Rules for Preparing a Paper to be Submitted for Publication in a Special Thematic Edition of the "Energy" Magazine - "Modern Problems of Power Engineering and Ways of Solving Them"

A paper may be submitted to the editorial office in *Georgian, English* or *Russian* languages. The volume of a paper must not exceed 4 – 6 pages of an A4 format (297 X 210 mm)

A paper for submission must be prepared in MS Word, .docx (.doc) formats. Fonts: Georgian – Sylfaen, English and Russian – Times New Roman. Margins of a paper: upper – 25 mm, lower – 25 mm, on the right – 20 mm, on the left – 20 mm. A text to be done automatically.

The Structure of a Paper

On the first line:

UDC (International Universal Decimal Classification) must be pointed out.

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 11, the text is aligned on left side of the page.

By skipping one line:

An author's name, surname and a scientific degree must be shown.

If there are two or more authors each of the authors must be typed on the new line.

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 10, interval – 1; the text is aligned on left side of the page (a name and surname in **Bold**).

By skipping one line:

Name of the article in Georgian, English and Russian languages.

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 11, the text is aligned. The text is aligned in the middle of the page (in **Bold**). The first one is written in the language of the article; in non-Georgian articles the Georgian is written as a second.

On the next line:

Annotation: in Georgian, English and Russian languages. The volume must not exceed **500** symbols.

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 10, interval – 1; the text is aligned on the width of the page ("Annotation" – in **Bold**).

On the next line:

Key words: in Georgian, English and Russian languages. 4 – 5 key words must be given (no more then two word combinations are allowed).

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 10, interval – 1; the text is aligned on the width of the page ("key words" – in **Bold**). An annotation and key words are written in the first place in the language of an article. In non-Georgian articles an annotation and key words are written in a second place.

For example:

UDC 621 311

ბადურ ჯუნაშბვილი, ტექნ მეცნ. დოქტორი,
ალექსანდრე პეტროსიანი, აკადემ. დოქტორი,
არჩილ გვიმრაძე, დოქტორანტი

ელექტრომომხმარებლების მიერ ქსელში წარმოქმნილი ძაბვის მაღალი სიხშირის ჰარმონიკების სიმეტრიულობის გამოკვლევა

ანოტაცია. *ჩატარებული ექსპერიმენტული გამოკვლევებით მიღებული შედეგების საფუძველზე დასაბუთებულია, რომ ელექტრომომხმარებლის დატვირთვის დენის შედეგად ქსელში წარმოქმნილი ძაბვის მაღალი რიგის ჰარმონიკების სპექტრის ყოველი სიხშირე მკვეთრად გამოხატული ასიმეტრიულობით ხასიათდება და საჭიროა იგი გათვალისწინებულ იქნას ფილტრების შეერთების სქემების შედგენისას.*

საკვანძო სიტყვები: *მართვის სისტემა, შემზღუდავი მოწყობილობა, ჰარმონიკები, მაღალი სიხშირის, სამფაზა, ელექტრორკალური ღუმელი.*

Бадур Чунашвили, док. техн. наук
Александр Петросян, акад.доктор
Арчил Гвимрадзе, докторант

Исследование симметрии высокочастотных гармоник, генерируемых потребителями электроэнергии в сети.

Аннотация. *По результатам экспериментальных исследований обосновано, что каждая частота спектра гармоник высокого порядка, генерируемая токовой нагрузкой в сети, характеризуется выраженной асимметрией и требует учета при составлении схем подключения фильтров.*

Ключевые слова: *система управления, устройства ограничения, гармоники высшего порядка, трёхфазная электродуговая печь.*

Badur Tchunashvili, Doctor of Science
Alexander Petrosyan, PhD
Archil Gvimradze, doctoral student

Research and estimation of Asymmetric quality of reactive tension generated by Energy Consumers

Summary. Based on the results of experimental research conducted on the stand called "Control and Accounting of electric energy quality indices" we can substantiate that higher order harmonics generated in the network show sharply asymmetric range of the frequency when the load of power consumed by a consumer is increased and its essential to be considered while drawing up filter merging schemes.

Keywords: *control system, limiting devices, higher order harmonics, three-phase electric arc furnace.*

The text of an article is written in two columns

Different parts must be separated in the text. For example: **Introduction, The Aim of the Work, Thematic Part, Conclusions, list of the reference literature and used literature in English language (transliteration)**.

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 10, interval – 1; paragraph gap – 0,75; the text is aligned on the width of the column. The text divisions are given in Bold.

Formulas must be typed in Microsoft Equation 3.0.

Graphic Part must be done in **.jpg or *.bmp. format (300–600dpi). An explanatory note for the graphic part is given below in 10 font: an explanatory note and number of tables are given above them in 10 font.*

For example:

Introduction. The amplitudes of the high-frequency harmonics generated by a power consumer in the power supply network are determined by the parameters of the power elements of the network and the shape of their output current [1]. The shape of the load current of the electric consumer depends on the principle of operation of a separate electrotechnical unit (ETU) integrated in it [2].
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Purpose of the work. The aim of the work is to study the distortion of the curve shape of the output currents in the individual phases as a result of the operating modes of high-power single-phase ETDs in the elements of the power supply network and to determine and evaluate the asymmetry of the high-order harmonics generated by them.
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Study of the symmetry of the high-order harmonics generated in the network. To optimally conduct experimental studies of electrical consumers, we can divide the integrated ETBs into the following three main groups:

1. Electrotechnical installations, most of which are equipped with thyristor controllers made according to the three-phase Larionov circuit and the control of the load current of each phase is based on the principle of interconnected transverse-pulse regulation (DC electric furnaces,

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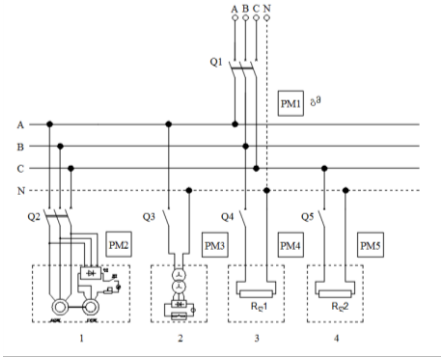

Fig. 1. "Load Stand" Scheme

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The parameters are calculated by the equation:

$$sin^2\alpha + cos^2\alpha = 1, \qquad (1)$$

Where

α –.....
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The results are shown in the table 1.

Table 1.

#	Studied Parameter	Result
1	Network Voltage	380 v.
2	Load Current	1500 a.
3	Power Factor	0,96

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Conclusions

1. It is substantiated that the harmonics of each frequency spectrum of the high-order harmonic spectrum generated by the electric current due to the load current of the electric user are characterized by pronounced asymmetry, and it is necessary to take it into account when compiling diagrams and parameters of harmonic suppression filters.

2.……
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Literature:

1. Вагин Г.Я., Севостьянов А.А. Электромагнитная совместимость в электроэнергетике: учебник для вузов. Нижний Новгород: НГТУ, 2004. 214с.

2. Yacamini Y. Power Systems Harmonics. – Part 3: Problems Caused by Distorted Supplies/ Power Engineering Journal. October 1995, pp. 233-238.

3. ჭუნაშვილი ბ., ქობალია მ. პეტროსიანი ა., შამფრიანი ნ. ელექტრომომარაგების სისტემის დატვირთვების ფიზიკური მოდელის დამუშავება// ენერგეტიკა: რეგიონული პრობლემები და განვითარების პერსპექტივები. ქუთაისი, 2015. #3 გვ. 6-8.

References (transliterated)

1. Vagin G.YA., Sevost'yanov A.A Elektromagnitnaya sovmestimost' v elektroenergetike: uchebnik dlya vuzov [Electromagnetic compatibility in the electric power industry: university textbook]. Nizhnij Novgorod: NGTU, 2004. 214 p.

2. Yacamini Y. Power Systems Harmonics. – Part 3: Problems Caused by Distorted Supplies/ Power Engineering Journal. October 1995, pp. 233-238.

3. Chunashvili b., qobalia m. petrosiani a., shampriani n. eleqtromomaragebis sistemis datvirTvebis fizikuri modelis damushaveba [Development of a physical model of loads of the power supply system]// energetika: regionuli problemebi da ganviTarebis perspeqtivebi. KuTaisi, 2015. #3 gv. 6-8.

Information about the authors in three languages must be given in the end of an article (name, surname, scientific or academic degree, position, organization, city/town, country, Email address)

Fonts: Georgian – Sylfaen, English and Russian – Times New Roman, size – 10, interval – 1; paragraph gap – 0,75; the text is aligned on the width of the column. The text divisions are given in Bold.

ინფორმაცია ავტორების შესახებ / About the Authors / Сведения об авторах