DEVELOPMENT OF A FAULT DETECTION ALGORITHM BASED ON ELECTRICAL DRIVE RELIABILITY

Usmonov Shukurillo Yulbarsovich
Fergana Polytechnic Institute
“Electrical engineering, electrical mechanics and electrical technologies”
department associate professor, (PhD)
E-mail: ushu1967@gmail.com

ABSTRACT

The scientific significance of the research results is based on theoretical researches in the field of energy resources use, the regulation of the work processes of textile enterprise machines, modern automatic control theory methods and economical operation modes specific to electric machines, mathematical modeling through artificial neural networks, determining the energy consumption of electric machines, increasing the energy efficiency of the control system. It is explained by the research of the model and the method of increasing the new reliability.

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

The lack of methods for increasing the operational reliability of electrical systems is related to the difficulty in creating a database for statistical testing of fault classification. The development of such a database is carried out based on the predicted number of failures. It is stated that it is necessary to describe the mathematical equations on the basis of the model to solve the problem without requiring a database for each part. Accordingly, it takes a long time to develop a database containing predefined parameters for tracking defective and normal equipment and classifying errors. Also, reliability is improved by relying on special algorithms based on the business process of the enterprise in accordance with the field of database production [1].

Dynamic processes are also considered as a part of the model by identifying failures as a result of mechanical vibrations [2]. As a result of the detection and analysis of vibrations, the reliability of the operation can be under constant control and affect the indicator of increasing the level of reliability. A reliability index is obtained by comparing such processes with a database of the engine involved in the failure.

A common drawback of mechanical fault detection is the environmental impact associated with the equipment. The developed algorithm does not only include

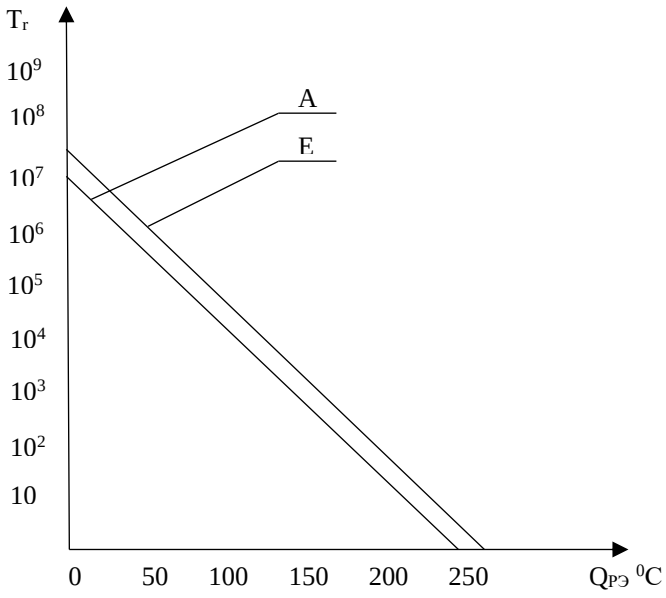
dynamic processes, but also requires defining the interval of change of mechanical parameters. This range is not determined by a specific indicator, that is, if it is seen in the example of loading, this indicator is considered depending on the range variable, including the minimum and maximum value. Another disadvantage of this range comes from the difficulty of repeating the measurements. Basically, in the determination of the acceleration index of the electric vehicle, vibration values are introduced and depend on the method and location of the control to ensure repeatable determination [3].

Even with proper control setup and location, the fault detection process will still indicate a disturbance due to variations in vibration, operating speed, input voltage, and motor load. Experience has shown that when detecting mechanical malfunctions, the probability of erroneously indicating a malfunction of the electrical system is very high. For example, motor rotor coupling equipment such as bearings, belt drives, gears, drum couplings, and couplings may make it impossible to analyze the mechanical vibration of the motor, which involves partitioning specific frequencies into frequency and related harmonics.

The heat resistance requirements of the electric drive motor are on average 20,000 hours, and their level of durability is reflected in the model. The temperatures characterizing the classes of heat resistance of the electric motors of the weaving machine were determined.

$$T_{r0} = \frac{T_r}{e^{-\ln 2 \frac{\theta}{\Delta\theta}}}$$

Based on Figure 1.1, the first integral indicator is presented based on the values represented by the value of θ = 10 0C.



Often it does not allow to detect the desired signal, therefore, the acquisition of information requires expensive and complex tools, such a system is less effective in detecting or predicting the failure.

Based on the above, it is possible to increase the economic efficiency of the enterprise and increase the operational reliability of the electrical system by determining the following:

- elimination of feedback failure resulting from modeling errors, misidentified indicators and miss indication of engine failures;

- development of a comprehensive database on the analysis of the causes of failures in electric motors through the classification of previously described errors and on the basis of the developed functional schemes;

- eliminating the need for expensive and complex tools for obtaining and processing data that may indicate the presence of a malfunction;

СПИСОК ИСПОЛЬЗОВАННОЙ ЛИТЕРАТУРЫ: (REFERENCES)

1. Jaloliddinova Nozima Doniyorjon Qizi, Sultonov Ro‘Zmatjon Anvarjon O‘G‘Li Renewable sources of energy: advantages and disadvantages // Достижения науки и образования. 2019. №8-3 (49). URL: https://cyberleninka.ru/article/n/renewable-sources-of-energy-advantages-and-disadvantages (дата обращения: 01.12.2023).

2. Султонов Рузиматжон Анваржон Угли, Кодиров Хусанхон Мунаввархон Угли, Мирзалиев Бобурбек Бахтиёрович Выбор механических двигателей электрического тока, используемых в системе электропривода // Проблемы Науки. 2019. №11-2 (144). URL: https://cyberleninka.ru/article/n/vybor-mehanicheskih-dvigateley-elektricheskogo-toka-ispolzuemyh-v-sisteme-elektroprivoda (дата обращения: 01.12.2023).

3. Султанов Рузимаджон Анваржон Угли Рекомендации по выработке электроэнергии и компенсации потерянной энергии с помощью системы охлаждения электродвигателей // Вестник науки и образования. 2019. №19-3 (73). URL: https://cyberleninka.ru/article/n/rekomendatsii-po-vyrabotke-elektroenergii-i-kompensatsii-poteryannoy-energii-s-pomoschyu-sistemy-ohlazhdeniya-elektrodvigateley (дата обращения: 01.12.2023).

4. Usmonov Shukurillo Yulbarsovich, Sultunov Ruzimatjohn Anvarjohn O‘G‘Li, Kuchkarova Dilnoza Toptievna Research potential of energy saving pump unit and hydraulic network // Проблемы Науки. 2019. №12-1 (145). URL: https://cyberleninka.ru/article/n/research-potential-of-energy-saving-pump-unit-and-hydraulic-network (дата обращения: 01.12.2023).

5. Usmonov S. Y. Analysis of Working Modes of Well Pumping Equipment Eectr //Central Asian Journal of Theoretical and Applied Science. – 2022. – Т. 3. – №. 11. – С. 119-125.
6. Yulbarsovich U. S., Nurillaevich M. N. FREQUENCY CONTROL OF POWER EQUIPMENT DURING SECONDARY STEAM GENERATION IN THE PRODUCTION UNIT //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.
7. Yulbarsovich U. S. et al. MEASUREMENT AND CONTROL OF THE LOAD OF ENERGY DEVICES //Galaxy International Interdisciplinary Research Journal. – 2023. – Т. 11. – №. 4. – С. 663-666.
8. Yu U. S., Sultonov R. A. NONLINEAR FEEDBACK CONTROL IN INTELLIGENT AC MOTOR CONTROL //Advancing in research, practice and education. – 2022. – Т. 9. – С. 188.
9. Усмонов Ш. Ю., Султонов Р. А. У., Кучкарова Д. Т. СИНТЕЗ АЛГОРИТМОВ ИНТЕЛЛЕКТУАЛЬНОЙ СИСТЕМЫ УПРАВЛЕНИЯ МНОГОСВЯЗНЫМИ ЭЛЕКТРОПРИВОДАМИ //Universum: технические науки. – 2022. – №. 1-3 (94). – С. 50-53.
10. Усмонов Ш. Ю., Кучкарова Д. Т., Султонов Р. А. Автоматические системы управления машин и агрегатов шелкомотания на основе энергосберегающего электропривода //Universum: технические науки. – 2021. – №. 12-6 (93). – С. 37-41.
11. Sultonov R. A., Shermatov B. A. IMPROVING PRODUCT QUALITY BY REDUCING THE ENERGY CONSUMPTION OF ELECTRIC DRIVES IN THE SILK INDUSTRY //Экономика и социум. – 2021. – №. 11-1 (90). – С. 538-544.
12. Mukaramovich A. N., Yulbarsovich U. S. CALCULATION OF THE SPEED CONTROL RANGE OF AN INTELLIGENT ASYNCHRONOUS ELECTRIC DRIVE DURING REWINDING RAW SILK //ЭЛЕКТРИКА. – 2011. – №. 4. – С. 26-28.
13. Арипов Н. М., Усмонов Ш. Ю. Разработка энергосберегающего частотно-регулируемого асинхронного электропривода с вентиляторной нагрузкой //Электрика. – 2011. – №. 4. – С. 26-28.
14. Усмонов Ш. Ю. Частотно-регулируемый асинхронный электропривод с экстремальным управлением для вентиляторной нагрузки //Advances in Science and Technology Сборник статей X международной научнопрактической конференции, Москва:«Научно-издательский центр «Актуальность. РФ. – 2017. – С. 36-38.
15. Арипов Н. М. и др. Основные технические требования по диапазону и точности регулирования скорости перемотки шелка-сырца //Вестник Казанского

государственного энергетического университета. – 2021. – Т. 13. – №. 1 (49). – С. 218-231.

16. McCray T. R., Gritzner C. F. Uzbekistan. – Infobase Publishing, 2009.

17. Арипов Н. М., Усмонов Ш. Ю., Кучкарова Д. Т. Влияние изменения скоростных режимов переработки полуфабриката на энергоемкость шелкомотания //Текстильный журнал Узбекистана. – 2021. – №. 2.

18. Usmonov S. Optimization of the Launching Process in the Electric Drive with the Help of Genetic Algorithm //Machine Learning Research. – 2017. – Т. 2. – №. 2. – С. 61-65.

19. Usmonov S. Y. et al. Research potential of energy saving pump unit and hydraulic network //Проблемы современной науки и образования. – 2019. – №. 12. – С. 38-40.

20. Усмонов Ш. Ю., Муминов З. М., Сайфидинов Р. КОНЦЕПТУАЛЬНЫЕ ВОПРОСЫ ПОВЫШЕНИЯ ЭНЕРГОЭФФЕКТИВНОСТИ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.