The four steps of a RMM program

by Bernard Beauzamy  
Chairman and CEO, Société de Calcul Mathématique SA, Paris

January 2006

The RMM (Robust Mathematical Modeling) program aims at providing contacts to mathematicians (no matter public or private). It allows mathematicians to answer the question "how can we be useful?", and thus of course create more jobs. Until recently, jobs in mathematics were connected to education, which is very limited: a mathematician's task is to solve problems, not just to teach. These problems, in order to be useful socially speaking, have to address the following three difficulties:

- the data are missing or corrupted;
- the laws are unknown;
- the objectives are multiple and contradictory.

Any mathematical tool which addresses at least one of these difficulties is potentially useful, since they appear constantly in real-life problems. On the opposite, to develop abstract, elaborate, theoretical tools is of limited interest, since these tools will never find the proper situation for application.

The wrong attitude is to develop tools first, hoping that they will sometime meet some need. This does not work, because nobody cares about such tools: the scientific journals in which they are presented are not read by the users. The two communities "users" and "theorists" are disjoint, in many respects (vocabulary, scale of time, ambitions, and so on). There is a need (we may think of that later, in the frame of the RMM program) for a scientific journal for the users, written in their vocabulary.

Since we cannot develop the tools first, we have to understand the needs first, and then build the tools according to the needs. This leads to the following scheme:

**Step 1: open a colloquium**

This colloquium should typically meet once a month. The speaker should never be a mathematician, but a representative of any community which might need mathematics: industry, banks, insurance, medicine, environment, energy, and so on.

The speaker will present his organization and mention some difficulties: these difficulties are always described in "human terms": too much work, not enough money, and so on. Then the mathematicians will try to turn these difficulties in quantitative terms. This step, called modeling, is not easy at all. Usually, one has to do it several times before some satisfactory description is obtained.

**Step 2: open a working seminar**

This working seminar, or working group, should consist in mathematicians, junior and senior together. It will meet every week (four times as often as the colloquium) and its task should be to "digest" what the speaker said. This is the place where the modeling described above will take place.
Step 3 : write reports

The output of the working seminar should be the production of written reports, describing the problems mentioned by the speaker during the colloquium (step 1), and possibly some steps towards their resolution. These reports should of course not be under final form: they are simple working papers.

Step 4 : give the reports to the speakers

When the "digestion" process is well advanced, when we have some documents on it, we return to the initial speaker and present our approach to him. This way, he will be convinced we have understood his problem and we are willing to work on it.

Then, depending on the size of the project, a contract should be signed with the speaker's organization to work on this problem.

These four steps are absolutely necessary if we want to address real-life problems. The colloquium is necessary to discover them, then the working group is necessary to digest them (the digestion will not occur by itself, just listening to the speaker), then the written documents are necessary to set our propositions under a precise form (which is what real-life organizations expect), and then the final discussion will prove our engagement.

These four steps are necessary, and I dare say that they are almost sufficient. Of course, they may not lead to a contract immediately, but they almost always lead to a contract, either later, or in another area, with another organization. This requires, of course, that enough information has been sent around, so that other organizations know about the competences that have been created.