

Introduction to the Theory and Application of Data Envelopment Analysis

A foundation text with integrated software



Emmanuel Thanassoulis

Introduction To The Theory And Application Of Data Envelopment Analysis

**Abraham Charnes, William W.
Cooper, Arie Y. Lewin, Lawrence M.
Seiford**

Introduction To The Theory And Application Of Data Envelopment Analysis:

Introduction to the Theory and Application of Data Envelopment Analysis Emmanuel Thanassoulis, 2013-06-29 1 DATA ENVELOPMENT ANALYSIS Data Envelopment Analysis DEA was initially developed as a method for assessing the comparative efficiencies of organisational units such as the branches of a bank schools hospital departments or restaurants The key in each case is that they perform feature which makes the units comparable the same function in terms of the kinds of resource they use and the types of output they produce For example all bank branches to be compared would typically use staff and capital assets to effect income generating activities such as advancing loans selling financial products and carrying out banking transactions on behalf of their clients The efficiencies assessed in this context by DEA are intended to reflect the scope for resource conservation at the unit being assessed without detriment to its outputs or alternatively the scope for output augmentation without additional resources The efficiencies assessed are comparative or relative because they reflect scope for resource conservation or output augmentation at one unit relative to other comparable benchmark units rather than in some absolute sense We resort to relative rather than absolute efficiencies because in most practical contexts we lack sufficient information to derive the superior measures of absolute efficiency DEA was initiated by Charnes Cooper and Rhodes in 1978 in their seminal paper Charnes et al 1978 The paper operationalised and extended by means of linear programming production economics concepts of empirical efficiency put forth some twenty years earlier by Farrell 1957

Introduction to Data Envelopment Analysis and Its Uses William W. Cooper, Lawrence M. Seiford, Kaoru Tone, 2006-03-20 Introduction to Data Envelopment Analysis and Its Uses With DEA Solver Software and References has been carefully designed by the authors to provide a systematic introduction to DEA and its uses as a multifaceted tool for evaluating problems in a variety of contexts The authors have been involved in DEA's development from the beginning William Cooper with Abraham Charnes and Edwardo Rhodes is a founder of DEA Lawrence Seiford and Kaoru Tone have been actively involved as researchers and practitioners from its earliest beginnings All have been deeply involved in uses of DEA in practical applications as well as in the development of its basic theory and methodologies The result is a textbook grounded in authority experience and substance *Data Envelopment Analysis: Theory, Methodology, and Applications* Abraham Charnes, William W. Cooper, Arie Y. Lewin, Lawrence M. Seiford, 2013-12-01 This book represents a milestone in the progression of Data Envelopment Analysis DEA It is the first reference text which includes a comprehensive review and comparative discussion of the basic DEA models The development is anchored in a unified mathematical and graphical treatment and includes the most important modeling extensions In addition this is the first book that addresses the actual process of conducting DEA analyses including combining DEA and 1 parametric techniques The book has three other distinctive features It traces the applications driven evolution and diffusion of DEA models and extensions across disciplinary boundaries It includes a comprehensive bibliography to serve as a source of references as well as a platform for further

developments And finally the power of DEA analysis is demonstrated through fifteen novel applications which should serve as an inspiration for future applications and extensions of the methodology The origin of this book was a Conference on New Uses of DEA in 2 Management and Public Policy which was held at the IC Institute of the University of Texas at Austin on September 27-29 1989 The conference was made possible through NSF Grant SES 8722504 A Charnes and 2 W W Cooper co-PIs and the support of the IC Institute

Data Envelopment Analysis in the Financial Services Industry Joseph C. Paradi, H. David Sherman, Fai Keung Tam, 2017-11-21 This book presents the methodology and applications of Data Envelopment Analysis DEA in measuring productivity efficiency and effectiveness in Financial Services firms such as banks bank branches stock markets pension funds mutual funds insurance firms credit unions risk tolerance and corporate failure prediction Financial service DEA research includes banking insurance businesses hedge pension and mutual funds and credit unions Significant business transactions among financial service organizations such as bank mergers and acquisitions and valuation of IPOs have also been the focus of DEA research The book looks at the range of DEA uses for financial services by presenting prior studies examining the current capabilities reflected in the most recent research and projecting future new uses of DEA in finance related applications

Advances in DEA Theory and Applications Kaoru Tone, 2017-04-12 A key resource and framework for assessing the performance of competing entities including forecasting models *Advances in DEA Theory and Applications* provides a much needed framework for assessing the performance of competing entities with special emphasis on forecasting models It helps readers to determine the most appropriate methodology in order to make the most accurate decisions for implementation Written by a noted expert in the field this text provides a review of the latest advances in DEA theory and applications to the field of forecasting Designed for use by anyone involved in research in the field of forecasting or in another application area where forecasting drives decision making this text can be applied to a wide range of contexts including education health care banking armed forces auditing market research retail outlets organizational effectiveness transportation public housing and manufacturing This vital resource Explores the latest developments in DEA frameworks for the performance evaluation of entities such as public or private organizational branches or departments economic sectors technologies and stocks Presents a novel area of application for DEA namely the performance evaluation of forecasting models Promotes the use of DEA to assess the performance of forecasting models in a wide area of applications Provides rich detailed examples and case studies *Advances in DEA Theory and Applications* includes information on a balanced benchmarking tool that is designed to help organizations examine their assumptions about their productivity and performance

Advances in the Theory and Applications of Performance Measurement and Management Ali Emrouznejad, Emmanuel Thanassoulis, Mehdi Toloo, 2024-09-02 This book presents selected proceedings of DEA45 International Conference on Data Envelopment Analysis which was held September 4-6 2023 at Surrey Business School University of Surrey Guildford UK It contains theoretical and empirical papers on Data Envelopment Analysis DEA and

related fields with a focus on performance measurement and management It discusses the latest research and developments and their application in various areas such as regulation agriculture education financial and health services The book is of interest to both researchers and practitioners working on or utilizing the DEA method for examining efficiencies across various organizations

Preferential Voting and Applications: Approaches Based on Data Envelopment Analysis Mehdi Soltanifar,Hamid Sharafi,Farhad Hosseinzadeh Lotfi,Witold Pedrycz,Tofigh Allahviranloo,2023-05-19 This book presents the theory and application of the models presented in this regard and establishes a meaningful relationship between data envelopment analysis and multi attribute decision making The issue of choice using the aggregation of voters votes is one of the most important group decision making issues that are always considered by decision makers in electoral systems Voting is a method of group decision making in a democratic society that expresses the will of the majority Voting is perhaps the simplest way to gather the opinions of experts and this ease of application has made it a multi attribute decision making method in group decisions Preferential voting is a type of voting that may refer to electoral systems or groups of the electoral system In preferential voting voters vote for multiple candidates and how the candidates are arranged on the ballot is important Researchers have made many efforts to provide models of voter aggregation and one of the best results of these efforts is the aggregation of votes based on the policy of data envelopment analysis Thus in group decisions the opinions of experts are obtained in a simple structure and consolidated in an interactive and logical structure and the results can be a powerful tool for decision support This book provides a complete set of voting models based on data envelopment analysis and expressing its various applications in industry and society However most decision making methods do not use the opinions of experts or reduce the motivation of experts to participate in complex interactions and time while voting methods do not have this shortcoming This book is suitable for graduate students in the fields of industrial management business management industrial engineering applied mathematics and economics It can also be a good source for researchers in decision science decision support systems data envelopment analysis supply chain management healthcare management and others The methods presented in this book can not only offer a comprehensive framework for solving the problems of these areas but also can inspire researchers to pursue new innovative hybrid methods

Entrepreneurship and Intrapreneurship in Social, Sustainable, and Economic Development Sebastian Aparicio,Andreu Turro,Maria Noguera,2021-01-25 Entrepreneurship and intrapreneurship have become a vehicle that offers solutions for social environmental and economic problems Even though the level of entrepreneurial activity and its diversity have been motivated through public policies social support has also played an important role in encouraging people to think of entrepreneurship as a desirable career choice This book brings together analyses of those elements required for entrepreneurial and intrapreneurial intention and action which ultimately become important leverages of development Chapters highlight the importance of rural urban university organizational and family environments for a bunch of intentions and behaviors such as green sport social

corporate innovative traditional and gender entrepreneurship This entrepreneurial diversity is translated into higher development through the empowerment of women environmental consciousness and efficient production Policymakers scholars and practitioners can find different examples and cases useful for decision making learning and practice in this book

Theory and Method in Higher Education Research Malcolm Tight, Jeroen Huisman, 2015-09-29 Theory and Method in Higher Education contains contributions to international debates regarding the application and development of theory and methodology in researching higher education

Neutrosophic Sets and Systems, Vol. 41, 2021 Florentin Smarandache, Mohamed Abdel-Basset, Said Broumi, Neutrosophic Sets and Systems has been created for publications on advanced studies in neutrosophy neutrosophic set neutrosophic logic neutrosophic probability neutrosophic statistics that started in 1995 and their applications in any field such as the neutrosophic structures developed in algebra geometry topology etc **Advanced Intelligent Computing Technology and Applications**

De-Shuang Huang, Qinhu Zhang, Chuanlei Zhang, Wei Chen, 2025-07-14 The 12 volume set CCIS 2564 2575 together with the 28 volume set LNCS LNAI LNBI 15842 15869 constitutes the refereed proceedings of the 21st International Conference on Intelligent Computing ICIC 2025 held in Ningbo China during July 26 29 2025 The 523 papers presented in these proceedings books were carefully reviewed and selected from 4032 submissions This year the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications Therefore the theme for this conference was Advanced Intelligent Computing Technology and Applications

OR/MS Today, 2002 **Optimization of Complex Systems: Theory, Models, Algorithms and Applications**

Hoai An Le Thi, Hoai Minh Le, Tao Pham Dinh, 2019-06-15 This book contains 112 papers selected from about 250 submissions to the 6th World Congress on Global Optimization WCGO 2019 which takes place on July 8 10 2019 at University of Lorraine Metz France The book covers both theoretical and algorithmic aspects of Nonconvex Optimization as well as its applications to modeling and solving decision problems in various domains It is composed of 10 parts each of them deals with either the theory and or methods in a branch of optimization such as Continuous optimization DC Programming and DCA Discrete optimization Network optimization Multiobjective programming Optimization under uncertainty or models and optimization methods in a specific application area including Data science Economics Finance Energy Water management Engineering systems Transportation Logistics Resource allocation Production management The researchers and practitioners working in Nonconvex Optimization and several application areas can find here many inspiring ideas and useful tools techniques for their works

Managing Tourism Firms Clive L. Morley, 2007 In this volume Dr Clive Morley presents a series of papers designed to illustrate facets of managing organisations engaged in tourism Back cover **Theory and History in Regional Perspective**

Masamichi Kawano, Karima Kourtit, Peter Nijkamp, Yoshiro Higano, 2022-05-14 This collection of essays presents

insight and methodology that are highly relevant for readers today as they consider the future of the world they live in. Experiencing the COVID 19 pandemic people have realized how fragile the current economy is and the necessity for reconstructing the socio economic system. That system which was considered the default for so long was succeeded by the analytical framework of economics and regional science. The contents of this book are diversified as are the achievements of Prof Yasuhiro Sakai to whom this volume is dedicated and cover a wide area from mathematical and experimental economics to conventional and emerging fields of regional science. Some are timeless topics that have had new life breathed into them. Part I deals with among other areas risk management with uncertain events the effectiveness and impacts of regulation and friction related to trading the stability of strategic behavior and market equilibrium and sustainable regional development and urban planning from the long term perspective. Part II also presents a diversity of subjects including input output analysis and computable general equilibrium CGE modelling for internal as well as external structure and network linkage such as a value chain openness and creativity as related to competition among cities and regions dispersion versus concentration and inequality versus equality.

Decision Sciences Raghu Nandan Sengupta, Aparna Gupta, Joydeep Dutta, 2016-11-30. This handbook is an endeavour to cover many current relevant and essential topics related to decision sciences in a scientific manner. Using this handbook graduate students researchers as well as practitioners from engineering statistics sociology economics etc will find a new and refreshing paradigm shift as to how these topics can be put to use beneficially. Starting from the basics to advanced concepts authors hope to make the readers well aware of the different theoretical and practical ideas which are the focus of study in decision sciences nowadays. It includes an excellent bibliography reference journal list information about a variety of datasets illustrated pseudo codes and discussion of future trends in research. Covering topics ranging from optimization networks and games multi objective optimization inventory theory statistical methods artificial neural networks times series analysis simulation modeling decision support system data envelopment analysis queueing theory etc this reference book is an attempt to make this area more meaningful for varied readers. Noteworthy features of this handbook are in depth coverage of different topics solved practical examples unique datasets for a variety of examples in the areas of decision sciences in depth analysis of problems through colored charts 3D diagrams and discussions about software.

Safety and Reliability. Theory and Applications Marko Cepin, Radim Bris, 2017-06-14. Safety and Reliability Theory and Applications contains the contributions presented at the 27th European Safety and Reliability Conference ESREL 2017 Portoro Slovenia June 18-22 2017. The book covers a wide range of topics including Accident and Incident modelling Economic Analysis in Risk Management Foundational Issues in Risk Assessment and Management Human Factors and Human Reliability Maintenance Modeling and Applications Mathematical Methods in Reliability and Safety Prognostics and System Health Management Resilience Engineering Risk Assessment Risk Management Simulation for Safety and Reliability Analysis Structural Reliability System Reliability and Uncertainty Analysis

Selected special sessions include contributions on the Marie Skłodowska Curie innovative training network in structural safety risk approaches in insurance and finance sectors dynamic reliability and probabilistic safety assessment Bayesian and statistical methods reliability data and testing organizational factors and safety culture software reliability and safety probabilistic methods applied to power systems socio technical economic systems advanced safety assessment methodologies extended Probabilistic Safety Assessment reliability availability maintainability and safety in railways theory big data risk analysis and management and model based reliability and safety engineering Safety and Reliability Theory and Applications will be of interest to professionals and academics working in a wide range of industrial and governmental sectors including Aeronautics and Aerospace Automotive Engineering Civil Engineering Electrical and Electronic Engineering Energy Production and Distribution Environmental Engineering Information Technology and Telecommunications Critical Infrastructures Insurance and Finance Manufacturing Marine Industry Mechanical Engineering Natural Hazards Nuclear Engineering Offshore Oil and Gas Security and Protection Transportation and Policy Making *Islamic Economic Studies*, 2008 *Advances in Computer Science, Engineering & Applications* David C. Wyld, Jan Zizka, Dhinaharan Nagamalai, 2012-05-15 The International conference series on Computer Science Engineering Applications ICCSEA aims to bring together researchers and practitioners from academia and industry to focus on understanding computer science engineering and applications and to establish new collaborations in these areas The Second International Conference on Computer Science Engineering Applications ICCSEA 2012 held in Delhi India during May 25-27 2012 attracted many local and international delegates presenting a balanced mixture of intellect and research both from the East and from the West Upon a strenuous peer review process the best submissions were selected leading to an exciting rich and a high quality technical conference program which featured high impact presentations in the latest developments of various areas of computer science engineering and applications research **Higher Education: Handbook of Theory and Research** Michael B. Paulsen, 2016-04-12 Published annually since 1985 the Handbook series provides a compendium of thorough and integrative literature reviews on a diverse array of topics of interest to the higher education scholarly and policy communities Each chapter provides a comprehensive review of research findings on a selected topic critiques the research literature in terms of its conceptual and methodological rigor and sets forth an agenda for future research intended to advance knowledge on the chosen topic The Handbook focuses on a comprehensive set of central areas of study in higher education that encompasses the salient dimensions of scholarly and policy inquiries undertaken in the international higher education community Each annual volume contains chapters on such diverse topics as research on college students and faculty organization and administration curriculum and instruction policy diversity issues economics and finance history and philosophy community colleges advances in research methodology and more The series is fortunate to have attracted annual contributions from distinguished scholars throughout the world

This book delves into Introduction To The Theory And Application Of Data Envelopment Analysis. Introduction To The Theory And Application Of Data Envelopment Analysis is an essential topic that needs to be grasped by everyone, from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Introduction To The Theory And Application Of Data Envelopment Analysis, encompassing both the fundamentals and more intricate discussions.

1. The book is structured into several chapters, namely:
 - Chapter 1: Introduction to Introduction To The Theory And Application Of Data Envelopment Analysis
 - Chapter 2: Essential Elements of Introduction To The Theory And Application Of Data Envelopment Analysis
 - Chapter 3: Introduction To The Theory And Application Of Data Envelopment Analysis in Everyday Life
 - Chapter 4: Introduction To The Theory And Application Of Data Envelopment Analysis in Specific Contexts
 - Chapter 5: Conclusion
 2. In chapter 1, the author will provide an overview of Introduction To The Theory And Application Of Data Envelopment Analysis. The first chapter will explore what Introduction To The Theory And Application Of Data Envelopment Analysis is, why Introduction To The Theory And Application Of Data Envelopment Analysis is vital, and how to effectively learn about Introduction To The Theory And Application Of Data Envelopment Analysis.
 3. In chapter 2, the author will delve into the foundational concepts of Introduction To The Theory And Application Of Data Envelopment Analysis. This chapter will elucidate the essential principles that need to be understood to grasp Introduction To The Theory And Application Of Data Envelopment Analysis in its entirety.
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 6. In chapter 5, this book will draw a conclusion about Introduction To The Theory And Application Of Data Envelopment Analysis. The final chapter will summarize the key points that have been discussed throughout the book.
- This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. It is highly recommended for anyone seeking to gain a comprehensive understanding of Introduction To The Theory And Application Of Data Envelopment Analysis.

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