

## SCIENTOMETRIC INDICATORS OF “TECHNICAL ELECTRODYNAMICS” JOURNAL IN THE INTERNATIONAL DATABASE SCOPUS 2016

One of the generally accepted criteria of a performance efficiency of scientists and research teams is a number of publications in authoritative journals and a number of citations. That is why the terms like "impact-factor", "citation index", "Hirsch index" and other scientometric indicators are constantly used to evaluate a paper of the scientists and research teams on the basis of which rating tables of scientists, publications, research centers and even countries are created. They show not only the quantity, but also the quality of an intellectual product.

The main scientometric indicators can be divided into two groups:

- Indicators of a journal ratings (impact-factor JCR, SNIP, SJR);
- "non-journal" indexes, i.e. indicators of a publication activity of a scientist, organization (Hirsch index, average citation).

Let's briefly consider each of these indicators.

*Impact-factor* is a numerical indicator of the importance and informational value of a scientific journal (a ratio of a number of citations received in the current year to their number for the previous two years). It is annually calculated by the Institute for Scientific Information, USA (ISI) and published in the JCR (Journal Citation Reports) [1]. Impact factor is calculated for journals indexed in the Web of Science (WoS) database. In 2016, only 15 Ukrainian journals had impact factor (from 1,071 to 0,187) [2]. Unfortunately, the TE journal is not included into WoS.

*Citation index* – Science Citation Index (SCI) – is a system of the Institute of Scientific Information, Philadelphia, which is based on the links between documents on direct, reverse and cross references. Calculating system includes bibliographic description of all articles from the scientific journals included in JCR. This is an indicator accepted in the scientific world showing the significance of scientist's works, which is represented by a number of references to the scientist's publications in refereed scientific periodicals. Presence in the scientific and educational organizations of scientists with a high index indicates a high efficiency and effectiveness of the organization as a whole.

To rank the journals Scopus (a bibliographic and abstract database and citation tracking tool, created by a publishing corporation Elsevier) uses its bibliometric system - standardized indicators that take into account not only quantity but also quality of references to the articles – SJR and SNIP [3].

*SJR – SCimago Journal Ranking* is the most important indicator of the journal's credibility according to Scopus. The rating of journals was created by the University of Granada, which takes into account not only a total number of citations, but also their evaluated and qualitative indicators, such as an authority of references, that is, how authoritative the journals referring to the articles of this publication are. SJR indicates an average number of citations (for a certain year), divided by a number of scientific articles published over the past three years.

*SNIP – Source Normalized Impact per Paper* was developed by Professor H. F. Moed at Leiden University [4]. This indicator takes into account a level of citations in each scientific branch and can be used to compare publications in different scientific fields. When calculating SNIP, a "citation potential" indicator is used that takes into account a number of citations of the journals of a certain discipline, and a capture rate of this discipline by scientometric database.

*H-index* is a scientometric indicator, proposed in 2005 by Jorge Hirsch American professor of physics at the University of California, San Diego as an alternative to the classic "citation index" - a total number of references to the scientist's papers. The criterion is based on a number of researcher's publications and a number of their citations. That is, a scientist who published  $N$  articles has  $h$  index, if  $h$  of his articles received at least  $h$  citations, others ( $N-h$ ) of his articles received no more than  $h$  citations.

*IPP – impact per publication* is calculated as a ratio of a number of citations given for the current year to a total number of publications over the past three years. IPP is quite similar to the known impact factor of a journal. Like the impact factor, IPP does not take into account differences in citation practice in various scientific fields.

Let's analyze the basic scientometric indicators of the journal "Technical Electrodynamics" (Tekhnichna Elektrodynamika, TE) during the last years (table 1, pic.) [5, 6].

**Table 1**

Year	H-index	SNIP	IPP	SJR
2015	5	0,65	0,21	0,187
2016	8	0,84	0,25	0,19

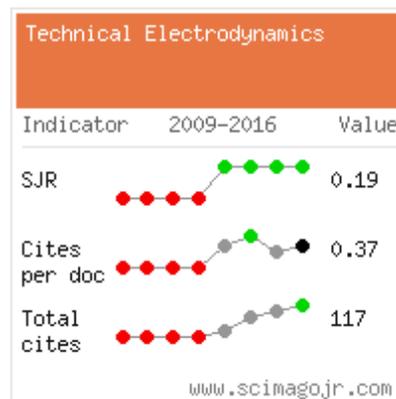
The table shows an increase of the main indicators. It indicates that we are moving in the right direction. The editorial board adheres to the announced publication schedule of new journal issues and transparency of the papers' review, pays great attention to the control standards of a quality of materials and sources of the researches and to the lists of official bibliography. But when the Hirsch index is eight, is it good or bad?

To answer this question, let's compare the indicators of the TE journal with the indicators of other publications, for example, from Eastern Europe and Ukraine, which are included in the Scopus database [7].

The TE journal is indexed in Scopus in two scientific categories: **Energy - Energy Engineering and Power Technology**, and **Engineering - Electrical and Electronic Engineering**. Let's check what place the TE journal occupies among other journals in these categories.

#### **Category Energy – Energy Engineering and Power Technology.**

In the Scopus database in this category there are twelve magazines of Eastern Europe. The TE journal is the seventh among them (Table 2), and it is the only Ukrainian journal indexed in Scopus in this category. The first place is occupied by "Oil Shale" journal (Estonia). Almost all of its publications for the last three years have references. The articles of TE journal have about 40% of references.

**Table 2**

	Title	SJR	H index	Total Docs. (2016)	Total Docs. (3years)	Total Refs.	Total Cites (3years)	Citable Docs. (3years)	Cites/Doc (2years)	
<b>1</b>	Oil Shale	0.466 Q2	22	26	95	660	92	82	1.04	Естонія EE
<b>7</b>	Technical Electrodynamics	0.187 Q3	8	122	304	976	117	304	0.37	Україна UA
<b>8</b>	Energetika	0.162 Q3	6	23	42	591	11	42	0.21	Литва LT

#### **Category Engineering – Electrical and Electronic Engineering.**

In the Scopus database in the specified category there are 48 journals of Eastern Europe and three Ukrainian journals. Among the Eastern European journals, TE occupies the 26th place, and among Ukrainian - the 2nd [7]. The "Nanomaterials and Nanotechnology" journal (Croatia) is on the 1st place: SJR - 0,355; the Hirsch index - 12; citation for three years - almost 115%.

So, the answer to the above-mentioned question may be this: not bad, but we should not relax, since there is a lot of work ahead.

Scopus experts also pay attention to the content of published materials and conduct a citation analysis in two stages: calculation of latent citation of a publication and citation of the members of editorial board (editor-in-chief and two randomly selected members of editorial board), taking into account three indicators: a number of their publications, general citation index and Hirsch index. They analyze several articles, and pay attention to the articles to be presented in a scientific language, corresponded to the journal subject and have scientific novelty; and evaluate a quality of English language in articles and abstracts [9].

Let's pay attention of the readers to some other indicators not reflected in the tables [5].

**A total number of citations** of TE journal in 2015 is 93, **self-citations** (a number of references received by journal from the articles published in it) - 56, that is 60%, in 2016 - 117 and 69, respectively, that is 59%. These are very unsatisfactory high rates. These numbers testify that the journal is not cited enough, except self-citation, and this indicates a small journal visibility [1]. For the journal, a self-citation rate of 30-35% is usually considered as an acceptable, and does not determine a journal as a problematic one. It should be noted that self-

citation itself is an integral part of scientific communication. The journal should refer to its publications, otherwise it would mean the absence of any continuity in its functioning. But we should always remember about possible abuses. Therefore, the editorial board will continue to pay attention to this issue.

Further, a **ratio of a number of external citations to their total number** in 2015 was almost 40%, and in 2016 - 41%. What should be done to improve this indicator?

The authors of our journal **should promote their papers**, that is, a scientist should have accounts in Scopus, ResearcherID, Google Scholar, Researchgate, ORCID [10].

All Ukrainian scholars also need to place their bibliometric profile in the system of Bibliometrics of Ukrainian Science NBUV <http://www.nbuviap.gov.ua/bpnu/>, designed to provide community with a holistic view of a state of domestic scientific environment (requirements can be found on "About the project" page). Unfortunately, as of August 14, 2017 there are only nine scientists of our Institute registered in this System, who were able to create accounts in Google Scholar. So what impression can the Institute make on the Ukrainian public opinion and a foreign user of Google Scholar?

Not only our Institute, but also other institutes of the Department of Physical and Technical Problems of Power Engineering of NAS of Ukraine are weakly represented in the mentioned System: Pukhov Institute for Modelling in Energy Engineering – 10 scientists, Institute of Engineering Thermophysics – 12 scientists, Institute of Technical Problems of Magnetism – 14 scientists, etc.

The scientist's profile is created automatically in the Scopus using his surname, institution name and its address. There may be some errors in the surnames' transliteration, so there may be several profiles created for one person. So, it is necessary to check, edit and combine your profiles.

ResearcherID is a free add-on from Thomson Reuters that allows an author to compile his own publications, create a list of his publications and evaluate their citation based on the Web of Science (WoS) database, even if these publications were not published in the journals indexed by WoS.

ORCID is an open database of scientists that enables scientist to present all his achievements and scientific path.

Google Scholar allows you to easily search for the necessary literature, and find a research that best suits your query. Also, in the Google Scholar bibliometric profile, the author can enter information about any of his scientific papers.

Researchgate, a social network of scholars, is a platform for a convenient search for colleagues, scientific information exchange, and in addition you can present your own achievements.

Without taking into account all these points, the author and journals, in which he publishes his papers, remain "unknown".

The editorial board of TE journal has already done some work with the scientific staff of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine in this direction. But, unfortunately, not everyone understands the significance and urgency of these steps for today.

The next indicator is a **ratio of a number of articles, which were cited, to non-cited** - in 2015 it was 15.6%, and in 2016 - almost 30%. It seems that a considerable number of scientists are engaged in the researches that are of no interest and not needed at all. In order to improve this indicator, the reviewers of the journal should be more demanding, clearly determine whether an article is original enough, with novelty elements and interesting for publication. If there are any suspicions that the article is a copy of another paper to a large extent, the editorial board should be informed about it by citing or providing preliminary paper. Contributors should pay more attention to the quality of scientific (especially English) language in the articles and abstracts [8]. An abstract should be structured as following: background, purpose, methods, results, conclusions. An introduction should correspond to a title of the research topic, and the main conclusions should correspond to the purpose formulated in the article.

**Citable documents – Non-citable documents.** Not every article in the journal is considered as a primary research and, therefore, is **citable** (one that can be referred to).

In 2015, a number of articles in the journal with substantial (according to Scopus experts) researches, was twice higher over the three-year period against a number of non-research papers, and in 2016 all papers were considered to be **citable**.

In order to keep this indicator on the same level in the future, the editorial board will continue to adhere to the "EASE Guidelines" [10], which have the following appeal (requirement) to authors [8]: "...Do not copy large parts of your earlier publications and do not send the same paper to several journals at the same time ...Provide new research results ....Clearly separate your original data and hypothesis from the data

and hypotheses of other people and your early publications ...Otherwise you can become a plagiarist or self-plagiarist. "

**International Collaboration:** In 2015 – 6,1%, in 2016 – 6,56%. The editorial board of the journal should make some efforts to improve this indicator, and prioritize articles with foreign co-authors.

Thus, we briefly analyzed the scientometric indicators of "Technical Electrodynamics" journal according to Scopus and ways of their improvement. Based on the above-mentioned, it is possible to outline further steps and approaches in the journal's policy necessary for the growth of its scientometric indicators to achieve its high level.

1. It is necessary to strive to include the journal into scientometric database Web of Science.

2. Also the attention should be paid to DOI (Digital Object Identifier) – a digital object identifier for creating permanent links, which is provided by the registration agency CrossRef. DOI is a unique alphanumeric string assigned to digital object (article, book). In the CrossRef system, each DOI is associated with a set of basic metadata and URL link to the full text, that is, uniquely identifies an item and provides a permanent link to its place in the Internet. DOI is a compulsory element of a modern scientific journal.

3. On the website of the journal <http://www.techned.org.ua/eng/>, it is desirable to place full texts of articles in English publicly available. This will enable foreign readers to get acquainted with each journal issue, which will lead to its promotion among foreign scholars.

Implementation of these tasks requires certain material resources and publisher support - the Institute of Electrodynamics of the NAS of Ukraine.

The editorial board expresses its gratitude to the authors for their papers, reviewers, employees of the Institute, who are not indifferent to the journal problems, for cooperation and assistance. Only through joint efforts we can achieve further real achievements.

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2. <http://www.openscience.in.ua/ua-journals>

3. Journal metrics. <http://www.journalmetrics.com>

4. *Henk F. Moed.* Measuring contextual citation impact of scientific journals. – Available at: <http://arxiv.org/ftp/arxiv/papers/0911/0911.2632.pdf>

5. <http://www.scimagojr.com/journalsearch.php?q=21100207636&tip=sid&clean=0>

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