To whom it may concern   Brussels, October 2003
SCI and Mathematics

The National Committee of Mathematics, the Belgian representative of the International
Mathematical Union and appointed by the Koninklijke Vlaamse Academie van België voor
Wetenschappen en Kunsten en de Académie Royale de Belgique (Royal Flemish Academy
of Belgium for Sciences and Arts, and the Royal Academy of Belgium) on the one hand and
the Belgian Mathematical Society on the other like to express their point of view in relation
to the use and abuse of the SCI and the particular role which mathematics plays in all this.

In addition we want to emphasize the differences which exist in publishing policy between
mathematics and many other scientific disciplines.

- De SCI has been created as a repertoire for bibliographic searches mainly for chemistry
  and biology, whilst since a long time mathematicians had at their disposal a German,
  an American and a Russian journal which are exclusively devoted to reviews of math-
  ematical articles. Until recently many mathematicians were not even aware of the
  existence of the SCI, and consequently the publishing policy of mathematicians was
  (and is) not adjusted to the SCI.

- Most articles referred to in mathematics papers are more than 10 years old. For
  example in 2001 there were about 5000 citations in "Annals of Mathematics" of which
  about 80% were more than 10 years old. As compared to mathematics, the number
  of citations in other disciplines is enormous. The results obtained in journals of other
  disciplines are often short-term results that are not always lasting.

  It is alarming that the VLIR (Flemish Inter-university Council) only takes a window of
  10 years to establish its new key of allocating budgets for scientific research. In practice
  this means that almost all research groups in mathematics will "miss the boat".

- Compared to other scientific disciplines impact factors for mathematics journals are
  extremely low. The mathematics journal with the highest impact factor is 20 times
  lower than that of a biology journal with the highest impact factor. The inventor of
  the impact factor, E. Garfield advised strongly against the use of the Impact Factor
  for the evaluation of scientific research.

- There are several scientific journals of high level standards which are published by
  universities or scientific institutions. The non-commercial character of such institutions
  and universities entails that these journals do not necessarily appear on a regular
  basis, which means immediately differences in the IF. Not long ago this happened
  to the "Annali di Matematica" and the "Institut des Hautes Etudes Scientifiques :
  Publications Mathématiques", which contain several articles by Fields Medal winners,
  to be to compared to the Nobel prize winners.

- There are a number of journals that can be placed in the category of mathematics
  as well as in another scientific discipline, which may make a very substantial differ-
  ence in Impact Factor. For instance, the "Journal of Computational Neuroscience",
  accommodated in the bio-medical sciences, has impact factor is 2.6 (figure of 1999),
  but if it would be placed in applied mathematics, then such an impact factor would
  be extremely high.

- Taking the first 20 mathematical journals from the list with descending values of the Impact Factor, then we see hardly any fundamental (pure) mathematics, but rather journals which have a big overlap with biology, economy, ... Journals which follow a trendy subject are present as well, but they are not always concerned with the more fundamental subjects.

- Two other examples of absurd situations are:

    1. Both the American Mathematical Society and the London Mathematical Society publish a series of journals. Publication of an article in one of these depends solely on its length, even though the same severe referee norms apply. Nevertheless the impact factors of these journals are very different.

    2. Some years ago the "Lancet" published a paper about the relationship between the weight of back packs of school children and the weight of the pupils; it had an impact factor of 11.79, whereas the proof by Wiles of the last theorem of Fermat, a problem that could not be solved by the most famous mathematicians for centuries, which appeared in the "Annals of Mathematics" with an impact factor of 1.7.

- Because math journals are often published by universities or scientific institutions and, not in the least, in many cases the refereeing process of papers in mathematics is very time consuming, it regularly happens that the factual publication of an article is years behind. This is obviated by the availability and distribution of (electronic) preprints. However, citations to preprints do not have any influence on the impact factor of a journal.

- Another difference in publishing policy is that, certainly in most pure mathematics papers, the authors are listed alphabetically. However, in many forms for evaluations, promotions, and applications for research projects it is required to mention the order of the authors.

- The average number of authors for a mathematics paper is considerably lower than in many (most) other disciplines. Whereas in some scientific disciplines it is not exceptional that there are e.g. 30 or more authors for an (often relatively short) contribution, in mathematics many articles are written by just 1 or 2 authors.

    In several disciplines it is usual to include all members of a research group as co-authors of an article. In mathematics the head of a research group is not even mentioned, unless he or she really has made a scientific contribution to the paper.

- To compute an impact factor on the basis of citations within two years makes no sense for mathematics because this time span is very close to the reaction time needed to react to a published paper. Therefore the IF is computed as the quotient of two small numbers giving in a quite random result. For example in 1988 the *Journal of Differential Geometry* was ranked sixth with an IF of 1.231. In 2001 it was number 114 (without any change of its level) and in 2002, it was number 70.

All this shows that the SCI, and certainly the Impact Factor have little value for an evaluation of research (projects) in mathematics; this is even more so in comparison with

other disciplines. The use of these databases for the partitioning of money entails that mathematics is going to be negligible and a frustration for the researchers.

The previous arguments and the resulting point of view is supported at a European level by the EMS (European Mathematical Society). Their president (Sir John Kingman) confirms this in a letter (see attachment) and an official point of view of the EMS will be published shortly.

We hope that the authorities take into account the particular role played by mathematics, if they still intend to make use of these evaluation methods (SCI and IF).

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