

GUEST, P. G., *Numerical Methods of Curve Fitting* (Cambridge University Press, 1961), xiv + 422 pp., 80s.

The fitting of curves to observational data, whether curves of a prescribed function or of a probability distribution, is one of the oldest applicational problems of the practical statistician, actuary, physicist, astronomer or meteorologist. Since about 1920 the whole subject has been reconsidered from modern standpoints, part practical, part theoretical. On the practical side there is the availability of superior calculating machines, electrical or high-speed electronic; these have reacted on the choice of theoretical methods, so that for example linear combination on a wholesale scale, or orthogonal functions, can be freely used. At the same time, and particularly since the pioneer work of R. A. Fisher, the theory of tests of statistical significance has been investigated in the minutest detail, so that side by side with the theoretical and calculative branches of curve fitting there is also the statistical testing of the results.

A modern textbook will take full account of all three aspects. It can be said at once that the book before us does this, and handsomely. In fact it contains more than its title implies. Part I consists of four chapters on general theoretical statistics, in which probability, characteristic functions, binomial, Poisson and χ^2 distributions are treated and the central limit theorem derived, not in full rigour but with broad sufficient indications; also such other typical test distributions as those of t and F . This ground being prepared, the book proceeds to the theme of the title, with such thoroughness that for example the fitting of a straight line, linear regression, occupies 62 pages, and the fitting of a polynomial more than 180. A profusion of methods is given and a complete discussion of standard errors and of testing. Part III deals with the fitting of harmonic and other functions more general than the polynomial, and with multivariate regression. Numerical examples and tables illustrate the discussion at every point; and in a final chapter five typical examples are worked out with full comment. The bibliography is extensive, covering eight pages. The text is singularly free from error, and the printing excellent.

It is a book which, costly as it is, should be on the shelf of all statisticians, and in fact of everyone who is likely to encounter the problem of fitting a curve to observed data.

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