Fifty years of non-linear modelling by computer

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Abstract

Fifty years ago few non-linear models were fitted to data because of the computing time involved, using only desk calculators and tables. The advent of the computer made it possible not only to fit models more quickly but to develop new methods and new approaches to the general problem. Now that computers are even faster and software is available to try to fit any model whatsoever, the basic principles are in danger of being forgotten. Too often the scientist merely provides the equations to be fitted, assumes that least squares is the only method available, and provides an answer which may be quite inappropriate or misleading. The need to consider parameterisation, error structure, confidence regions for parameters, design of data collection, and the possibility of ambiguity or non-existence of solutions, is as important as ever. Some examples will be discussed.