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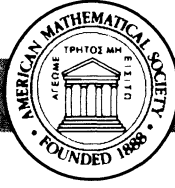
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Statistical Analysis of Measurement Error Models and Applications

Proceedings of a
Summer Research Conference
held June 10–16, 1989

Statistical Analysis of Measurement Error Models and Applications



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Statistical Analysis of Measurement Error Models and Applications

Proceedings of the AMS-IMS-SIAM
Joint Summer Research Conference
held June 10–16, 1989, with support
from the National Science Foundation
and the U. S. Army Research Office

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Editors

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Preface

This volume contains papers presented at the conference “Statistical Analysis of Measurement Error Models and Applications,” held June 10 to June 16, 1989, at Humboldt State University, Arcata, California. The conference was a Summer Research Conference sponsored jointly by the American Mathematical Society, the Institute of Mathematical Statistics, and the Society for Industrial and Applied Mathematics, and supported by a grant from the National Science Foundation. The organizing committee was composed of Raymond J. Carroll, Co-Chair; Wayne A. Fuller, Co-Chair; Leon J. Gleser, Co-Chair; G. W. Stewart and J. H. Ware.

Measurement error models describe functional relationships among variables observed subject to random errors of measurement. Examples include linear and nonlinear errors-in-variables regression models, calibration and inverse regression models, factor analysis models, latent structure models, and simultaneous equation models. Such models are used in medicine, the life sciences, econometrics, chemometrics, geology, sample surveys, time series, and other disciplines. Although the problem of estimating the parameters of such models exists in most scientific fields, there are few sources that treat measurement error models as an area of statistical methodology. This volume is designed to add to that small number.

The conference was organized to achieve three main goals. First, it was desired to bring together researchers working on measurement error models in a variety of disciplines in order to improve communication. Interaction between disciplines has been hampered by different model formulations, terminology, and notation. Second, it was felt that a dialogue with numerical analysts could lead to cooperation in constructing statistical software. Third, the conference offered a chance to take stock of recent research developments in nonlinear measurement error models.

To fulfill these goals, a broad mix of theoretical statisticians, applied statisticians, and numerical analysts from academia, government and industry were invited. Because of the range of participants, a variety of topics were considered at the conference.

We have organized the papers into four broad groups. The first group contains papers treating general aspects of the measurement error problem.

The discussion of the history of measurement error models by Peter Sprent furnishes an introduction for the remainder of the volume.

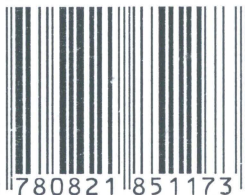
The second group contains seven papers concerned with inference for the nonlinear measurement error model. This is an active area of research and generated considerable interest at the conference. The third group of papers examine computational aspects of estimation. The final set of three papers study estimators that possess robustness properties against deviations from common model assumptions.

The organizers thank the sponsoring organizations and the National Science Foundation for supporting the conference. We thank Carole Kohanski for assisting with local arrangements and the AMS publication staff for their able editorial assistance. We extend particular thanks to Leon Gleser for his efforts on behalf of the conference.

Philip J. Brown

Wayne A. Fuller

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