MATHEMATICAL UNDERPINNINGS OF ANALYTICS.
THEORY AND APPLICATIONS

Book details:

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Oxford University Press, *2015*,
xiii + 261 pages, £ 29.99,
ISBN: 978-0-19-872509-1 (hardcover)

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*Readership***:** Masters students in Mathematics or Applied Mathematics; students in quantitative sciences; analytics practitioners or professionals who want to understand the math underlying their businesses.

The book presents methods of Analytics within a framework of modern data science. Analytics is defined as the application of mathematical and statistical concepts to large data sets; it needs to be founded on rigorous mathematical methods that may give rise to new solutions for companies' problems. This methodology could inspire new products and services or new business models.
In the book the instruments of probability theory, graphs and networks, random matrices, linear algebra, optimization, forecasting, discrete dynamical systems, and more, are dealing with to extract insights that offer to the readers some options for action and competitive advantages. This makes it the most desirable and valuable part of big data science.
Each Chapter tackles a topic in analytics: social networks and digital marketing;

forecasting; clustering and segmentation; inverse problems; Markov models of behavioral changes; multiple hypothesis testing and decision-making. Chapters start with the background of mathematical theory, exposed in a strong way, and then give way to practical considerations and real applications.

Examples are taken by real applications in many fields: commercial services, digital media, communications, domestic energy, security, environment, marketing, customer relationship management.

Exercises (and solutions), external data resources, and suggestions for project works are given.

The book includes an appendix giving a short course in Bayesian reasoning.

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