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Nota di contenuto	Modeling and Forecasting Electricity Loads and Prices; Contents; Preface; Acknowledgments; 1 Complex Electricity Markets; 1.1 Liberalization; 1.2 The Marketplace; 1.2.1 Power Pools and Power Exchanges; 1.2.2 Nodal and Zonal Pricing; 1.2.3 Market Structure; 1.2.4 Traded Products; 1.3 Europe; 1.3.1 The England and Wales Electricity Market; 1.3.2 The Nordic Market; 1.3.3 Price Setting at Nord Pool; 1.3.4 Continental Europe; 1.4 North America; 1.4.1 PJM Interconnection; 1.4.2 California and the Electricity Crisis; 1.4.3 Alberta and Ontario; 1.5 Australia and New Zealand; 1.6 Summary 1.7 Further Reading2 Stylized Facts of Electricity Loads and Prices; 2.1 Introduction; 2.2 Price Spikes; 2.2.1 Case Study: The June 1998 Cinergy Price Spike; 2.2.2 When Supply Meets Demand; 2.2.3 What is Causing the Spikes?; 2.2.4 The Definition; 2.3 Seasonality; 2.3.1 Measuring Serial Correlation; 2.3.2 Spectral Analysis and the Periodogram; 2.3.3 Case Study: Seasonal Behavior of Electricity Prices and Loads; 2.4 Seasonal Decomposition; 2.4.1 Differencing; 2.4.2 Mean or Median Week; 2.4.3 Moving Average Technique; 2.4.4 Annual Seasonality and Spectral Decomposition

2.4.5 Rolling Volatility Technique; 2.4.6 Case Study: Rolling Volatility in Practice; 2.4.7 Wavelet Decomposition; 2.4.8 Case Study: Wavelet Filtering of Nord Pool Hourly System Prices; 2.5 Mean Reversion; 2.5.1 R/S Analysis; 2.5.2 Detrended Fluctuation Analysis; 2.5.3 Periodogram Regression; 2.5.4 Average Wavelet Coefficient; 2.5.5 Case Study: Antipersistence of Electricity Prices; 2.6 Distributions of Electricity Prices; 2.6.1 Stable Distributions; 2.6.2 Hyperbolic Distributions; 2.6.3 Case Study: Distribution of EEX Spot Prices; 2.6.4 Further Empirical Evidence and Possible Applications

2.7 Summary; 2.8 Further Reading; 3 Modeling and Forecasting Electricity Loads; 3.1 Introduction; 3.2 Factors Affecting Load Patterns; 3.2.1 Case Study: Dealing with Missing Values and Outliers; 3.2.2 Time Factors; 3.2.3 Weather Conditions; 3.2.4 Case Study: California Weather vs Load; 3.2.5 Other Factors; 3.3 Overview of Artificial Intelligence-Based Methods; 3.4 Statistical Methods; 3.4.1 Similar-Day Method; 3.4.2 Exponential Smoothing; 3.4.3 Regression Methods; 3.4.4 Autoregressive Model; 3.4.5 Autoregressive Moving Average Model; 3.4.6 ARMA Model Identification

3.4.7 Case Study: Modeling Daily Loads in California; 3.4.8 Autoregressive Integrated Moving Average Model; 3.4.9 Time Series Models with Exogenous Variables; 3.4.10 Case Study: Modeling Daily Loads in California with Exogenous Variables; 3.5 Summary; 3.6 Further Reading; 4 Modeling and Forecasting Electricity Prices; 4.1 Introduction; 4.2 Overview of Modeling Approaches; 4.3 Statistical Methods and Price Forecasting; 4.3.1 Exogenous Factors; 4.3.2 Spike Preprocessing; 4.3.3 How to Assess the Quality of Price Forecasts; 4.3.4 ARMA-type Models; 4.3.5 Time Series Models with Exogenous Variables; 4.3.6 Autoregressive GARCH Models

Sommario/riassunto

This book offers an in-depth and up-to-date review of different statistical tools that can be used to analyze and forecast the dynamics of two crucial for every energy company processes-electricity prices and loads. It provides coverage of seasonal decomposition, mean reversion, heavy-tailed distributions, exponential smoothing, spike preprocessing, autoregressive time series including models with exogenous variables and heteroskedastic (GARCH) components, regime-switching models, interval forecasts, jump-diffusion models, derivatives pricing and the market price of risk. Modeling and Foreca