

A Special Responsibility for Authors in the Computer Age

The advent of computers and the widespread dissemination of the ability and knowledge to use them has permitted the solution of many extraordinarily difficult problems. Such solutions were so much beyond human capacities that the problems, themselves, were laid aside and forgotten in those days when only human capacities were available.

Some new difficulties, however, have now arisen. When analytical solutions are available, a student may readily and quickly find the effects on the solution of new values of certain important variables by merely "plugging in" the appropriate quantities. This is, of course, not possible with solutions based on computers. The author thus has a considerable responsibility to cover a range of pertinent variables in his calculations and to list them in his presentation. He also has a particular responsibility to use realistic values of his parameters. At least one case is known in which the numerical values of a parameter assumed were such that a basic assumption of the method was negated.

Probably the most important responsibility may be described thus. Each new departure builds on its predecessors. Sometimes a new method is proposed to replace an old one and proved only with numerical calculations. This is quite justified, since the problems are often so difficult that no experimental data are available for comparison. On other occasions, a refinement of former work is introduced, such as the addition of axial diffusion to previous models in which that phenomenon was neglected. In both cases it seems highly desirable that the authors of the newer work use the same values of those parameters common to both older and newer work as were used in the older work. Then and only then may one see the results of the newer method or the effects of the newly considered variable. At least one example is known in which two different methods of approaching the same problem are so completely different in example calculation that comparison is hopeless.

The happy day when all these solutions may be compared with data may yet come. Until it does, it is highly desirable to use numbers in such a way that comparisons among methods or between refined and unrefined conditions may be made.

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