Write MATLAB code to implement the Simplex method.

(a) Your code should accept the following input

    i. an $m \times n$ matrix A (you can assume $rank(A) = m < n$)

    ii. an $m \times 1$ vector b

    iii. an $n \times 1$ vector c

    iv. BFS_1 given as an $n \times 1$ vector F where

$$F(i) = \begin{cases} 1 & \text{if } x_i \text{ is a basic variable in } BFS_1 \\ 0 & \text{if } x_i \text{ is a nonbasic variable in } BFS_1 \end{cases}$$

for the LP

$$\begin{aligned} \max \quad & c^T x \\ \text{s.t.} \quad & Ax = b \\ & x \geq 0 \end{aligned}$$

(b) Your code should produce the following output:

    i. if the LP is bounded,

        A. an optimal BFS again as a vector F

        B. the values of the variables at the optimal BFS and

        C. the optimal objective function value

    ii. if the LP is unbounded, a message that the LP is unbounded.

(c) Use the *Maximum Coefficient Pivot Rule*:

    i. **Selection of Entering Variable:**
    Among the competing $NBVs$ pick the NBV that has the largest RCC. In case of a tie, pick the NBV with the smallest subscript.

    ii. **Selection of Leaving Variable:** Among the BVs that reach zero as a result of increasing the entering variable's value, pick the BV that has the smallest subscript.

Simplex Method Matlab Code

Abdelkhalak El Hami,Bouchaib Radi

Simplex Method Matlab Code:

Metal Forming Mohsen Kazeminezhad,2012-10-17 Different aspects of metal forming consisting of process tools and design are presented in this book The chapters of this book include the state of art and analysis of the processes considering the materials characteristics The processes of hydroforming forging and forming of sandwich sheet are discussed Also a chapter on topography of tools and another chapter on machine tools are presented Design of a programmable metal forming press and methods for predicting forming limits of sheet metal are described   Dynamics of Large Structures and Inverse Problems Abdelkhalak El Hami,Bouchaib Radi,2017-07-17 This book deals with the various aspects of stochastic dynamics the resolution of large mechanical systems and inverse problems It integrates the most recent ideas from research and industry in the field of stochastic dynamics and optimization in structural mechanics over 11 chapters These chapters provide an update on the various tools for dealing with uncertainties stochastic dynamics reliability and optimization of systems The optimization reliability coupling in structures dynamics is approached in order to take into account the uncertainties in the modeling and the resolution of the problems encountered Accompanied by detailed examples of uncertainties optimization reliability and model reduction this book presents the newest design tools It is intended for students and engineers and is a valuable support for practicing engineers and teacher researchers   **Material Forming Processes** Bouchaib Radi,Abdelkhalak El Hami,2016-09-16 Manufacturing industries strive to improve the quality and reliability of their products while simultaneously reducing production costs To do this modernized work tools must be produced this will enable a reduction in the duration of the product development cycle optimization of product development procedures and ultimately improvement in the productivity of design and manufacturing phases Numerical simulations of forming processes are used to this end and in this book various methods and models for forming processes including stamping hydroforming and additive manufacturing are presented The theoretical and numerical advances of these processes involving large deformation mechanics on the basis of large transformations are explored in addition to the various techniques for optimization and calculation of reliability The advances and techniques within this book will be of interest to professional engineers in the automotive aerospace defence and other industries as well as graduates and undergraduates in these fields

Optimization Rajesh Kumar Arora,2015-05-06 Choose the Correct Solution Method for Your Optimization ProblemOptimization Algorithms and Applications presents a variety of solution techniques for optimization problems emphasizing concepts rather than rigorous mathematical details and proofs The book covers both gradient and stochastic methods as solution techniques for unconstrained and co   **New Approaches in the Manufacturing Processes** Moussa Karama,2011-06-08 Special topic volume with invited peer reviewed papers only   **Numerical Analysis and Scientific Computation** Jeffery J. Leader,2022-05-11 This is an introductory single term numerical analysis text with a modern scientific computing flavor It offers an immediate immersion in numerical methods featuring an up to date approach to

computational matrix algebra and an emphasis on methods used in actual software packages always highlighting how hardware concerns can impact the choice of algorithm It fills the need for a text that is mathematical enough for a numerical analysis course yet applied enough for students of science and engineering taking it with practical need in mind The standard methods of numerical analysis are rigorously derived with results stated carefully and many proven But while this is the focus topics such as parallel implementations the Basic Linear Algebra Subroutines halfto quadruple precision computing and other practical matters are frequently discussed as well Prior computing experience is not assumed Optional MATLAB subsections for each section provide a comprehensive self taught tutorial and also allow students to engage in numerical experiments with the methods they have just read about The text may also be used with other computing environments This new edition offers a complete and thorough update Parallel approaches emerging hardware capabilities computational modeling and data science are given greater weight   Engineering Design via Surrogate Modelling Alexander Forrester,András Sobester,Andy Keane,2008-09-15 Surrogate models expedite the search for promising designs by standing in for expensive design evaluations or simulations They provide a global model of some metric of a design such as weight aerodynamic drag cost etc which can then be optimized efficiently Engineering Design via Surrogate Modelling is a self contained guide to surrogate models and their use in engineering design The fundamentals of building selecting validating searching and refining a surrogate are presented in a manner accessible to novices in the field Figures are used liberally to explain the key concepts and clearly show the differences between the various techniques as well as to emphasize the intuitive nature of the conceptual and mathematical reasoning behind them More advanced and recent concepts are each presented in stand alone chapters allowing the reader to concentrate on material pertinent to their current design problem and concepts are clearly demonstrated using simple design problems This collection of advanced concepts visualization constraint handling coping with noisy data gradient enhanced modelling multi fidelity analysis and multiple objectives represents an invaluable reference manual for engineers and researchers active in the area Engineering Design via Surrogate Modelling is complemented by a suite of Matlab codes allowing the reader to apply all the techniques presented to their own design problems By applying statistical modelling to engineering design this book bridges the wide gap between the engineering and statistics communities It will appeal to postgraduates and researchers across the academic engineering design community as well as practising design engineers Provides an inclusive and practical guide to using surrogates in engineering design Presents the fundamentals of building selecting validating searching and refining a surrogate model Guides the reader through the practical implementation of a surrogate based design process using a set of case studies from real engineering design challenges Accompanied by a companion website featuring Matlab software at http www wiley com go forrester   **Linear Programming Using MATLAB®** Nikolaos Ploskas,Nikolaos Samaras,2017-10-28 This book offers a theoretical and computational presentation of a variety of linear programming algorithms and methods with an emphasis on

the revised simplex method and its components A theoretical background and mathematical formulation is included for each algorithm as well as comprehensive numerical examples and corresponding MATLAB code The MATLAB implementations presented in this book are sophisticated and allow users to find solutions to large scale benchmark linear programs Each algorithm is followed by a computational study on benchmark problems that analyze the computational behavior of the presented algorithms As a solid companion to existing algorithmic specific literature this book will be useful to researchers scientists mathematical programmers and students with a basic knowledge of linear algebra and calculus The clear presentation enables the reader to understand and utilize all components of simplex type methods such as presolve techniques scaling techniques pivoting rules basis update methods and sensitivity analysis   Electro-optical System Design, Simulation, Testing, and Training Richard M. Wasserman,Scott Lawrence DeVore,2002 The past few years have seen an upsurge in the numbers of known Neolithic settlements in Ireland Many of these sites have been excavated by archaeologists based in field units but few are well known to the wider archaeological community The papers in this volume were presented at a conference held at Queen s University Belfast in 2001 which provided a forum for a discussion of the new Neolithic material from Ireland in its wider geographical context Although the bulk of the emerging Irish settlement evidence relates to substantial houses many of these papers consider wider themes including issues of contact and communication along the sea routes and coastal margins of north west Europe questions of diversity and regional patterns of sedentism and mobility and variations in regional food production strategies   **Some Algorithms for Large-scale Linear and Convex Minimization in Relative Scale** Peter Richtárik,2007   IEEE/ACM Transactions on Networking ,2009   *Smart Antennas with MATLAB, Second Edition* Frank Gross,2015-02-09 The most complete current guide to smart antenna design and performance Featuring new coverage of reconfigurable antennas vector antennas and direction finding antennas this up to date resource offers a rigorous review of the basic electromagnetic principles that drive smart antenna design and deployment Case studies and worked examples using MATLAB are provided End of chapter assignments reinforce the concepts presented Thoroughly revised to reflect recent developments and the latest technologies this is a comprehensive reference for all professionals students and researchers in the field of smart antennas Smart Antennas with MATLAB Second Edition covers Fundamentals of electromagnetic fields Antenna fundamentals Array fundamentals Principles of random variables and processes Propagation channel characteristics Angle of arrival estimation Smart antennas Direction finding Electromagnetic vector sensors Smart antenna design and optimization   *Temperature Limit Values for Cold Touchable Surfaces* ,2003   **Atmospheric Propagation** ,2005   **MATLAB Manual** Karen Donnelly,1995   **Journal of Chemical Engineering of Japan** ,2006 Includes abstracts of Kagaku k gaku v 31   **Proceedings** ,2003 The ASE conference is the major conference for theory and practice concerned with automating the software development process Formerly known as Knowledge Based Software Engineering KBSE the conference expanded in order to reach out to other scientific communities

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