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Advanced Statistical Methods in Process Monitoring, Finance, and Environmental Science

Essays in Honour of Wolfgang Schmid

This book presents a unique collection of contributions on modern methods and applications in three key areas of statistics, celebrating the significant work of Wolfgang Schmid in this field. It is structured thematically into parts focusing on statistical process monitoring, financial statistics, and spatial statistics with environmetrics, each featuring chapters from leading experts.
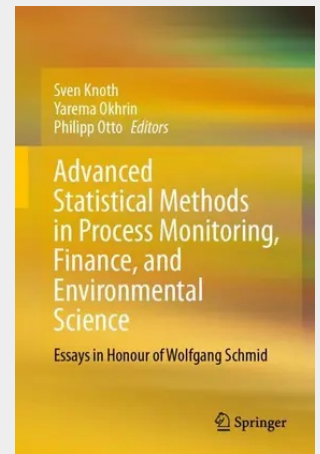
The opening articles on statistical process monitoring present novel methodologies for the detection of anomalies and control charting techniques, which are crucial for maintaining quality in manufacturing processes. Detailed discussions are included on integrating multivariate statistical methods and real-time monitoring to enhance process reliability and efficiency.

The part on financial statistics explores rigorous approaches in financial econometrics, with an emphasis on dynamic modelling of market volatility and risk assessment. Contributions cover advanced asset allocation strategies, leveraging high-dimensional data analysis, and the application of machine learning techniques.

Spatial statistics and environmetrics are addressed through innovative research on the statistical analysis of environmental data. This includes the use of geostatistical models and hybrid models that combine traditional statistical techniques with machine learning to improve the prediction of environmental phenomena. Key topics here involve the modelling of extremes and airborne pollutants, the prediction of earthquakes using a smartphone-based sensor network, and reviews of selected topics essential in modern spatial statistics.

Each part not only reflects Wolfgang Schmid's interests and impact in these areas but also provides detailed theoretical and applied studies, demonstrating how these sophisticated statistical methods can be effectively employed in practical scenarios. This makes the book an indispensable resource for researchers and practitioners looking to apply cutting-edge statistical techniques in these complex fields.

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