

Preface

This proceedings volume entitled “Recent Advances in Robust Statistics: Theory and Applications” outlines the ongoing research in some topics of robust statistics. It can be considered as an outcome of the International Conference on Robust Statistics (ICORS) 2015, which was held during January 12–16, 2015, at the Indian Statistical Institute in Kolkata, India. ICORS 2015 was the 15th conference in this series, which intends to bring together researchers and practitioners interested in robust statistics, data analysis and related areas. The ICORS meetings create a forum to discuss recent progress and emerging ideas in statistics and encourage informal contacts and discussions among all the participants. They also play an important role in maintaining a cohesive group of international researchers interested in robust statistics and related topics, whose interactions transcend the meetings and endure year round. Previously the ICORS meetings were held at the following places: Vorau, Austria (2001); Vancouver, Canada (2002); Antwerp, Belgium (2003); Beijing, China (2004); Jyväskylä, Finland (2005); Lisbon, Portugal (2006); Buenos Aires, Argentina (2007); Antalya, Turkey (2008); Parma, Italy (2009); Prague, Czech Republic (2010); Valladolid, Spain (2011); Burlington, USA (2012); St. Petersburg, Russia (2013); and Halle, Germany (2014).

More than 100 participants attended ICORS 2015. The scientific program included 80 oral presentations. This program had been prepared by the scientific committee composed of Claudio Agostinelli (Italy), Ayanendranath Basu (India), Andreas Christmann (Germany), Luisa Fernholz (USA), Peter Filzmoser (Austria), Ricardo Maronna (Argentina), Diganta Mukherjee (India), and Elvezio Ronchetti (Switzerland). Aspects of Robust Statistics were covered in the following areas: robust estimation for high-dimensional data, robust methods for complex data, robustness based on data depth, robust mixture regression, robustness in functional data and nonparametrics, statistical inference based on divergence measures, robust dimension reduction, robust methods in statistical computing, non-standard models in environmental studies and other miscellaneous topics in robustness.

Taking advantage of the presence of a large number of experts in robust statistics at the conference, the authorities of the Indian Statistical Institute, Kolkata, and the conference organizers arranged a one-day pre-conference tutorial on robust

statistics for the students of the institute and other student members of the local statistics community. Professor Elvezio Ronchetti, Prof. Peter Filzmoser, and Dr. Valentin Todorov gave the lectures at this tutorial class. All the attendees highly praised this effort.

All the papers submitted to these proceedings have been anonymously refereed. We would like to express our sincere gratitude to all the referees. A complete list of referees is given at the end of the book.

This book contains ten articles which we have organized alphabetically according to the first author's name. The paper of Adelchi Azzalini, keynote speaker at the conference, discusses recent developments in distribution theory as an approach to robustness. M. Baragilly and B. Chakraborty dedicate their work to identifying the number of clusters in a data set, and they propose to use multivariate ranks for this purpose. C. Croux and V. Öllerer use rank correlation measures, like Spearman's rank correlation, for robust and sparse estimation of the inverse covariance matrix. Their approach is particularly useful for high-dimensional data. The paper of F.Z. Dođru and O. Arslan examines the mixture regression model, where robustness is achieved by mixtures of different types of distributions. A.-L. Kißlinger and W. Stummer propose scaled Bregman distances for the design of new outlier- and inlier-robust statistical inference tools. A.K. Laha and Pravida Raja A.C. examine the standardized bias robustness properties of estimators when the underlying family of distributions has bounded support or bounded parameter space with applications in circular data analysis and control charts. Large data with high dimensionality are addressed in the contribution of E. Liski, K. Nordhausen, H. Oja, and A. Ruiz-Gazen. They use weighted distances between subspaces resulting from linear dimension reduction methods for combining subspaces of different dimensions. In their paper, J. Miettinen, K. Nordhausen, S. Taskinen, and D.E. Tyler focus on computational aspects of symmetrized M-estimators of scatter, which are multivariate M-estimators of scatter computed on the pairwise differences of the data. A robust multilevel functional data method is proposed by H.L. Shang and applied in the context of mortality and life expectancy forecasting. Highly robust and efficient tests are treated in the contribution of G. Shevlyakov, and the test stability is introduced as a new indicator of robustness of tests.

We would like to thank all the authors for their work, as well as all referees for sending their reviews in time.

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