Statistical Science
1990, Vol. 5, No. 2, 159

In This Issue

The COPSS lectures honoring Sir Ronald A. Fisher were delivered in 1988 by Professor Erich L. Lehmann, University of California at Berkeley, and in 1989 by Sir David R. Cox, Oxford University. Both independently chose similar topics, namely, how one specifies the model, and the roles models play. These eminent statisticians provide different classifications of models that they hope will help guide us to appropriate model selection in applications. The written versions of their talks appear here as our first pair of articles.

Lehmann reviews Fisher's (meager) and Neyman's (lengthy) expositions about where models come from, including a reservoir of models that facilitate knowing when a model is appropriate (e.g., the Poisson) and model selection techniques. The two model classifications considered are empirical (guiding action) and explanatory (guiding understanding). Cox, seeing these matters a bit differently, observes that there are substantive models (connected with subject matter), empirical models (e.g., linear models to represent dependencies thought to be present), randomization models and indirect models (used to suggest methods of analysis).

Model selection in the statistical sciences contains individual and artistic components that depend on the statistician's subject matter knowledge, the breadth of his or her knowledge of the statistical models available, and a sense of aesthetics. While the ideas proposed here will be useful guides to many of us, each new real data analysis also will provide an exciting challenge for individual creativity in model selection.

Claus Weihs and Heinz Schmidli are industrial statisticians at CIBA-GEIGY, a pharmaceutical, dyestuffs and agrochemical company. Their paper describes their integrated, interactive graphics program, OMEGA (Online Multivariate Explanatory Graphical Analysis), for multivariate exploratory data analysis, combining algebraic dimension reducing and dynamic graphics. The classical algebraic techniques (principal components, discriminant analysis, resampling methods, etc.) and static and dynamic graphic techniques (scatter plots, 3D rotation, etc.) are examples of OMEGA's capabilities, illustrated by the authors in a 29-dimensional dyestuff application. Several discussants expand on these ideas, pro and con, describing alternative ideas, and, in some cases, competing software. These technologies promise to help future statisticians to understand more easily, and more deeply, the true nature of complex multivariate data.

Z. William Birnbaum emigrated from Poland just before World War II to the United States, where he mainly has been Professor of Statistics at the University of Washington. Albert Marshall interviewed Birnbaum, a former Editor of *The Annals of Mathematical Statistics* and President of the IMS 1963–64, last year about his career in mathematics and statistics since his graduate work at one of the leading European institutions, the University of Lwów. Birnbaum's research has spanned a variety of important areas, including topics in nonparametric statistics, reliability, sampling, and applied statistical work in cancer research and infant mortality, among others.

The likelihood function is a venerable and immensely valuable statistical tool used to describe the likely values of a parameter. However, many statisticians now prefer specifications to be in terms of future observations, rather than parameters, and so the notion of "predictive likelihood" has emerged. Jan Bjørnstad of the University of Tromsø, Norway, reviews more than a dozen definitions of predictive likelihood, including the profile predictive likelihood and the Bayesian (flat prior) posterior predictive density. Each definition measures the likelihood of a future observation z, given observed data y. That so many versions of predictive likelihood exist attests not only to the vagueness of what is sought, but also to the importance of the concept. Bjørnstad, and those providing comments on his paper, expose the complexities of the concepts, while emphasizing the usefulness of the prediction intervals that stem from these measures of predictive likelihood.

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