1. Record Nr. UNINA9911004824503321 Autore Soliman S. A. **Titolo** Electrical load forecasting: modeling and model construction / / Soliman Abdel-hady Soliman, Ahmad M. Al-Kandari Burlington, MA,: Butterworth-Heinemann, c2010 Pubbl/distr/stampa **ISBN** 9786612738098 9781282738096 1282738097 9780123815446 0123815444 Descrizione fisica 1 online resource (441 p.) Altri autori (Persone) AlkandariAhmad M Disciplina 333.793/213015195 Soggetti Electric power-plants - Load - Forecasting - Mathematics Electric power systems - Mathematical models Electric power consumption - Forecasting - Mathematics Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Description based upon print version of record. Note generali Includes bibliographical references and index. Nota di bibliografia Front Cover; Half Title Page; Title Page; Copyright; Dedication; Table of Nota di contenuto Contents: Acknowledgments: Introduction: Outline of the Book: Chapter 1. Mathematical Background and State of the Art; 1.1 Objectives; 1.2 Matrices and Vectors; 1.3 Matrix Algebra; 1.3.1 Addition of Matrices; 1.3.2 Matrix Subtraction (Difference); 1.3.3 Matrix Multiplication; 1.3.4 Inverse of a Matrix (Matrix Division); 1.4 Rank of a Matrix; 1.5 Singular Matrix; 1.6 Characteristic Vectors of a Matrix; 1.7 Diagonalization; 1.8 Partitioned Matrices: 1.9 Partitioned Matrix Inversion: 1.10 Quadratic Forms 1.11 State Space Representation 1.12 Difference Equations; 1.13 Some Optimization Techniques; 1.13.1 Unconstrained Optimization; 1.13.2 Constrained Optimization; 1.14 State of the Art; References; Chapter 2. Static State Estimation; 2.1 Objectives; 2.2 The Static Estimation Problem Formulation; 2.2.1 Linear Least Error Squares Estimation; 2.2.2 Weighted Linear Least Error Squares (WLES) Estimation; 2.2.3

Constrained Least Error Squares (CLES) Estimation; 2.2.4 Recursive Least Error Squares (RLES) Estimation; 2.2.5 Nonlinear Least Error

Squares (NLLES) Estimation

2.3 Properties of Least Error Squares Estimation2.4 Least Absolute Value Static State Estimation; 2.4.1 Historical Perspective; 2.4.2 Least Absolute Value of Error Estimation; 2.4.3 Least Absolute Value Based on Linear Programming; 2.4.4 Schlossmacher Iterative Algorithm; 2.4.5 Sposito and Hand Algorithm; 2.4.6 Soliman and Christensen Algorithm; 2.5 Constrained LAV Estimation; 2.6 Nonlinear Estimation Using the Soliman and Christensen Algorithm; 2.7 Leverage Points; 2.8 Comparison between LES Estimation and LAV Estimation Algorithms; References

Chapter 3. Load Modeling for Short-Term Forecasting3.1 Objectives; 3.2 Introduction; 3.3 Base Load; 3.4 Weather-Dependent Load; 3.4.1 Temperature; 3.4.2 Wind Speed; 3.4.3 Humidity; 3.4.4 Illumination; 3.5 Residual Load; 3.6 Short-Term Load Models; 3.6.1 Multiple Linear Regression; 3.6.2 General Exponential Smoothing; 3.6.3 Stochastic Time Series; 3.6.4 Qualities of Forecasting Models; 3.7 Special Load-Forecasting Models; 3.7.1 Model A: Multiple Linear Regression Model; 3.7.2 Model B: Harmonics Model; 3.7.3 Model C: Hybrid Model; References

Chapter 4. Fuzzy Regression Systems and Fuzzy Linear Models4.1 Objectives; 4.2 Fuzzy Fundamentals; 4.3 Fuzzy Sets and Membership; 4.3.1 Membership Functions; 4.3.2 Basic Terminology and Definitions; 4.3.3 Support of a Fuzzy Set; 4.3.4 Normality; 4.3.5 Convexity and Concavity; 4.3.6 Basic Operation; 4.4 Fuzzy Linear Estimation; 4.4.1 Nonfuzzy Output (Yj =mj); 4.4.2 Fuzzy Output Systems; 4.5 Fuzzy Short-Term Load Modeling; 4.5.1 Multiple Fuzzy Linear Regression Model: Crisp Data; 4.5.2 Multiple Fuzzy Linear Regression Model: Fuzzy Data; 4.5.3 Fuzzy Load Model B; 4.5.4 Fuzzy Load Model C 4.6 Conclusion

Sommario/riassunto

Succinct and understandable, this book is a step-by-step guide to the mathematics and construction of electrical load forecasting models. Written by one of the world's foremost experts on the subject, Electrical Load Forecasting provides a brief discussion of algorithms, their advantages and disadvantages and when they are best utilized. The book begins with a good description of the basic theory and models needed to truly understand how the models are prepared so that they are not just blindly plugging and chugging numbers. This is followed by a clear and rigorous exposition of the