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DESING OF TRANSDUCERS FOR CONTROL OF NONSYMMETRY OF THREE PHASES ELECTRICAL NETS OF POWER SUPPLY SYSTEMS

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The Main factors of appearances of inaccuracies of transdusers of current are: nonsymmetry of current and voltages in value and phase, swings of frequency, change temperature surrounding ambiences, appearance of harmonicas current and voltages of electric network, vibratory loads during functioning transdusers and others.

Prinsiple schemes of the electromagnetic transdusers of current to voltage with flat measure winding for combined autocontrol of source of power of energy system given in fig. 1 and 2. Designed schemes of the combined control of source of power on base of electromagnetic transdusers of current to voltage with flat measure winding practically notinertion, provide pinpoint accuracy and unification out signal universal when using in combined autocontrol system of steady-state and dynamic source of power of PSS, comsume small power, have not a rolling parts, differ high reliability.

The Designs of the electromagnetic transdusers of the current to voltage with flat measure winding for multifunction control of sources of power of energy system are on fig. 3 and 4.

The technical data of electromagnetic transdusers of the current to voltages with flat measuring winding for power course of PSS given in tab. l.

The graphs of the steady-state features of the electromagnetic transdusers of the current to voltage, got according to formulas (1–3) are presented on fig. 3–6:

$$U_{eout} = 4{,}44 fW(F_{pio\max A}\, e^{-\frac{R_I t}{L_I}} \pm F_{rem\,A}\, e^{-\frac{R_I t}{L_I}}) \qquad (1)$$

Similar formulas for building of the steady-state features for secondary voltages of the phases B and C three-phase electric nets:

$$U_{eout} = 4{,}44 fW(F_{\max B}\, e^{-\frac{R_{II} t}{L_{II}}} \pm F_{rem\,B}\, e^{-\frac{R_{II} t}{L_{II}}}), \qquad (2)$$

$$U_{eout} = 4{,}44\, fW\left(F_{\max C}\; e^{-\frac{R_{III}t}{L_{III}}} \pm F_{rem\,C}\; e^{-\frac{R_{III}t}{L_{III}}}\right) \qquad (3)$$

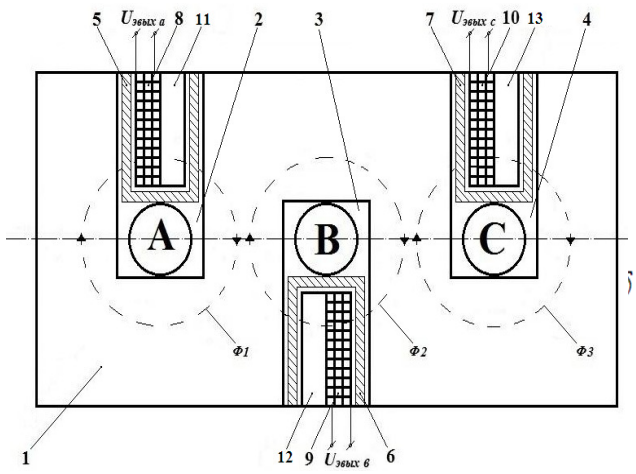


Fig. 1. The Electromagnetic transdusers of the primary current to secondary voltage with a fixed magnetic circuit: 1 – base-main core; 2–4 – gaps; 5–7 – seal holder plastins; 8–10 – flate measuring windings (FMW); 11–13 – insulation plastins; A, B and C – primary windings – conductors of electrical three-phases nets of PSS

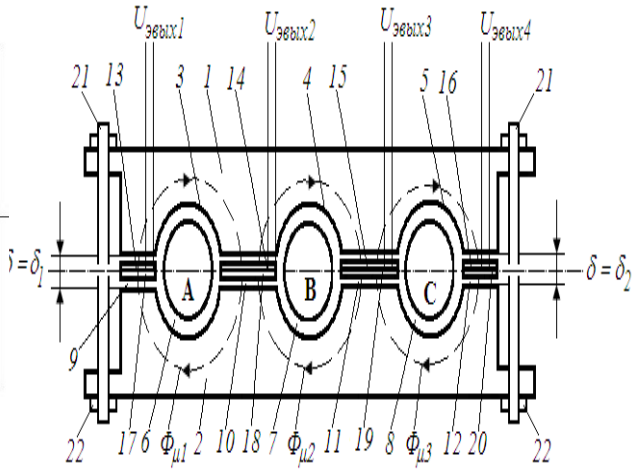


Fig. 2. The Electromagnetic transdusers of the primary current to secondary with movable magnetic circuit: 1–2 – base-main cores; 3–8 – air clearance; 9–12 – gaps; 13–16– insulation plastins; 17–20 – flate measuring windings (FMW); A, B and C – primary windings – conductors of electrical three-phases nets of PSS

Table 1

The technical data of the electromagnetic transdusers of current to voltages with flat measuring winding

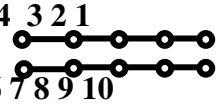
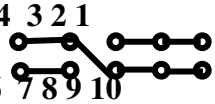
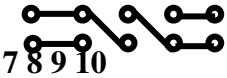
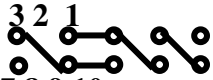
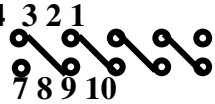
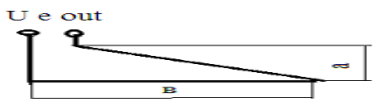
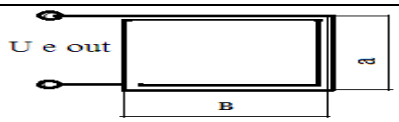
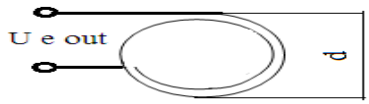
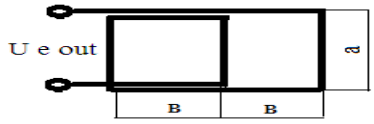
Number of input point	*Primary current*		*Output voltage U out (V)*	*Coeff. of transformation K T*	*Resistanse R (mΩ)*	*Inductance Lp (μH)*	*Construction chemas of connections of flate measuring windings (FMW) with advisable numbers of windings*
	I_p (A)	*I_{max} (A)*					
1	25	36	25	1/1000	0,3	0,023	**In 5 4 3 2 1**  **Out 6 7 8 9 10**
2	12	18	24	2/1000	1,1	0,09	**In 5 4 3 2 1**  **Out 6 7 8 9 10**
3	8	12	24	3/1000	2,5	0,21	**In 5 4 3 2 1**  **Out 6 7 8 9 10**
4	6	9	24	4/1000	4,4	0,37	**In 5 4 3 2 1**  **Out 6 7 8 9 10**
5	5	7	25	5/1000	6,3	0,58	**In 5 4 3 2 1**  **Out 6 7 8 9 10**

Table 2

Principle of design of flat measuring windings
for the electromagnetic transdusers of primary current to voltage

№	*Type of flat measuring windings*	*Form of flat measuring windings*	*Area of the section*
1	Triangulare		$S_{tr} = ab/2$
2	Square-wave		$S_{sq} = kab$
3	Round		$S_r = k\pi D^2/4$
4	Loopy		$S_p = 2\ ab$

As can be seen from fig. 3 and 4, when increase air gaps-clearance, strongly decreases the value of the output voltage U_{eout}. The Best values of output voltage are provided at value of the air clearance equal *0,002–0,003 m.* and count whorl W_{FMW} equal *3–4* (fig. 5). Increase the number whorl of the electromagnetic transdusers of the cujrrent to voltage (fig. 6) promotes more fluent change the value of the output voltage, change area sections of flat measure winding provides linear change the output value of the voltage (fig. 6).

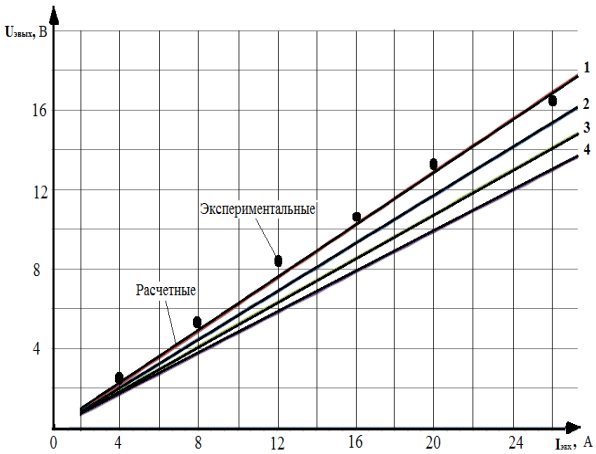


Fig. 3. Steady-state features of output voltage under different FMW under importances of the air clearance (points – an experiment, line – a design values): 1 – 20 мм, 2 – 22 мм, 3 – 24 мм, 4 – 26 м

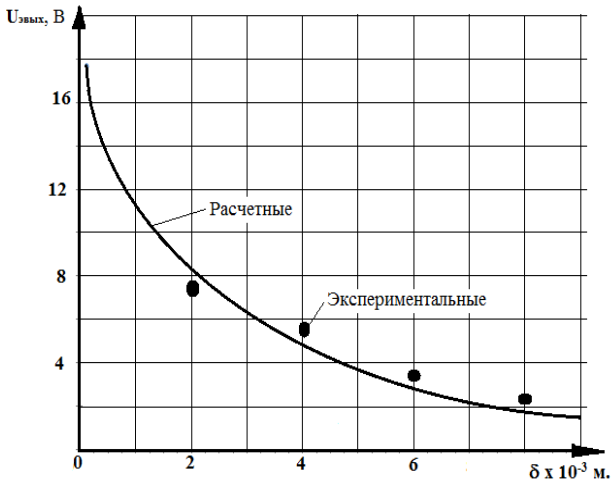


Fig. 4. Dependency of the U_{eout} with different importances

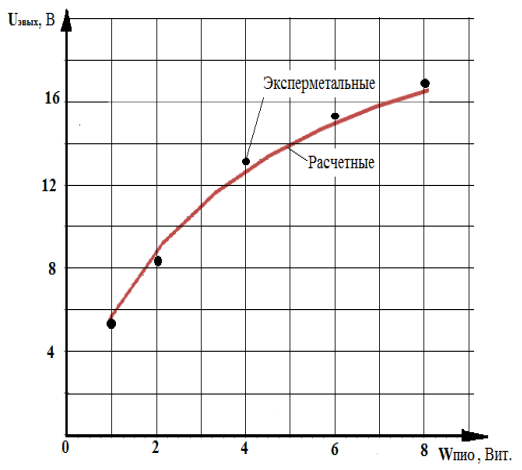


Fig. 5. Dependency of the output voltage $U_{e\ out}$ under different importances of the number whorl – W_{FMW}.

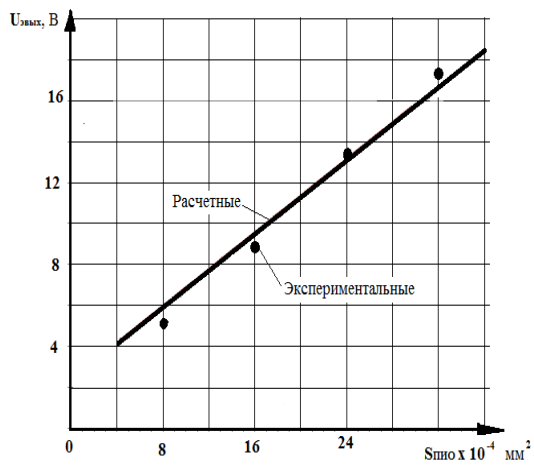


Fig. 6. Dependency of the output voltage $U_{e\ out}$ under different importances area sections

In given article for combined control of values and parameters of three-phase current of electric nets and power PSS, on the based on theoretical and experimental research is designed: principles of desing of electromagnetic transdusers of primary current to secondary voltage with flat measuring winding; the corresponding to mathematical models; the algorithms of research and designing; as well as methods of the calculation that has allowed to solve a problem development and construction efficient electromagnetic transdusers one- and multiphases primary current to secondary voltage.

Are they in total received following main results:

1. Motivated, that using flat measuring windings in electromagnetic trunsduser, provides control system the reception unified out signal with parameter: voltage – *20* V, current – *100 mA* and allows develop new electromagnetic trunsduser of current to voltage with flat measuring windings – as detector element, being up to quality combined control power PSS.

2. The Best values out voltages U_{eout} are provided at value of air gaps-clearance – δ equal – 0,002–0,003 m and numbers whorl flat measuring windings – W_{FMW} equal – *3–4*.

3. Emploed electromagnetic converters of the current to voltage in electric sets of the systems of power supply more than 20 enterprises shows of accuracy and automations of control source of power, have allowed to reduce the loss to electric powers on 11,26% under normative importance 13,29 % (have provided the reduction of the technological consuption to electric powers on 1,13 mlrd. kVtx hour)of account due to increasing of the class of accuracy of elements controle system of power of the power systems from 1,0 to 0,5.

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АВТОМАТИЗАЦИЯ БУХГАЛТЕРСКОГО УЧЕТА С ПОМОЩЬЮ MICROSOFT EXCEL

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В условиях современной рыночной экономики первостепенные задачи деятельности компании заключаются в стремлении предприятия занимать лидирующее положение на рынке, повышение эффективности работы кадров, и создание оптимальной структуры управления. Для успешного развития производственных процессов необходимо использовать передовые технологии, поэтому возникает необходимость автоматизации бухгалтерских данных.

Значимость бухгалтерского учета значительно возрастает, если его информация характеризуется обоснованностью, достоверностью, полнотой, своевременностью и динамичностью. Этот факт оказывает существенное влияние на результативность принимаемых решений в условиях неопределенности и риска, а также является гарантом эффективности управления компании в целом. Согласно 402-ФЗ «О бухгалтерском учете» руководитель экономического субъекта несет единоличную ответственность за достоверность предоставления информации о финансовом положении, финансовом результате и движении денежных средств за отчетный период» [1].

Очень часто на предприятиях осуществляется автоматизация отчетности на базе различных программных продуктов («1С: Бухгалтерия», «БЭСТ-Офис», «Турбо-Бухгалтер», «Парус-бухгалтерия», «Контур» и прочее). Однако в программных продуктах, использующиеся для автоматизации, заложены общие принципы построения отчетов, а каждое предприятие – уникально, сложно унифицировать всю отчетность в специализированных программных продуктах, а иногда — и невозможно это сделать. И в этом случае на помощь приходят универсальные программные пакеты, которые