Contents

Part I Methodological Developments in Data Science

1 **Aviation Data Analysis by Linear Programming in Airline Network Revenue Management** 3
Wolfgang Gaul and Christoph Winkler

2 **Bayesian Reduced Rank Regression for Classification** 19
Heinz Schmidli

3 **Modelling and Classification of GC/IMS Breath Gas Measurements for Lozenges of Different Flavours** 31
Claudia Wigmann, Laura Lange, Wolfgang Vautz and Katja Ickstadt

4 **The Cosine Depth Distribution Classifier for Directional Data** 49
Houyem Demni, Amor Messaoud and Giovanni C. Porzio

5 **A Nonconformity Ratio Based Desirability Function for Capability Assessment** 61
Ramzi Talmoudi

Part II Computational Statistics

6 **Heteroscedastic Discriminant Analysis Using R** 77
Gero Szepannek and Uwe Ligges

7 **Comprehensive Feature-Based Landscape Analysis of Continuous and Constrained Optimization Problems Using the R-Package Flacco** 93
Pascal Kerschke and Heike Trautmann

Part III Perspectives on Statistics and Data Science

8 **A Note on Artificial Intelligence and Statistics** 127
Katharina Morik

9 Statistical Computing and Data Science in Introductory Statistics 139
Karsten Lübke, Matthias Gehrke and Norman Markgraf

10 Approaching Ethical Guidelines for Data Scientists 151
Ursula Garzcarek and Detlef Steuer

Part IV Statistics in Econometric Applications

11 Dating Lower Turning Points of Business Cycles – A Multivariate Linear Discriminant Analysis for Germany 1974 to 2009 173
Ullrich Heilemann and Heinz Josef Münch

12 Partial Orderings of Default Predictions 187
Walter Krämer and Peter N. Posch

13 Improving GMM Efficiency in Dynamic Models for Panel Data with Mean Stationarity 201
Giorgio Calzolari and Laura Magazzini

Part V Statistics in Industrial Applications

14 Economically Designed Bayesian *np* Control Charts Using Dual Sample Sizes for Long-Run Processes 219
Imen Kooli and Mohamed Limam

15 Statistical Analysis of the Lifetime of Diamond-Impregnated Tools for Core Drilling of Concrete 233
Nadja Malevich, Christine H. Müller, Michael Kansteiner, Dirk Biermann, Manuel Ferreira and Wolfgang Tillmann

16 Detection of Anomalous Sequences in Crack Data of a Bridge Monitoring 251
Sermad Abbas, Roland Fried, Jens Heinrich, Melanie Horn, Mirko Jakubzik, Johanna Kohlenbach, Reinhard Maurer, Anne Michels and Christine H. Müller

17 Optimal Semi-Split-Plot Designs with R 271
Sebastian Hoffmeister and Andrea Geistanger

18 Continuous Process Monitoring Through Ensemble-Based Anomaly Detection 289
Jochen Deuse, Mario Wiegand and Kirsten Weisner

Part VI Statistics in Music Applications

19 Evaluation of Audio Feature Groups for the Prediction of Arousal and Valence in Music 305
Igor Vatolkin and Anil Nagathil

20 The Psychological Foundations of Classification 327
Martin Ebeling and Günther Rötter