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# MODERNIZATION OF SCIENCE AND ITS INFLUENCE ON GLOBAL PROCESSES

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# CONTENT

## SECTION 1.
## ENTREPRENEURSHIP, TRADE AND SERVICE SECTOR

ПІЛЬГОВЕ КРЕДИТУВАННЯ ЯК СПОСІБ ПОДОЛАННЯ ПЕРЕШКОД, ЯКІ ПОСТАЮТЬ ПРИ СКОРОЧЕННІ СПОЖИВАННЯ ПІДПРИЄМСТВАМИ НЕВІДНОВНИХ ЕНЕРГОРЕСУРСІВ
**Ємельянов О.Ю.** ........................................................................ 7

## SECTION 2.
## FINANCE AND BANKING; TAXATION, ACCOUNTING AND AUDITING

КОЛЕКТОРСТВО В УМОВАХ ФІНАНСОВОЇ КРИЗИ ТА ВІЙНИ
**Микуляк О.В., Яструбецька Л.С.** ........................................................................ 10

ОСОБЛИВОСТІ ФІНАНСОВОГО РИЗИК-МЕНЕДЖМЕНТУ НА ПІДПРИЄМСТВІ
**Рубежанська В.О., Остапенко Д.В.** ........................................................................ 12

РИЗИКИ ТА ЗАГРОЗИ КІБЕРБЕЗПЕЦІ БІЗНЕСУ В УМОВАХ ЦИФРОВІЗАЦІЇ ЕКОНОМІКИ
**Білько С.С.** ........................................................................ 14

## SECTION 3.
## MANAGEMENT, PUBLIC MANAGEMENT AND ADMINISTRATION

ОСНОВНІ АСПЕКТИ МЕТОДИЧНОГО ПІДХОДУ ДО ВОЄННО-ЕКОНОМІЧНОГО ОЦІНЮВАННЯ СПРОМОЖНОСТЕЙ ЗБРОЙНИХ СИЛ УКРАЇНИ
**Науково-дослідна група:**
**Семененко Л.М., Митченко С.В., Кравченко Є.В., Целіщев І.О., Дровнин А.С.** ... 17

ПОЛІЦЕНТРИЗМ ЯК ПРИНЦИП СУСПІЛЬНОГО СТРУКТУРУВАННЯ
**Шедяков В.Є.** ........................................................................ 21

РЕКОМЕНДАЦІЇ ЩОДО УДОСКОНАЛЕННЯ СИСТЕМИ КЕРІВНИХ ДОКУМЕНТІВ ОБОРОННОГО ТА БЮДЖЕТНОГО ПЛАНУВАННЯ УКРАЇНИ
**Науково-дослідна група:**
**Семененко О.М., Скуріневська Л.В., Москаленко І.В., Добровольський Ю.Б., Ярмольчик М.О.** ........................................................................ 26

## SECTION 4.
## INTERNATIONAL RELATIONS

INFRASTRUCTURE MAPPING OF UKRAINE AND ARTIFICIAL INTELLIGENCE AS THE KEY FOR THE RECOVERY ENERGY SECTOR
**Doronina I.** ........................................................................ 29

ПЕРСПЕКТИВИ РОЗВИТКУ КОНСАЛТИНГОВОЇ ГАЛУЗІ УКРАЇНИ В ПІСЛЯВОЄННИЙ ПЕРІОД
**Шенгер М.І., Охріменко О.О. ....................................................................................32**

## SECTION 5.
## LAW AND INTERNATIONAL LAW

THE SPECIAL ROLE OF CONSTITUTIONAL COURTS IN THE JUDICIAL SYSTEM
**Mamutova A.A., Nizamova I.E. qizi, Imamalieva D.I. ......................................................35**

ОРГАНИ ВИКОНАВЧОЇ ВЛАДИ ЯК СУБ'ЄКТИ ЗАБЕЗПЕЧЕННЯ ПРАВ ВНУТРІШНЬО ПЕРЕМІЩЕНИХ ОСІБ
**Кошляк Н.Е. ......................................................................................................................38**

ТЕОРЕТИКО-ПРАВОВА ХАРАКТЕРИСТИКА ІНФОРМАЦІЙНОЇ БЕЗПЕКИ В УМОВАХ ВОЄННОГО СТАНУ
**Ряполов А.П. ......................................................................................................................41**

## SECTION 6.
## BIOLOGY AND BIOTECHNOLOGY

ACTIVITY OF GLUTATHIONE-S-TRANSFERASE AND REDUCED GLUTATHIONE CONTENT IN RAT LIVER CELLS UNDER THE INFLUENCE OF DIETHYL PHTHALATE
**Ketsa O.V., Shvets A.O. ......................................................................................................44**

DETECTION OF THE MARKERS OF HERPESVIRUS INFECTIONS IN PREGNANTS AND NEWBORNS
**Research group:**
**Gavryliuk V.G., Lavrentieva K.V., Sklyar T.V., Karmazina O.S. ...................................48**

ПРОФІЛАКТИКА НИЗЬКОГО РІВНЯ ГЕМОГЛОБІНУ
**Коц С.М., Коц В.П., Зейдан А.А. .......................................................................................52**

## SECTION 7.
## MINING, OIL AND GAS ENGINEERING

ПІДВИЩЕННЯ БЕЗПЕКИ ПРАЦІ ГІРНИКІВ НА ВИЇМКОВИХ ДІЛЬНИЦЯХ ВУГІЛЬНИХ ШАХТ
**Чепіга Д.А., Ткачук О.М. ....................................................................................................55**

## SECTION 8.
## GENERAL MECHANICS AND MECHANICAL ENGINEERING

TYPES OF MECHATRONIC MODULES BY THE METHOD OF USED ENERGY
**Huliieva N.M., Marchuk S.F. ...............................................................................................57**

## SECTION 9.
## ENERGY AND POWER ENGINEERING

ANALYSIS OF ACTIVE POWER LOSSES IN AN INDUCTION MOTOR UNDER THE INFLUENCE OF CURRENT LOAD
**Vovk O., Kvitka S., Zharikova A. ........................................................................ 58**

## SECTION 10.
## PHYSICS AND MATHEMATICS

SIT-ELEMENTS AND DYNAMICAL SIT-ELEMENTS FOR CONTINUAL SETS
**Danilishyn I.V., Danilishyn O.V. ........................................................................ 61**

ВИВЧЕННЯ МАГНІТНИХ ЯВИЩ ЗА ДОПОМОГОЮ НОВІТНЬОГО ОБЛАДНАННЯ «PHYWE»
**Слюсаренко В.В. ........................................................................................................ 67**

## SECTION 11.
## PHILOLOGY AND JOURNALISM

ВИНИКНЕННЯ ФЕНОМЕНУ МЕМІВ ТА ЇХ ІНТЕГРАЦІЯ В ІНТЕРНЕТ-КОМУНІКАЦІЇ
**Велічковська О.В. ...................................................................................................... 73**

СПОСОБИ ВІДТВОРЕННЯ НЕОЛОГІЗМІВ УКРАЇНСЬКОЮ МОВОЮ
**Максимова А.Я. .......................................................................................................... 77**

## SECTION 12.
## PHILOSOPHY AND POLITICAL SCIENCE

DEDUCTIVE AND INDUCTIVE REASONING IN EXPERT SYSTEMS
**Mashchenko A.R. ........................................................................................................ 80**

## SECTION 13.
## PEDAGOGY AND EDUCATION

DEVELOPMENT OF STEAM EDUCATION AS PART OF A UKRAINIAN-GERMAN JOINT PROJECT
**Oberemok Z. ................................................................................................................ 82**

ЕКОНОМІЧНА ОСВІТА МАЙБУТНІХ ПЕДАГОГІВ: РЕАЛІЇ І ПЕРСПЕКТИВИ
**Ву Мінлі ........................................................................................................................ 85**

ОСНОВНІ СУБ’ЄКТИ ІНТЕРНАЦІОНАЛІЗАЦІЇ ВИЩОЇ ОСВІТИ ПРОВІДНИХ ЄВРОПЕЙСЬКИХ КРАЇН
**Мазур О.І., Драпак Г.Б. ............................................................................................. 87**

# SECTION 9.
## ENERGY AND POWER ENGINEERING

**Vovk Oleksandr**
Ph.D., Associate Professor
*Dmytro Motornyi Tavria State Agrotechnological University, Ukraine*

**Kvitka Serhii**
Ph.D., Associate Professor
*Dmytro Motornyi Tavria State Agrotechnological University, Ukraine*

**Zharikova Anna**
Assistant
*Dmytro Motornyi Tavria State Agrotechnological University, Ukraine*

# ANALYSIS OF ACTIVE POWER LOSSES IN AN INDUCTION MOTOR UNDER THE INFLUENCE OF CURRENT LOAD

The conversion of energy in an induction motor (IM) is accompanied by irreversible losses, which are manifested in the form of heat, which is released in the structural elements. The sources of heat in an induction motor are mainly active parts (windings, core) and bearings.

When studying the thermal processes of induction motors, many works [1-4] pay great attention to determining the active power losses and their distribution in individual components and active elements of the motor. However, they do not fully take into account the influence of current changes in the stator and rotor windings when determining heat losses.

Therefore, the study and determination of active power losses in the components and active elements of an induction motor under the influence of a current load is important in determining its thermal state.

The accuracy of determining the thermal state of an induction motor as a result of a thermal calculation largely depends on the accuracy of accounting for all heat losses. The distribution of heat losses in individual components and active elements of the motor is of great importance. For example, the losses in the stator winding ΔP12 are distributed between bodies 1 (ΔP1) and 2 (ΔP2), the power ΔP5 is the sum of the electrical losses in the rotor winding ΔP el.2 and half of the pre-load losses ΔP add [2, 5, 6].

The active power losses in an induction motor will be calculated based on its *Γ*- shaped replacement circuit.

Electrical losses in the stator winding [2]

$$\Delta \mathrm{P}_{12} = \Delta \mathrm{P}_{el.1} = 3 \cdot r_{1\theta} \cdot I_1^2, \tag{1}$$

*where* $r_1$ *- active resistance of the stator winding phase at temperature* $\theta$*,* $\Omega$ *;*

$I_1$ *- current value of the current in the stator winding, A.*

Additional active power losses in an induction motor [2]

$$\Delta \mathrm{P}_{add} = 0{,}005\mathrm{P}_{1\mathrm{H}}, \tag{2}$$

*where* $\Delta P_{1H}$ *- nominal power consumption, W.*

Losses in the rotor [2]

$$\mathit{\Delta} \mathrm{P}_5 = \mathit{\Delta} \mathrm{P}_{el.2} + 0{,}5\mathit{\Delta} \mathrm{P}_{add}, \tag{3}$$

*where* $\Delta P_{el.2}$ *- electrical losses of active power in the rotor winding, Ω.*

$$\mathit{\Delta} \mathrm{P}_{el.2} = 3 \cdot r_{2\theta}'' \cdot (I_2'')^2, \tag{4}$$

*where* $r_{2\theta}''$ *- is the reduced active resistance of the rotor winding phase at temperature θ, Ω;*
$I_2''$ *- reduced current of the electric motor, A.*

Of practical interest are the dependences of active power losses in the active elements of the electric motor as a function of the design temperature at different values of the current multiplicity. An asynchronous electric motor 4AM112M4U3 was chosen for the research.

The graphical dependences of active power losses in the stator winding and rotor of the 4AM112M4U3 induction motor as a function of the design temperature at different current multiplicity are shown in Figure 1 and Figure 2.

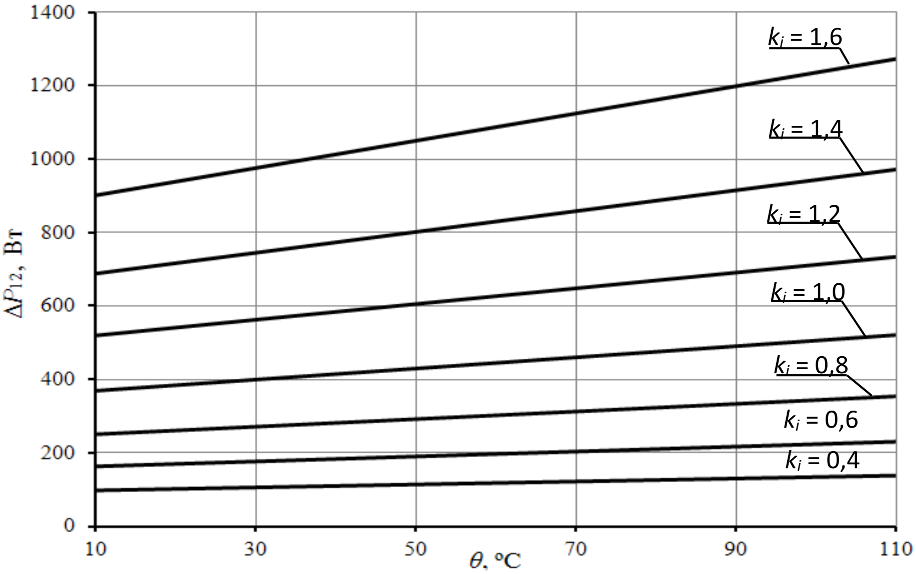

Fig. 1. **Dependences of active power losses in the stator winding of the 4AM112M4U3 induction motor as a function of the calculated temperature at different multiplicities of current strength**

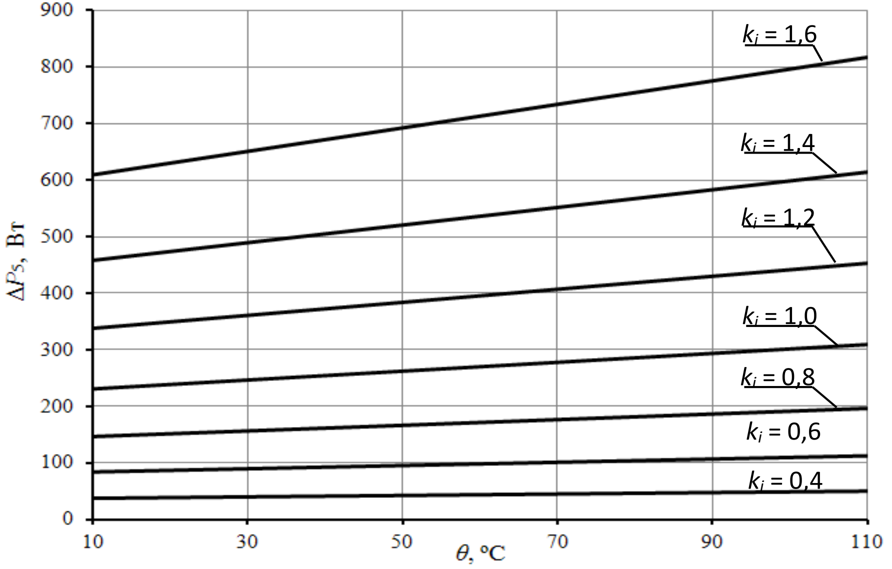

Fig. 2. **Dependences of active power losses in the rotor of an induction motor 4AM112M4U3 as a function of the calculated temperature at different multiplicity of current strength**

The active resistances $r_\theta$ at a temperature that differs from the design temperature are determined by the formula [2]

$$r_\theta = r\left(\frac{\frac{1}{\alpha}+\theta}{\frac{1}{\alpha}+\theta_P}\right), \tag{5}$$

*where r - active resistance at the design temperature, Ω;*

*$\theta_P$ - calculated temperature, °C;*

*α - temperature coefficient of resistance of the material*

The analysis of the results shows that the active power losses in the stator winding and rotor of an induction motor are linearly dependent on the operating temperature and increase significantly with an increase in the current multiplicity.

**References:**

1. Kvitka S.O., Vovk O.Y., Kvitka O.S. Study of active power losses in an induction motor // Scientific Bulletin of Tavria State Agrotechnological University: Electronic scientific professional edition. Issue 7, Vol. 1. - Melitopol: TSATU, 2017. P. 126-134.
2. Vovk O.Y., Kvitka S.O., Kvitka O.S. Calculation determination of active power losses in induction motors according to passport data // Bulletin of the Kharkiv Petro Vasylenko National Technical University of Agriculture. Technical sciences. Issue 186 "Problems of energy supply and energy saving in the agro-industrial complex of Ukraine." - Kharkiv: KHNTUA, 2017. P. 80-82.
3. Vovk O.Y., Kvitka S.O., Kvitka O.S. Influence of voltage deviation of the supply network on the losses of active power in an induction motor // Bulletin of Kharkiv Petro Vasylenko National Technical University of Agriculture. Technical sciences. - Issue 164 "Problems of energy supply and energy saving in the agro-industrial complex of Ukraine." - Kharkiv: KHNTUA, 2015. - PP. 121-123.
4. Kvitka S.O., Vovk O.Y., Kvitka O.S. Mathematical model of the thermal state of an induction motor in non-stationary modes // Bulletin of the Kharkiv Petro Vasylenko National Technical University of Agriculture. Technical sciences. Issue 175 "Problems of energy supply and energy saving in the agro-industrial complex of Ukraine." - Kharkiv: KHNTUA, 2016. P. 140-142.
5. Kvitka S.O., Vovk O.Y., Kvitka O.S. Thermal model of an induction motor in stationary modes // Bulletin of the Kharkiv Petro Vasylenko National Technical University of Agriculture. Technical sciences. - Issue 164 "Problems of energy supply and energy saving in the agro-industrial complex of Ukraine." - Kharkiv: KHNTUA, 2015. - P. 118-120.