Société de Calcul Mathématique, S. A.
Algorithmes et Optimisation

Publishing in the RMM program

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I. The academic system of publications

Anyone will agree that the academic system of publications, as it stands now in mathematics (including probabilities and statistics) does not meet the needs of the users. The publications are written by the scientists and for the scientists. The peer review system establishes strong rules which, in most cases, make it impossible for an engineer to see the benefits he could get from the results which are presented.

Among these rules, the most important ones are :

- The choice of a specific vocabulary, employed by the theorists, not by the users (each domain has its specific vocabulary) ;
- An axiomatic presentation, with no reference to concrete needs ;
- An emphasis upon technical achievements and originality ;
- An abstract presentation of the results (a "theorem"), with no comparison with concrete situations ;
- No comparison of the new tool with existing ones ;
- No validation of the new results : to what situations do they apply ?

Two other drawbacks of the academic system of publications are :

- They do not allow any discussion : the paper usually does not reflect any controversy ;
- They are immediately obsolete : once published, the paper does not reflect subsequent changes in the knowledge.

So, there is an obvious need for a better system, taking the users' needs into account.

II. The Industry approach

Even in big companies, which have research centers, the approach to new results is quite often of empirical nature : This tool works, this one does not work. The need for a proof is rarely felt. But a proof (or rather a validation) is quite essential, because it indicates that all possibilities have been taken into account, have been considered. This is the difference between an empirical approach and a scientific approach.

All companies would benefit from a scientific approach, but usually they do not carry it completely, for the following reasons :

– They do not feel the need ;

– They do not have time ;

– They fear any discussion about a problem which they consider as confidential.

Let us answer these three points :

– The need for a scientific approach appears quickly if the problem is of importance for the company : what are the consequences of a wrong answer ?

– The management of time is often unsatisfactory : the company wants a quick complete answer, which is usually impossible. So, it satisfies itself with a quick empirical answer. But, if the problem is really important, more time should be devoted to a better exploration, with corresponding benefits ;

– Confidentiality usually comes from a wrong approach. Any problem can be put, by a competent engineer, under a form which can be publicly discussed, with benefits from the discussion, without disclosing confidential data. For instance, the actual data may be replaced by generic ones, situations may be changed, and so on.

So, quite clearly, all companies could benefit of an open system for scientific discussion, as we now present.

III. New technologies for publication

Until now, the length of a scientific paper was limited by editorial rules. This eliminated de facto many features which would be helpful for the understanding : history of the problem, complete data, complete treatment of examples, discussions, analysis of the results and validations.

But now, Internet access to web sites makes it easy to publish very complete papers, describing experiments in full, including comments by other authors.

We insist here that the users' comments are an essential tool for validation of any scientific result. Just as the comments upon an hotel, made by the consumers, or upon a television set, are elements of choice for further consumers, for a scientific tool the comments of previous users are quite essential, no matter whether they are positive or negative.

We insist also that these comments, written by users, should always be signed : Engineer X, from company Y, tried this tool and makes the following remarks. So the authors may answer these specific comments and initiate a discussion.

The habit, among academic scientists, of anonymous reports, is wrong and should be abandoned. It brings nothing, scientifically speaking, and only permits the lack of responsibility and the tendency to criticize, quite often for illegitimate reasons. There is nothing, in a scientific report, which cannot be signed.

IV. Publishing in the RMM Program

Let us first recall that the RMM program (Robust Mathematical Modeling) deals with all kinds of uncertainties (upon data, upon laws, upon objectives). So, the program will consider any paper dealing with these questions. Papers dealing only with other topics (for instance, a faster algorithm for something) will not be considered, but papers with different aims will be considered if they address the robustness concern (for instance : the robustness of a faster algorithm).

In order to be considered for publication, a paper should always consist in three parts :

– A description part (modeling) : What is the problem ? Where does it come from ? This part should always be written in "real life" terms, so as to be understood by the engineers of the corresponding domain ;

– A technical part : What are the solutions brought by the paper to the problem ? These solutions might of course be limited (it works only in special cases), or even negative (we tried this, and it does not work). Here, the proofs and arguments should be detailed, so as to be understood by interested engineers ;

– A validation part : We applied this tool to this situation, and we obtained these results. This should be compared with previous results, obtained by other tools.

Papers describing the state of the art in some situation (that is, in which part 2 is not original) are perfectly acceptable, if well-documented. Indeed, we need to analyze the possibilities of existing algorithms in many situations. Nobody knows exactly, for instance, what are the capacities of algorithms for image analysis, for optimal control, for traffic management, and so on.

On the other hand, papers containing only a technical tool (that is, reduced to part 2) will not be considered.

V. Submitting a paper

Papers may be submitted at any time by any member of the RMM program. They should be sent by email to bernard.beauzamy@scmsa.com.

A preliminary checking will be made in order to ensure that the paper satisfies the rules stated above. If it does not, the author will be informed immediately. If it does, the paper will be sent to all members of the RMM program. Depending on their reaction, the paper will be put on the RMM web site, with all comments.

After a certain time, the author will be asked to modify his paper, in order to take the comments into account. The idea is that the published version should always be up to date, and ready for use by interested engineers.

Any published topic should first appear as a forum for discussion : people ask questions, and comment the answers. And the published papers should always be the best references available on these questions.