

Free ebook Chapter 2 data envelopment analysis explained Full PDF

Data Envelopment Analysis: Theory, Methodology, and Applications Handbook on Data Envelopment Analysis Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis Data Envelopment Analysis Data Envelopment Analysis with R Extension of Data Envelopment Analysis with Preference Information Advances in Data Envelopment Analysis Data Envelopment Analysis: Theory, Methodology, and Applications Introduction to the Theory and Application of Data Envelopment Analysis Uncertain Data Envelopment Analysis Dynamics of Data Envelopment Analysis Data Envelopment Analysis: Balanced Benchmarking Data Envelopment Analysis New Efficiency Theory Data Envelopment Analysis Introduction to Data Envelopment Analysis and Its Uses Performance Measurement with Fuzzy Data Envelopment Analysis Data Envelopment Analysis An Introduction to Data Envelopment Analysis Nonparametric Estimation of Educational Production and Costs using Data Envelopment Analysis Data Envelopment Analysis for Simplified Neutrosophic Sets Network Data Envelopment Analysis Neutrosophic data envelopment analysis based on the possibilistic mean approach Data Envelopment Analysis Uncertainty in Data Envelopment Analysis Handbook of Operations Analytics Using Data Envelopment Analysis Service Productivity Management Introduction to Data Envelopment Analysis and Its Uses Research Methodology on Data Envelopment Analysis (DEA) Environmental Assessment on Energy and Sustainability by Data Envelopment Analysis Data Envelopment Analysis with GAMS The emergy-data envelopment analysis (EM-DEA) approach handbook: An illustrated guide on how to use the EM-DEA approach to assess resource- and energy-use efficiency and the sustainability of agricultural and forestry ecosystems Data Envelopment Analysis Data Envelopment Analysis and Effective Performance Assessment Data Envelopment Analysis (DEA) Methods for Maximizing Efficiency

Data Envelopment Analysis in the Financial Services Industry Triangular Single Valued Neutrosophic Data
Envelopment Analysis: Application to Hospital Performance Measurement Data Envelopment Analysis Handbook
of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis

Data Envelopment Analysis: Theory, Methodology, and Applications 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

Handbook on Data Envelopment Analysis 2011-08-23

this handbook covers dea topics that are extensively used and solidly based the purpose of the handbook is to 1 describe and elucidate the state of the field and 2 where appropriate extend the frontier of dea research it defines the state of the art of dea methodology and its uses this handbook is intended to represent a milestone in the progression of dea written by experts who are generally major contributors to the topics to be covered it includes a comprehensive review and discussion of basic dea models which in the present issue extensions to

the basic dea methods and a collection of dea applications in the areas of banking engineering health care and services the handbook s chapters are organized into two categories i basic dea models concepts and their extensions and ii dea applications first edition contributors have returned to update their work the second edition includes updated versions of selected first edition chapters new chapters have been added on different approaches with no need for a priori choices of weights called multipliers that reflect meaningful trade offs construction of static and dynamic dea technologies slacks based model and its extensions dea models for dmus that have internal structures network dea that can be used for measuring supply chain operations selection of dea applications in the service sector with a focus on building a conceptual framework research design and interpreting results

Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis 2007-06-08

in a relatively short period of time data envelopment analysis dea has grown into a powerful analytical tool for measuring and evaluating performance dea is computational at its core and this book is one of several springer aim to publish on the subject this work deals with the micro aspects of handling and modeling data issues in dea problems it is a handbook treatment dealing with specific data problems including imprecise data and undesirable outputs

Data Envelopment Analysis 2016-03-22

this handbook compiles state of the art empirical studies and applications using data envelopment analysis dea it includes a collection of 18 chapters written by dea experts chapter 1 examines the performance of ceos of u s

banks and thrifts chapter 2 describes the network operational structure of transportation organizations and the relative network data envelopment analysis model chapter 3 demonstrates how to use different types of dea models to compute total factor energy efficiency scores with an application to energy efficiency in chapter 4 the authors explore the impact of incorporating customers willingness to pay for service quality in benchmarking models on cost efficiency of distribution networks and chapter 5 provides a brief review of previous applications of dea to the professional baseball industry followed by two detailed applications to major league baseball chapter 6 examines efficiency and productivity of u s property liability p l insurers using dea while chapter 7 presents a two stage network dea model that decomposes the overall efficiency of a decision making unit into two components chapter 8 presents a review of the literature of dea models for the performance assessment of mutual funds and chapter 9 discusses the management strategies formulation of the international tourist hotel industry in taiwan chapter 10 presents a novel use of the two stage network dea to evaluate sustainable product design performances in chapter 11 authors highlight limitations of some dea environmental efficiency models and chapter 12 reviews applications of dea in secondary and tertiary education chapter 13 measures the relative performance of new york state school districts in the 2011 2012 academic year chapter 14 provides an introductory prelude to chapters 15 and 16 which both provide detailed applications of dea in marketing chapter 17 then shows how to decompose a new total factor productivity index that satisfies all economically relevant axioms from index theory with an application to u s agriculture finally chapter 18 presents a unique study that conducts a dea research front analysis applying a network clustering method to group the dea literature over the period 2000 to 2014

Data Envelopment Analysis 2014-07-08

this handbook serves as a complement to the handbook on data envelopment analysis eds w w cooper l m seiford and j zhu 2011 springer in an effort to extend the frontier of dea research it provides a comprehensive

source for the state of the art dea modeling on internal structures and network dea chapter 1 provides a survey on two stage network performance decomposition and modeling techniques chapter 2 discusses the pitfalls in network dea modeling chapter 3 discusses efficiency decompositions in network dea under three types of structures namely series parallel and dynamic chapter 4 studies the determination of the network dea frontier in chapter 5 additive efficiency decomposition in network dea is discussed an approach in scale efficiency measurement in two stage networks is presented in chapter 6 chapter 7 further discusses the scale efficiency decomposition in two stage networks chapter 8 offers a bargaining game approach to modeling two stage networks chapter 9 studies shared resources and efficiency decomposition in two stage networks chapter 10 introduces an approach to computing the technical efficiency scores for a dynamic production network and its sub processes chapter 11 presents a slacks based network dea chapter 12 discusses a dea modeling technique for a two stage network process where the inputs of the second stage include both the outputs from the first stage and additional inputs to the second stage chapter 13 presents an efficiency measurement methodology for multi stage production systems chapter 14 discusses network dea models both static and dynamic the discussion also explores various useful objective functions that can be applied to the models to find the optimal allocation of resources for processes within the black box that are normally invisible to dea chapter 15 provides a comprehensive review of various type network dea modeling techniques chapter 16 presents shared resources models for deriving aggregate measures of bank branch performance with accompanying component measures that make up that aggregate value chapter 17 examines a set of manufacturing plants operating under a single umbrella with the objective being to use the component or function measures to decide what might be considered as each plant s core business chapter 18 considers problem settings where there may be clusters or groups of dmus that form a hierarchy the specific case of a set off electric power plants is examined in this context chapter 19 models bad outputs in two stage network dea chapter 20 presents an application of network dea to performance measurement of major league baseball mlb teams chapter 21 presents an application of a two stage network dea model for examining the performance of 30 u s airline companies

chapter 22 then presents two distinct network efficiency models that are applied to engineering systems

Data Envelopment Analysis with R 2019-07-23

this book introduces readers to the use of r codes for optimization problems first it provides the necessary background to understand data envelopment analysis dea with a special emphasis on fuzzy dea it then describes dea models including fuzzy dea models and shows how to use them to solve optimization problems with r further it discusses the main advantages of r in optimization problems and provides r codes based on real world data sets throughout offering a comprehensive review of dea and fuzzy dea models and the corresponding r codes this practice oriented reference guide is intended for masters and ph d students in various disciplines as well as practitioners and researchers

Extension of Data Envelopment Analysis with Preference Information 2015-01-02

this book provides an introduction to incorporating preference information in data envelopment analysis dea with a special emphasis in value efficiency analysis in addition to theoretical considerations numerous illustrative examples are included hence the book can be used as a teaching text as well only a modest mathematical background is needed to understand the main principles the only prerequisites are a familiarity with linear algebra especially matrix calculus b knowledge of the simplex method and c familiarity with the use of computer software the book is organized as follows chapter 1 provides motivation and introduces the basic concepts chapter 2 provides the basic ideas and models of data envelopment analysis the efficient frontier and production possibility set concepts play an important role in all considerations that s why these concepts are

considered more closely in chapter 3 since the approaches introduced in this study are inspired by multiple objective linear programming the basic concepts of this field are reviewed in chapter 4 chapter 5 also compares and contrasts data envelopment analysis and multiple objective linear programming providing some cornerstones for approaches presented later in the book chapter 6 discusses the traditional approaches to take into account preference information in dea in chapter 7 value efficiency is introduced and chapter 8 discusses practical aspects some extensions are presented in chapter 9 and in chapter 10 value efficiency is extended to cover the case when a production possibility set is not convex three implemented applications are reviewed in chapter 11

Advances in Data Envelopment Analysis 2015-03-26

data envelopment analysis dea is often overlooked in empirical work such as diagnostic tests to determine whether the data conform with technology which in turn is important in identifying technical change or finding which types of dea models allow data transformations including dealing with ordinal data advances in data envelopment analysis focuses on both theoretical developments and their applications into the measurement of productive efficiency and productivity growth such as its application to the modelling of time substitution i e the problem of how to allocate resources over time and estimating the value of a decision making unit dmu contents acknowledgements preface introduction the dea technology and its representation axiomatic properties of the dea model appendix looking at the data in dea data diagnostic technical change data translation appendix distance functions dea and intensity variables on shephard's duality theory adjoint transformations in dea the diet problem pricing decision making units dea and directional distance functions directional vectors aggregation and directional vectors endogenizing the directional vector appendix dea and time substitution theoretical underpinning reassessing the eu stability and growth pact methods some limitations of two dea models the non archimedean and dea super efficiency and zeros references readership advanced postgraduate students and

researchers in operations research and economics with a particular interest in production theory and operations management keywords optimization techniques multifactor productivity intertemporal firm choice technological change choices and consequences diffusion processes data envelopment analysis operations research

Data Envelopment Analysis: Theory, Methodology, and Applications 2011-09-01

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

Introduction to the Theory and Application of Data Envelopment

Analysis 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 chames 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

Uncertain Data Envelopment Analysis 2014-07-24

this book is intended to present the milestones in the progression of uncertain data envelopment analysis dea chapter 1 gives some basic introduction to uncertain theories including probability theory credibility theory uncertainty theory and chance theory chapter 2 presents a comprehensive review and discussion of basic dea models the stochastic dea is introduced in chapter 3 in which the inputs and outputs are assumed to be random

variables to obtain the probability distribution of a random variable a lot of samples are needed to apply the statistics inference approach chapter 4 and 5 provide two uncertain dea methods to evaluate the dmus with limited or insufficient statistical data named fuzzy dea and uncertain dea in order to evaluate the dmus in which uncertainty and randomness appear simultaneously the hybrid dea based on chance theory is presented in chapter 6

Dynamics of Data Envelopment Analysis 2013-11-11

data envelopment analysis develops a set of nonparametric and semiparametric techniques for measuring economic efficiency among firms and nonprofit organizations over the past decade this technique has found most widespread applications in public sector organizations however these applications have been mostly static this monograph extends this static framework of efficiency analysis in several new directions these include but are not limited to the following 1 a dynamic view of the production and cost frontier where capital inputs are treated differently from the current inputs 2 a direct role of the technological progress and regress which is so often stressed in total factor productivity discussion in modern growth theory in economics 3 stochastic efficiency in a dynamic setting where reliability improvement competes with technical efficiency 4 flexible manufacturing systems where flexibility of the production process and the economies of scope play an important role in efficiency analysis and 5 the role of economic factors such as externalities and input interdependences efficiency is viewed here in the framework of a general systems theory model such a view is intended to broaden the scope of applications of this promising new technique of data envelopment analysis the monograph stresses the various applied aspects of the dynamic theory so that it can be empirically implemented in different situations as far as possible abstract mathematical treatments are avoided and emphasis placed on the statistical examples and empirical illustrations

Data Envelopment Analysis: Balanced Benchmarking 2013-10-20

the current book introduces the methodology of data envelopment analysis dea dea uses mathematical programming techniques and models to evaluate the performance of peer units e g bank branches hospitals and schools in terms of multiple performance measures or metrics these multiple performance measures are classified or coined as dea inputs and dea outputs although dea has a strong link to production theory in economics the tool is also used for benchmarking in operations management where a set of measures is selected to benchmark the performance of manufacturing and service operations in the circumstance of benchmarking the efficient dmus as defined by dea may not necessarily form a production frontier but rather lead to a best practice frontier dea s empirical orientation and absence of a priori assumptions have resulted in its use in a number of studies involving efficient or best practice frontier estimation in the nonprofit regulated and private sectors dea applications involve a wide range of contexts such as education health care banking armed forces auditing market research retail outlets organization effectiveness transportation public housing and manufacturing dea is a balanced benchmarking tool that will help organizations to examine their assumptions about their productivity and performance the book provides students researchers and practitioners with a solid understanding of the methodology its uses and potentials in business analytics

Data Envelopment Analysis 2014-01-15

new efficiency theory refers to the various parametric and semi parametric methods of estimating production and cost frontiers which include data envelopment analysis dea with its diverse applications in management science and operations research this monograph develops and generalizes the new efficiency theory by highlighting the interface between economic theory and operations research some of the outstanding features of this monograph are 1 integrating the theory of firm efficiency and industry equilibrium 2 emphasizing growth

efficiency in a dynamic setting 3 incorporating uncertainty of market demand and prices and 4 the implications of group efficiency by sharing investments applications discuss in some detail the growth and decline of the us computer industry and the relative performance of mutual fund portfolios

New Efficiency Theory 2012-11-10

in a relatively short period of time data envelopment analysis dea has grown into a powerful quantitative analytical tool for measuring and evaluating performance it has been successfully applied to a host of different entities engaged in a wide variety of activities in many contexts worldwide in many cases evaluations of these entities have been resistant to other approaches because complex multiple levels of often poorly understood relations must be considered a few examples of these multifaceted problems are 1 maintenance activities of us air force bases in geographically dispersed locations 2 police force efficiencies in the united kingdom 3 branch bank performances in canada cyprus and other countries and 4 the efficiency of universities in performing their education and research functions in the u s england and france in addition to localized problems dea applications have been extended to performance evaluations of larger entities such as cities regions and countries these extensions have a wider scope than traditional analyses because they include social and safety net expenditures as inputs and various quality of life dimensions as outputs in other applications dea has been used to supply new insights into business activities and into the methods that have been used to evaluate these activities these include benchmarking studies of professional organizations including legal and accounting societies as well as organizational forms such as evaluating the relative efficiencies of the mutual vs corporate forms of organization that are used in the u s insurance industry finally dea can also be used to evaluate objects as well as governmental business and societal activities for example a test study found that dea compared favorably with traditional engineering approaches for use in evaluating the relative efficiencies of jet aircraft engines these advantages accrued to dea because of its ability to simultaneously handle multiple outputs and

inputs without having to first specify a system of weights for use in effecting these evaluations data envelopment analysis a comprehensive text with models applications references and dea solver software is designed to provide a systematic introduction to dea and its uses as a multifaceted tool for evaluating problems in a variety of contexts each chapter accompanies its developments with simple numerical examples and discussions of actual applications emphasis is placed on the use as well as an understanding of dea and the topics in this book have been selected and treated accordingly the objective is to introduce students researchers and practitioners in business economics engineering and the sciences to data envelopment analysis the authors have been involved in dea s development from the beginning william cooper with abraham charnes and eduardo 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 please see the book s preface for chapter by chapter information on specific features and information on the supporting dea solver software the preface can be found and downloaded at the internet

Data Envelopment Analysis 2007-05-08

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 eduardo 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

Introduction to Data Envelopment Analysis and Its Uses

2005-11-16

the intensity of global competition and ever increasing economic uncertainties has led organizations to search for more efficient and effective ways to manage their business operations data envelopment analysis dea has been widely used as a conceptually simple yet powerful tool for evaluating organizational productivity and performance fuzzy dea fdea is a promising extension of the conventional dea proposed for dealing with imprecise and ambiguous data in performance measurement problems this book is the first volume in the literature to present the state of the art developments and applications of fdea it is designed for students educators researchers consultants and practicing managers in business industry and government with a basic understanding of the dea and fuzzy logic concepts

Performance Measurement with Fuzzy Data Envelopment Analysis

2013-11-29

this volume systematically details both the basic principles and new developments in data envelopment analysis dea offering a solid understanding of the methodology its uses and its potential new material in this edition includes coverage of recent developments that have greatly extended the power and scope of dea and have lead to new directions for research and dea uses each chapter accompanies its developments with simple numerical examples and discussions of actual applications the first nine chapters cover the basic principles of dea while the final seven chapters provide a more advanced treatment

Data Envelopment Analysis 2007-01-10

data envelopment analysis dea is a mathematical programming technique with a number of practical applications for measuring the performance of similar units such as a set of hospitals a set of schools or a set of banks this book is designed as an introductory text both for students and professionals it includes a number of case studies as well as exercises and solved problems

An Introduction to Data Envelopment Analysis 2003-08-18

this book provides a complete analysis of educational production and costs using the nonparametric technique known as data envelopment analysis dea the book focuses on estimation of technical allocative and scale efficiency in the public sector characterized by the influence of exogenous socio economic variables state of the art dea models will be presented and fully discussed specific education topics important to policy makers including adequacy technical allocative and scale efficiency productivity and environmental costs will be analyzed to illustrate how these techniques can be applied to school systems worldwide the authors use data on australian elementary and high schools to develop nonparametric measures that will help inform current policy debate in australia the purpose of the book is to provide a comprehensive analysis of educational production using numerous public sector dea models we provide a review of dea with sas programming code to estimate technical scale and allocative efficiency in chapter 2 in chapter 3 we extend the dea models to control for exogenous factors of production sas code is also provided to estimate all public sector models we use simulated data to illustrate the results chapters 4 6 provide a complete analysis of the primary and secondary schools we analyze input and output oriented models and derive measures of technical allocative and scale efficiency we also provide estimates of environmental costs that arise from schools facing different operating environments based on socioeconomic conditions in addition we show how dea can provide insight on adequacy the minimum

cost of providing a pre defined adequate education the models presented are consistent with public sector production in general and educational production in particular we also provide a complete analysis of educational productivity for both primary and secondary schools using state of the art public sector malmquist measures the authors use current data on australian schools to highlight important policy questions related to efficiency and productivity given concerns that schools are not allocatively scarce resources in an economic efficient way this research focus comes at an important watershed moment in the australian federal governments current involvement in designing new nationally consistent funding models for both government and non government schooling sectors with effect from 2014 a new national school resourcing standard is proposed to be implemented signaling a move to resource adequacy school efficiency and value for money dimensions these standards are consistent with the measures presented and estimated in this book as a result the models implemented in this book can serve as the basis to evaluate the funding changes associated with the transition from a centralized to a new decentralized set of school funding arrangements

Nonparametric Estimation of Educational Production and Costs using Data Envelopment Analysis 2014-06-07

in recent years there has been a growing interest in neutrosophic theory and there are several methods for solving various problems under neutrosophic environment however a few papers have discussed the data envelopment analysis dea with neutrosophic sets so in this paper we propose an input oriented dea model with simplified neutrosophic numbers and present a new strategy to solve it the proposed method is based on the weighted arithmetic average operator and has a simple structure finally the new approach is illustrated with the help of a numerical example

Data Envelopment Analysis for Simplified Neutrosophic Sets

2016-08-23

this book presents the underlying theory model development and applications of network data envelopment analysis dea in a systematic way the field of network dea extends and complements conventional dea by considering not only inputs and outputs when measuring system efficiency but also the internal structure of the system being analyzed by analyzing the efficiency of individual internal components and more particularly by studying the effects of relationships among components which are modeled and implemented by means of various network structures the network dea approach is able to help identify and manage the specific components that contribute inefficiencies into the overall systems this relatively new approach comprises an important analytical tool based on mathematical programming techniques with valuable implications to production and operations management the existing models for measuring the efficiency of systems of specific network structures are also discussed and the relationships between the system and component efficiencies are explored this book should be able to inspire new research and new applications based on the current state of the art performance evaluation is an important task in management and is needed to i better understand the past accomplishments of an organization and ii plan for its future development however this task becomes rather challenging when multiple performance metrics are involved dea is a powerful tool to cope with such issues for systems or operations composed of interrelated processes managers need to know how the performances of the various processes evaluated and how they are aggregated to form the overall performance of the system this book provides an advanced exposition on performance evaluation of systems with network structures it explores the network nature of most production and operation systems and explains why network analyses are necessary

Network Data Envelopment Analysis 2023-01-01

data envelopment analysis dea is a non parametric approach for the estimation of production frontier that is used to calculate the performance of a group of similar decision making units dmu which employ comparable inputs to produce related outputs however observed values might occasionally be confusing imprecise ambiguous inadequate and inconsistent in real world applications thus disregarding these factors may result in incorrect decision making thus neutrosophic sets have been created as an extension of intuitionistic fuzzy sets to represent ambiguous erroneous missing and inaccurate information in real world applications in this study we have proposed a technique for solving the neutrosophic form of the charnes cooper rhodes ccr model based on single value trapezoidal neutrosophic numbers svtrns the possibilistic mean for svtrns is redefined and applied the mehar approach to transforming the neutrosophic dea neu dea model into its corresponding crisp dea model as a result the efficiency scores of the dmu are calculated using different risk parameter values lying in 0 1 a numerical example is given to analyze the performance of the all india institutes of medical sciences and compared it with abdefattah s ranking approach

Neutrosophic data envelopment analysis based on the possibilistic mean approach 2015-03-18

this handbook represents a milestone in the progression of data envelopment analysis dea written by experts who are often major contributors to dea theory it includes a collection of chapters that represent the current state of the art in dea research topics include distance functions and their value duals cross efficiency measures in dea integer dea weight restrictions and production trade offs facet analysis in dea scale elasticity benchmarking and context dependent dea fuzzy dea non homogenous units partial input output relations super

efficiency treatment of undesirable measures translation invariance stochastic nonparametric envelopment of data and global frontier index focusing only on new models approaches of dea the book includes contributions from juan aparicio mette asmild yao chen wade d cook juan du rolf färe julie harrison raha imanirad andrew johnson chiang kao abolfazl keshvari timo kuosmanen sungmook lim wenbin liu dimitri margaritis reza kazemi matin ole b olesen jesus t pastor niels chr petersen victor v podinovski paul rouse antti saastamoinen biresh k sahu kaoru tone and zhongbao zhou

Data Envelopment Analysis 2023-05-19

classical data envelopment analysis dea models use crisp data to measure the inputs and outputs of a given system in cases such as manufacturing systems production processes service systems etc the inputs and outputs may be complex and difficult to measure with classical dea models crisp input and output data are fundamentally indispensable in the conventional dea models if these models contain complex uncertain data then they will become more important and practical for decision makers uncertainty in data envelopment analysis introduces methods to investigate uncertain data in dea models providing a deeper look into two types of uncertain dea methods fuzzy dea and belief degree based uncertainty dea which are based on uncertain measures these models aim to solve problems encountered by classical data analysis in cases where the inputs and outputs of systems and processes are volatile and complex making measurement difficult introduces methods to deal with uncertain data in dea models as a source of information and a reference book for researchers and engineers presents dea models that can be used for evaluating the outputs of many real-life systems in social and engineering subjects provides fresh dea models for efficiency evaluation from the perspective of imprecise data applies the fuzzy set and uncertainty theories to dea to produce a new method of dealing with the empirical data

Uncertainty in Data Envelopment Analysis 2016-07-01

this handbook focuses on data envelopment analysis dea applications in operations analytics which are fundamental tools and techniques for improving operation functions and attaining long term competitiveness in fact the handbook demonstrates that dea can be viewed as data envelopment analytics chapters include a review of cross efficiency evaluation a case study on measuring the environmental performance of oecs countries how to select a set of performance metrics in dea with an application to american banks a relational network model to take the operations of individual periods into account in measuring efficiencies how the efficient frontier methods dea and stochastic frontier analysis sfa can be used synergistically and how to integrate dea and multidimensional scaling in other chapters authors construct a dynamic three stage network dea model a bootstrapping based methodology to evaluate returns to scale and convexity assumptions in dea hybridizing dea and cooperative games using dea to represent the production technology and directional distance functions to measure bank performance an input specific luenberger energy and environmental productivity indicator and the issue of reference set by differentiating between the uniquely found reference set and the unary and maximal types of the reference set finally additional chapters evaluate and compare the technological advancement observed in different hybrid electric vehicles hev market segments over the past 15 years radial measurement of efficiency for the production process possessing multi components under different production technologies issues around the use of accounting information in dea how to use dea environmental assessment to establish corporate sustainability a summary of research efforts on dea environmental assessment applied to energy in the last 30 years and an overview of dea and how it can be utilized alone and with other techniques to investigate corporate environmental sustainability questions

Handbook of Operations Analytics Using Data Envelopment Analysis 2006-09-10

here is an in depth guide to the most powerful available benchmarking technique for improving service organization performance data envelopment analysis dea the book outlines dea as a benchmarking technique identifies high cost service units isolates specific changes for elevating performance to the best practice services level providing high quality service at low cost and most important it guides the improvement process

Service Productivity Management 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

Introduction to Data Envelopment Analysis and Its Uses 2008

data envelopment analysis dea represents a milestone in the progression of a continuously advancing methodology for data analysis which finds extensive use in industry society and even in education this book is a handy encyclopedia for researchers students and practitioners looking for the latest and most comprehensive

references in dea j k mantri has specifically selected 22 research papers where dea is applied in different fields so that the techniques discussed in this book can be used for various applications in a bibliography of data envelopment analysis 1978 2001 gabriel tavares states that dea is a mathematical programme for measuring performance efficiency of organizations popularly named as decision making units dmu the dmu can be of any kind such as manufacturing units a number of schools banks hospitals police stations firms etc dea measures the performance efficiency of these kinds of dmus which share a common characteristic they have a non profit organization where measurement is difficult dea assumes the performance of the dmu using the concepts of efficiency and productivity which are measured as the ratio of total outputs to total inputs the efficiencies estimated are relative to the best performing dmu which is given a score of 100 the performance of other dmus varies between 0 and 100

Research Methodology on Data Envelopment Analysis (DEA)

2018-02-02

introduces a bold new model for energy industry pollution prevention and sustainable growth balancing industrial pollution prevention with economic growth is one of the knottiest problems faced by industry today this book introduces a novel approach to using data envelopment analysis dea as a powerful tool for achieving that balance in the energy industries the world s largest producers of greenhouse gases it describes a rigorous framework that integrates elements of the social sciences corporate strategy regional economics energy economics and environmental policy and delivers a methodology and a set of strategies for promoting green innovation while solving key managerial challenges to greenhouse gas reduction and business growth in writing this book the authors have drawn upon their pioneering work and considerable experience in the field to develop an unconventional holistic approach to using dea to assess key aspects of sustainability development the book is divided into two sections the first of which lays out a conventional framework of dea as the basis for

new research directions in the second section the authors delve into conceptual and methodological extensions of conventional dea for solving problems of environmental assessment in all contemporary energy industry sectors introduces a powerful new approach to using dea to achieve pollution prevention sustainability and business growth covers the fundamentals of dea including theory statistical models and practical issues of conventional applications of dea explores new statistical modeling strategies and explores their economic and business implications examines applications of dea to environmental analysis across the complete range of energy industries including coal petroleum shale gas nuclear energy renewables and more summarizes important studies and nearly 800 peer reviewed articles on energy the environment and sustainability environmental assessment on energy and sustainability by data envelopment analysis is must reading for researchers academics graduate students and practitioners in the energy industries as well as government officials and policymakers tasked with regulating the environmental impacts of industrial pollution

Environmental Assessment on Energy and Sustainability by Data Envelopment Analysis 2023-07-04

this book provides a comprehensive and practical introduction to data envelopment analysis dea it explains how this non parametric technique is used to measure performance and extract efficiency from homogeneous entities within a production procedure it situates dea within a growing field of productivity analysis and performance measurement for which numerous models have been proposed this book encapsulates all of the advances in dea models proposed in the literature these models are presented in the context of the gams software which is a powerful tool for mathematical programming models this book serves two educational purposes it introduces readers to dea models and provides examples using gams in addition the reader is introduced to gams programming as well as innovative and practical applications gams codes are available for free allowing readers to test and expand the models to meet their specific needs

Data Envelopment Analysis with GAMS 2023-02-03

the current book introduces the methodology of data envelopment analysis dea dea uses mathematical programming techniques and models to evaluate the performance of peer units e g bank branches hospitals and schools in terms of multiple inputs used and multiple outputs produced dea examines the resources available to each unit and monitors the conversion of these resources inputs into the desired outputs the book gives an overview of the various models from the literature and the geometric interpretations provided permit the reader to go beyond the mathematics various topics are covered relating to important practical considerations these include dealing with time series data as well as methods for restricting multipliers the book will thus provide students researchers and practitioners with a solid understanding of the methodology its uses and its potential

The energy-data envelopment analysis (EM-DEA) approach handbook: An illustrated guide on how to use the EM-DEA approach to assess resource- and energy-use efficiency and the sustainability of agricultural and forestry ecosystems 2008

for any organization analysis of performance and effectiveness through available data allows for informed decision making data envelopment analysis or dea is a popular effective method that can be used to measure productive efficiency in operations management assessment data envelopment analysis and effective performance assessment addresses the myriad of practical uses and innovative developments of dea emphasizing the importance of analyzing productivity by measuring inputs goals economic growth and

performance this book covers a wide breadth of innovative knowledge this book is essential reading for managers business professionals students of business and ict and computer engineers

Data Envelopment Analysis 2016-09-01

in today's highly competitive and rapidly evolving global landscape the quest for efficiency has become a crucial factor in determining the success of organizations across various industries data envelopment analysis (dea) methods for maximizing efficiency is a comprehensive guide that delves into the powerful mathematical tool of dea dea is designed to assess the relative efficiency of decision making units (dmus) and provides valuable insights for performance improvement this book presents a systematic overview of dea models and techniques from fundamental concepts to advanced methods showcasing their practical applications through real world examples and case studies catering to a broad audience this book is designed for students researchers consultants decision makers and enthusiasts in the field of efficiency analysis and performance measurement consultants and practitioners will gain practical insights for applying dea in various contexts and decision makers will be equipped to make informed decisions for maximizing efficiency additionally individuals with a general interest in data analysis and performance measurement will find this book accessible and informative this book covers a wide range of topics including mathematical foundations of dea dea models and variations dea efficiency and productivity measures dea applications in various industries such as healthcare finance supply chain management environmental management education management and public sector management

Data Envelopment Analysis and Effective Performance Assessment

2024-01-16

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

Data Envelopment Analysis (DEA) Methods for Maximizing Efficiency 2017-11-21

the foremost broadly utilized strategy for the valuation of the overall performance of a set of identical decision making units dmsu that use analogous sources to yield related outputs is data envelopment analysis dea however the witnessed values of the symmetry or asymmetry of different types of information in real world applications are sometimes inaccurate ambiguous inadequate and inconsistent so overlooking these conditions may lead to erroneous decision making neutrosophic set theory can handle these occasions of data and makes an imitation of the decision making procedure with the aid of thinking about all perspectives of the decision in this paper we introduce a model of dea in the context of neutrosophic sets and sketch an innovative process to solve it furthermore we deal with the problem of healthcare system evaluation with inconsistent indeterminate and incomplete information using the new model the triangular single valued neutrosophic numbers are also

employed to deal with the mentioned data and the proposed method is utilized in the assessment of 13 hospitals of tehran university of medical sciences of iran the results exhibit the usefulness of the suggested approach and point out that the model has practical outcomes for decision makers

Data Envelopment Analysis in the Financial Services Industry

2020-06-01

the current book introduces the methodology of data envelopment analysis dea as a data oriented operations analytics this data analysis tool analyzes multiple performance metrics integrates multi dimensional data into a composite index and recommends directions for improvement a number of dea books have been written for conventional and new dea models yet many of these books still require fundamental and necessary knowledge on linear mathematical optimization this book is uniquely designed to present the dea methodology in an applied setting where a reader is not required to have the knowledge on linear programming and linear algebra

Triangular Single Valued Neutrosophic Data Envelopment Analysis: Application to Hospital Performance Measurement

2014-05-06

organizations can use the valuable tool of data envelopment analysis dea to make informed decisions on developing successful strategies setting specific goals and identifying underperforming activities to improve the output or outcome of performance measurement the handbook of research on strategic performance management and measurement using data envelopment analysis highlights the advantages of using dea as a

tool to improve business performance and identify sources of inefficiency in public and private organizations these recently developed theories and applications of DEA will be useful for policymakers managers and practitioners in the areas of sustainable development of our society including environment agriculture finance and higher education sectors

Data Envelopment Analysis 2013-08-31

Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis

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