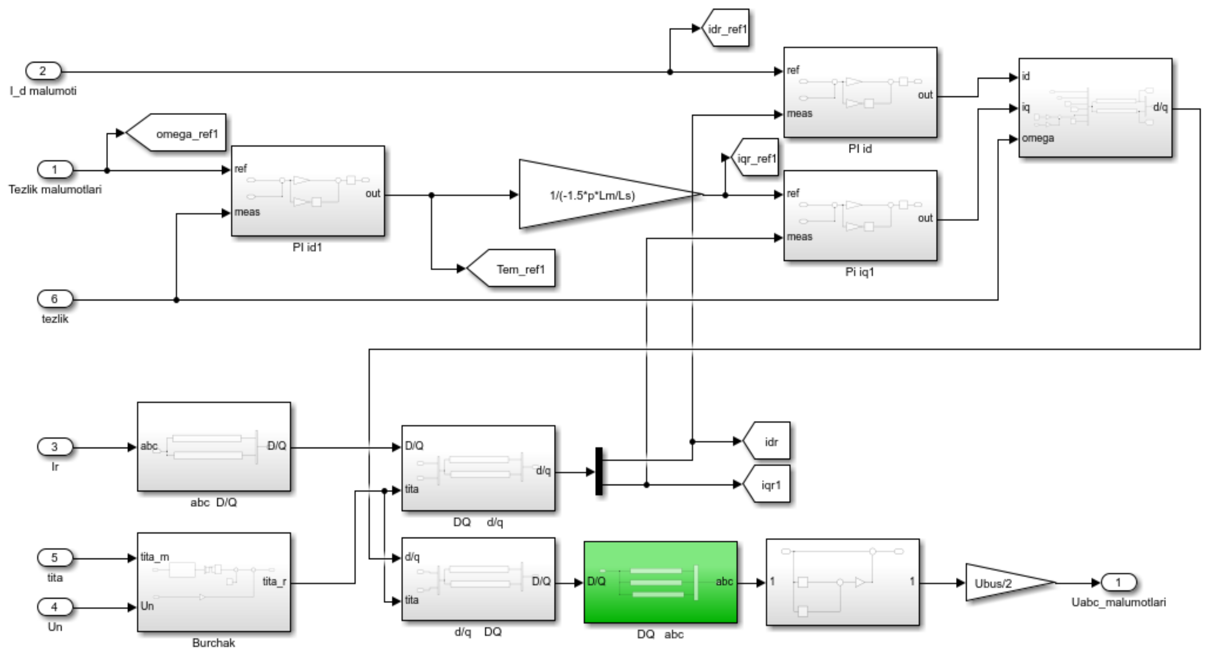

Figure 2. Mathematical model of speed control of textile enterprise machine

The application of compensation algorithms in intelligent control systems requires a constant exchange of information between the controllers of individual mobility levels, which is implemented in a high-level computing device.

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