
CHRONICLE

How to Publish a Good Article and to Reject a Bad One. Notes of a Reviewer

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The rank of a scientist depends not only on the level of his/her own achievements, but also on an ability to understand the achievements of others. Therefore, reviewing is pivotal in scientific activity. It is not a simple matter to write a good article unless the author reads his article through the referee's eyes. While young scientists may learn how to write an article from their supervisors and reading the articles of others (which are not always worthy of imitation), often they only have a vague idea on reviewing. Unfortunately, reviewing is not taught in Russian universities and our post-graduates in general look at lectures askew (on the contrary, attending a course of lectures on speciality is compulsory in foreign universities). I have not come across any textbook on reviewing. Therefore, I was urged by an idea to share my experience with others: lately, I had to read and write many reviews for several leading scientific journals and international conferences. It turned out that hints to a referee can hardly be separated from the hints to an author, and this explains the title of my article. Though the data and examples given below pertain to fields of my interest—automaton and control—my observations may apply equally to other areas.

1. WHY TO REVIEW?

A post-graduate generally faces the reviewing problem only when he faces the problem of writing a “pile” of annotations for his dissertation. As a rule, this shocks, tortures, and even paralyzes him; he is not accustomed to evaluate from outside what he has done, all the more, he does not know how to write so that others may understand it. It is rather easier to review others' works than one's own work. Therefore, the first hint is not to young scholars, but to their supervisors: frequently call in your post-graduates to review scientific articles. This may be of help at the time of defense of their dissertation.

A scientist must not overlook the reviewing activity; it keeps up his scientific shape. Leading foreign scientists write tens of reviews every year. For example, M. Gevers, the President of the European Union Control Association (EUCA) in 1998, wrote at his Internet site that he had to review 60 to 100 articles a year for 10–15 journals.

2. JOURNALS AND CONFERENCES

A review, as a rule, contains four sections, namely, (1) motivation: why a problem is important and why has it not been solved yet, (2) contribution of the article, (3) comments, and (4) evaluation of the article. In foreign publications, the first item is generally disregarded for saving space. For example, *Automatica*, the official journal of the International Federation of Automatic Control (IFAC), sends a blank with two sections “contribution” and “comments to authors” on a separate page, which is communicated only to the Editorial Board, but not to the author.

For conferences, the matter is simpler—only item 4 (only a grade is to be in) and, possibly, comments are needed (a paper cannot be rejected unless substantiated with weighty comments). Reviewing for a conference is less strict, since conferences are generally commercial projects: the larger the number of attendees, the better the advantage for the organizer. For small-scale conferences, only the “garbage” that is good for nothing is rejected. Nevertheless, only 60–70% of the submitted papers are accepted for leading international conferences with more than 1000 participants (for example, European or American Control Conferences). Only 55–60% of the submitted papers are approved for the triennial IFAC world congress with 1300–1700 reports and more than 2000 attendants. For the sake of comparison, we may note that not more than half the submitted articles are accepted for publication in leading journals. IEEE Transactions on Automatic Control an eminent journal in control theory—accepts on the average 25% of the forwarded papers.

Large international conferences, as a rule, require the full text of every paper. This aids in objective evaluation. The situation is somewhat different for workshops and seminars; they only need one-page abstracts. Objective evaluation of a paper from such a brief abstract is virtually impossible and papers are approved for inclusion in the proceedings largely on the basis of reputation and affiliation of the author.

Every paper is sent to two or three referees. Regular papers for leading journals (for example, IEEE Transactions) are assessed by four or five referees. An article is often forwarded for appraisal to those whom the author cites.

3. MOTIVATION AND CONTRIBUTION

Most fields in science today very much look like a pastureland over which a huge cattle herd is roaming. Grass has been mostly eaten away, and the “thick” parts have been denuded. Certain parts have been grazed over and over. At places grass has been trampled upon. Cattle may ramble a lot, but there is nothing to graze; so the herd has since long been looking for a new pasture. . .

The driving forces of the so-called scientific progress—search for and consumption of the scientific “grass”—are by no means vital today to industry or defense. They certainly have not lost their hold; they are still essential and do play a role, for example, in telecommunication (mobile telephony and Internet technology) and finance (prediction and control of financial markets). But the advances in fields of practical significance are not disclosed; they are company or state secrets. What the representatives of companies say at large conferences is mainly a matter of advertisement or disinformation to mislead competitors. In reality, the spirit of an international conference portrays a different kind of competition: fight for research grants and teaching positions. In foreign countries (unlike in Russia), competition promotes the survival of the fittest: 50–100 applicants from different countries may apply for a vacancy. Universities endeavor to draw in talented teachers and get rid of (even experienced) weaklings. Promotion to the next level (assistant→reader, reader→professor) is also a struggle for existence. There is also a real fight for research grants. How to select the best?

It is here that scientific journals and conferences play a decisive role: the number and quality of publications underlie the main criterion of selection at any competition. Experience in reviewing (membership of editorial boards of journals, conference program committees) is equally valued. Such are the criteria determining the success at the world science market.

To get a firm foothold on this market, an “uneaten” piece (motivation!) must be found, display one’s science muscles by solving a new problem (contribution!), and write about it so as to convince readers or audience, and referees in the first instance. The last part (“presentation”) is of no less importance, may be even more important than the previous steps. If you have expounded simply and to the point (referees have no time to read lengthy articles!) (1) what has been done before you and (2) what is your personal contribution, then the referee, as a rule, will be favorably disposed to

your work, unless, of course, you tread upon his toes, i.e., belittle his or her personal contribution. Therefore, the paper must carry citation to all those who have true bearings on the problem. But this must be done with caution: possibly, your paper will be sent for reviewing precisely to the scientist whom you cite. Publication is not a ring for revenge matches. It is unfair to disregard a paper just because you dislike its author.

4. THEORY AND PRACTICE

General belief says that nothing is more practical than a good theory. But who says that precisely your theory is good? Whom you have to convince the usefulness of the new result is just the referee. Only a referee of rare justice would be favorably disposed to your paper if you disregard him and do not give examples. A thoughtful supervisor will not endorse for publishing the paper of his post-graduate if it does not carry any example. Examples may be academic or applied. “Let us apply the method to the equation $Jx'' + A \sin(x) = u$ ” is an academic example. “Let us apply the method to control a single-link manipulator” is an applied example (though the problems may be solved through identical methods). In a theoretical paper, academic examples are obligatory, while applied examples are desirable. Examples that do not allow solution by other methods are particularly advisable. If there are no examples, the referee may straightaway return the paper (even without reading to the end), saying that the “paper needs thorough revision, and addition of examples illustrating the application of the results.” Incidentally, there is no need to exaggerate the importance of application to foreigners: in the world of high technologies, there is a clear understanding that the possibility for applications not only reinforces the motivation of the paper, but may also attract collaborators and sponsors.

5. AT HOME AND ABROAD

I would like to touch upon certain pitfalls of “Russian-speaking” authors. We often feel dejected that our works are not known and not cited. This, unfortunately, is true. Nonetheless, only the works that were really used in the course of preparation or (due to “tactical considerations”) the works whose authors may be appointed as referees are referenced in a paper (we too follow this rule). How often are foreign papers sent to Russia for reviewing? Undoubtedly, as often as our papers are sent abroad for reviewing.

Therefore, underestimation of the Russian contribution (more exactly, the contribution of the ex-USSR scientists) is explicable and springs from the distinction in the Russian and world science markets. Scientific products, i.e., independent shares, can be placed in each of these markets. It is quite a different matter that the home market has been presently impoverished, there are no opportunities in it and our scientists are threading through the world market, wherefrom they are actively pushed out. There is no meaning in falling in despondency: competition is the prime mover of progress! To remain competitive at the world market, one must learn to obey the rules of the game.

Now a few hints are worth making for those who, neglecting the past ups and downs endeavor to break through the world science market despite the imminent fate.

5.1. Learn the Language

Language is a stumbling block. A popular saying says “my tongue is my enemy.” Distorted language obstructs the road to success even for eminent scholars having well-known results. Language may mutilate or even nullify the significance of results (“attractor involves the set”). This is true for the English versions of manuscripts produced by translators, but not authors. Do not expect the referee to tolerate unreadable English, even though your result may be outstanding. Often the

English (and, consequently, the result) becomes just meaningless! There are innumerable examples. It just suffices to go through the machine translation of some paper or software manual to appreciate the situation: no one is obliged to endure bad English.

Textbooks and dictionaries are not of much help in learning the language. No dictionary will guide you when to translate the Russian word “reshenie” as “decision” and when as “solution”; what is the correct English equivalent for the Russian term “tsel,” “purpose” or “goal” or “aim” or “target,” or for the Russian verb “vklyuchat,” “add” or “insert” or “include” or “involve”? No textbook says that the Russian term “ob”ekt upravlenie” must be translated as “plant” or “system,” but not “object.” To write a paper in English, you can learn only from articles in leading foreign journals, preferably, written by authors whose native tongue is English. As guidelines, take the articles from the journal where you intend to send your paper, or still better from books on your speciality, because journals are crowded with papers written in poor English and many journals today even overlook the purity of English. At the early stages you may borrow phrases and whole blocks of phrases from old articles, but reliable in language. Prior to submitting the paper, you may profit if you could prepare a presentation copy and read it in a seminar in English. It is a good idea if a colleague knowledgeable in good English could peruse the text of your report.

5.2. References to English Publications on the Topic

The difference between your result and the well-known results must be described in brief and distinct terms in the Introduction. Its shorter version must be repeated in Conclusions, and a still more shorter version in the Abstract.

It is meaningless to emphasize the results you or your colleagues had discovered five or ten years earlier than the well-known results. I have often received comments such as “we are not interested in history,” “we do not know these works,” and “they are not available here.” Indeed, no one will look for a reference to an article in an unknown journal or a book written in a language not known to the majority of the participants of the world science market. Unfortunately, we are in such a position and we must pave the way, beginning from the start. Similarly, it is meaningless to assert that the your result is absolutely new and no one had studied the problem earlier. The referee would smilingly guess that either you are unaware of the literature on the topic or no one had investigated it earlier because it is of zero-value. This must not done even for our home journals (although, there are, unfortunately, articles referring solely to author’s works).

5.3. Motivation and Contribution

Well written motivation and contribution guarantee 70% success. Details and proofs receive scarce attention (only in disputable cases when referees diverge in their evaluation). Usually, motivation is stated in the Introduction and contribution in Conclusions, but there is no harm in repeating them. As much time and thought must be given to writing the motivation; these are the sentences that are purposefully repeated several times at several places. Sometimes proper words come to your mind only upon receipt of referee’s disapproval. What matters is not only a distinct formulation of your concrete contribution, i.e., how does your result differ from the well-known results, but it is equally important to describe its significance: what can be achieved with your results compared to the well-known results?

5.4. Choice of a Journal

You must weight your ambitions against the possible damages. Do not right away make an attempt to publish your article in the most prestigious journal. Struggle with referees may be

prolonged, and a few “thrashes” may even kill your desire for scientific work. In every field, besides leading journals, there are also other less eminent journals. The quality of a journal has a quantitative expression—the impact factor defining the citation frequency of papers from a journal. Impact factors of different journals are listed in the SCI Journal Citation Reports; they can also be found in Internet pages (see, for example, [1]). Impact factors of cover-to-cover translations of Russian journals published by MAIK “Interperiodika” can be viewed at (www.maik.rssi.ru). If you are a regular contributor to English journals and publishers, it is easier to climb up the career ladder.

Conferences provide an easier path to success and “peg” a new idea, but eventually a firm foothold must be gained through journal publications. Incidentally, it is impolite to submit a report to a conference, but not attend it (say, for lack of finance), because you may create problems to the organizers. A large number of such reports squander conference finances, therefore organizers evade such “no-show” authors.

6. HOW TO REJECT AN ARTICLE

To approve an article for publication is indeed a perplexing dilemma. To accept your article means to reject the article of someone else, for whom every publication may have decisive bearings on his promotion to a higher position. Therefore, a paper should be approved, as a rule, only if it cannot be rejected, i.e., there is nothing to cavil at in it.

This rule must be kept in mind when you are acting as a referee. If you are fortunate enough, you may find formal argumentation errors that falsify the result. Incorrectness is not tolerated in any science market and a false paper should be instantaneously turned down (we mean not minor errors or typos that have no influence on the main results of the paper). Inconspicuous errors are brought forward best through counterexamples. In either case, it facilitates the associate editor, who takes a preliminary decision on the basis of referees’ opinions, to agree with your comments and reject the paper. Referees capable of detecting errors in proofs and designing counterexamples are esteemed in the scientific society and become well known. (The other side of such an eminence—you will be dumped with weak manuscripts.) Sometimes an offshoot of a counterexample is a new publication. Well, this is another reason why reviewing is beneficial—it stimulates further work.

Weakness of motivation and contribution is a strong justification for rejection and must be demonstrated within 1–2 phrases to convince the editor and the author as well.

Contribution. “Contribution is unclear and meagre,” “results are not significant enough for publication in the journal”—these are excerpts from real reviews.

Motivation. A simple perusal of the descriptive part of the Introduction discloses the problems in the field, as yet unresolved problems, and the problems solved by the author. If all these are formulated distinctly to the point in the judgement of the referee, motivation may be regarded well founded. Otherwise, the referee may write “there is no comparison with the existing results” and cite one or two references you have neglected. Some review blank forms even contain a special question, namely, “Is the significance of the paper explained relative to previous works?” It is undesirable to refer to conference reports (except for large conferences) that are not easily accessible. It is meaningless to cite the works from Russian-language publications.

A good justification for rejection is a poor list of references containing mostly the works of the author. In such cases, the rejection slip simply reads “the list of references is inadequate.”

Undoubtedly, the author of a rejected article is like a wounded animal: he begins an immediate search for the works pointed out by the referee; if they are far-fetched and impertinent, he blames the referee, and if he does not find any fault therein, he blames the editor.

7. HOW TO AVOID REJECTION

Either you are an author or a referee, you should bear in mind that the first rejection is not the end in itself; it is rather the beginning of a long discussion. Every author has the right to disagree with referees and editors and send a well-reasoned objection. Furthermore, only an indifferent author would disregard this right. A relevant position is to revise the paper thoroughly and mail it with replies to referee's remarks and an accompanying letter to the editor.

The paper must be revised in conformity with the referee's comments, incorporating corrections to as many comments as possible even if you do not fully agree with them. If the referee says that something is unclear and makes comments, which, in your opinion, are unfounded, always remember that the blame is also on you. Recast the style of presentation and agree with his comments—you only gain by this conduct!

The letter to referees must contain replies to all remarks or a list of corrections introduced in conformity with their remarks (showing the page numbers) or an explanation as to why you do not agree with the remarks. Here is a model text of a letter to the editor:

Dear Professor . . . ,

I am enclosing herewith the revised manuscript of my paper “...” together with replies to reviewers' comments. I am grateful to the reviewers and Editor for their valuable comments and hope that you will reconsider my paper.

Though the goal of science is an unending pursuit for truth, adamant attitude to one's viewpoint does real harm to science. Only if authors could refrain from writing accusation letters! Since editors and referees, indeed, do an arduous thankless job, they greatly appreciate assistance rather than criticism. You gain nothing by your accusatory letter.

8. TRADITIONS MEAN A LOT

A real entangled problem is that research trends in Russia and abroad are different. The international science market is more mobile, new trends easily disseminate and oust traditional ones. It is useful to analyze briefly the situation in the control field. To this end counting the number of sessions on each topic at major conferences is worth. Still more useful are the data on key words from the Science Citation Index (SCI), whose Internet site can be accessed from a few Russian libraries (see at www.elibrary.ru). Russian Foundation for Basic Research (RFBR) conducts an important project on establishing a Russian SCI on the basis of the data from the RFBR research grants annual reports [2].

In mathematical control theory, optimal control has been one of central topics in Russia (since the discovery of the maximum principle by L.S. Pontryagin). In foreign countries, on the contrary it is declining in weight, whereas robust control and identification are becoming central. Adaptive control has ceased to grow in weight, which doubled in the eighties. In the nineties, there had been an added interest in nonlinear control theory. In foreign journals, the main attention is paid to output control, whereas Russian journals still publish articles, in which the state vector is assumed to be wholly measurable, which, as a rule, is far from being real. In Russia, little attention is paid to trends that are topical abroad, e.g., hybrid systems, discrete control for continuous systems, discrete events systems, input-output properties of systems, neural networks, and fuzzy systems. Recently, a new interesting trend has emerged in foreign countries at the border between control and information theories: the design of controllers under conditions of constrained capacity of communication channels.

For objective reasons, the intensity of publications on robotics and other sophisticated trends has decreased in Russia due to the high cost of experiments and equipment. On the contrary, research in nonlinear dynamics and nonlinear oscillations, which were traditionally given top priority in ex-

USSR, is now “fashionable” in the West especially in connection with the control of chaos, which may find applications in diverse fields, like information, vibration, laser, and chemical technologies.

It is worth to remember that control specialists come from two clans, mathematicians and engineers, since control theory is taught both at the departments of pure or applied mathematics, and at the departments of electrical or mechanical engineering. Though there is a difference in the level of education and orientation, but they, representatives of different clans, meet at the same conferences and are accommodative as they both need exchange of information.

The picture is still more intricate in fields such as nonlinear dynamics and chaos control—boarder areas between physics, mathematics, and engineering. The traditions of conferences and publications of physicists are different and diverse groups are just in the beginning of the way to mutual understanding.

9. CONCLUSIONS

By my personal experience, I know that it is hard to write a good paper in good English for a leading international journal. Every such an article is a step upward in scientific career, and I highly respect those who have made many such successful steps. Apparently, my generation is deprived of this benefit. The next generation must, therefore, be put on the right path. Conferences and olympiads in English for young scientists must be held and young scientists must be often delegated to conferences abroad. Incidentally, St. Petersburg hosted since 1991 an international (Baltic) olympiad on automatic control for students and post-graduates, in which only papers written in English were accepted. The next, 10th Olympiad will be held in May, 2004 (for details, visit www.boac.nm.ru).

Is it the only way to get into the world science market and write papers in foreign journals? There are two conflicting camps having two opposite opinions.

(1) Integration with the world science process is the prime end of work and the best results must be published in English, since isolation means that our science would lag behind the world progress.

(2) Russian science must be sponsored first of all and the best results must be published in Russian to lift the rating of Russian science and journals.

Both viewpoints, however, are tenable; have not our leading scientists successfully combined both approaches? Science, in the words of P.L. Kapitsa, “does not recognize borders and nationalities.” Although, as has already been mentioned, the Russian and world science markets are different, a thin thread nonetheless runs through them, and you cannot achieve distinguished success at the home market without threading through the world market. Therefore, in my opinion, the list of Russian journals approved by the Higher Attestation Committee for publication of results for doctorate dissertation (<http://db.informika.ru/vak/db/spisok.htm>) must be appended with a list of leading international journals, in which publication of results of doctorate dissertation must also be mandatory.

In general, experience is the best teacher. The more the articles you publish both in Russian and foreign journals and the more the reviews you produce, the better. It is also helpful to observe other recommendations [3–9]. The article [3] by P. Halmos, an eminent mathematician and admirable teacher, is highly instructive. Useful materials can also be found in the Internet, where you can visit time-saving reference and information sites, e.g., www.rusycon.ru—the Russian Systems and Control Archive containing about 2000 references not only in automaton and control, but also links to general science and information sites. By the time when three of your papers would have been rejected and three papers of other authors have been disapproved on the basis of your reviews, you

may have learnt to write better and your fourth paper may be good enough to get accepted for publication!

REFERENCES

1. Impact Factor of Journals for 2000, Site of Young Scientists Council, Institute of Automatic Control Sciences, Russian Academy of Sciences (<http://www.iacp.dvo.ru/young/cite/jif2000/jip.htm>).
2. Alfimov, M.V., Libkind, A.N, Libkind, I.A., and Minin, V.A., *Informatsionnye potoki v RFFI: novyi podkhod k tsitirovaniyu* (Information Flows at the Russian Foundation for Fundamental Research: A New Approach to Citation), *Vest. RFFI*, 2001, no. 4 (http://intra.rfbr.ru/pub/vestnik/V4_01/1_1.htm).
3. Halmos, P.R., How to Write Mathematical Texts, *Uspekhi Mat. Nauk*, 1971, vol. 26, no. 5 (161) (<http://mindspring.narod.ru/math/ega/>).
4. Sosinskii, A.B., *Kak napisat' matematicheskuyu stat'yu po-angliiski* (How to Write a Mathematical Paper in English), Moscow: Faktorial, 1998.
5. Sergeev, N.M., Coauthoring Ethics and Citation Ethics, *Ross. Khim. Zh.*, 1999, no. 6 (<http://vivovoco.rsl.ru/vv/papers/ecce/ethics/serg.htm>).
6. Kutateladze, S.S., *Russian-to-English in Writing: Sovety epizodicheskomu perevodchiku* (Hints to A Casual Translator), Novosibirsk: Inst. Mat., 2000 (<http://www.ibmh.msk.su/vivovoco/vv/books/rustoeng/content.htm>).
7. Bernstein, D.S., A Student's Guide to Research, *IEEE Control Syst.*, 1999, vol. 19, no. 1, pp. 102–108 (http://www.engin.umich.edu/dept/aero/people/faculty/bernstein/research_advice.pdf).
8. Bernstein, D.S., Peer Review, *IEEE Control Syst. Mag.*, 2000, vol. 20, no. 3, pp. 8–11 (http://www.engin.umich.edu/dept/aero/people/faculty/bernstein/peer_review.pdf).
9. Thompson, R.C., Author vs. Referee: A Case History for Middle Level Mathematicians, *Am. Math. Monthly*, 1983, vol. 90, pp. 661–668.

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