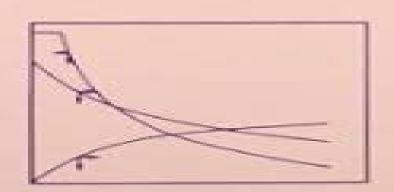
# Second Edition

# Mathematical Methods in Chemical Engineering

V. G. Jenson and G. V. Jeffreys







# <u>Mathematical Methods In Chemical Engineering Second</u> <u>Edition</u>

**Binay Kanti Dutta** 

#### **Mathematical Methods In Chemical Engineering Second Edition:**

INTRODUCTION TO NUMERICAL METHODS IN CHEMICAL ENGINEERING, SECOND EDITION AHUJA, PRADEEP, 2019-08-01 This book is an exhaustive presentation of the applications of numerical methods in chemical engineering Intended primarily as a textbook for B E B Tech and M Tech students of chemical engineering the book will also be useful for research and development process professionals in the fields of chemical biochemical mechanical and biomedical engineering The book now in its second edition comprises three parts Part I on General Chemical Engineering is same as given in the first edition of the book It explains solving linear and non linear algebraic equations chemical engineering thermodynamics problems initial value problems boundary value problems and topics related to chemical reaction dispersion and diffusion as well as steady and transient heat conduction Whereas Part II and Part III comprising two chapters and six chapters respectively are newly introduced in the present edition Besides three appendices covering computer programs have been included For practice the book provides students with numerous worked out examples and chapter end exercises including their answers NEW TO THE SECOND EDITION Part II on Fixed Bed Catalytic Reactor consists of solving multiple gas phase reactions in a PFR diffusion and multiple reactions in a catalytic pellet and fixed bed catalytic reactor with multiple reactions Part III on Multicomponent Distillation consists of solving vapour liquid liquid isothermal flash using NRTL model adiabatic flash using Wilson model bubble point method theta method and Naphtali Sandholm method for distillation using modified Raoult's law with Wilson activity coefficient model Mathematical Methods for Chemical Engineers Norman W. Loney, 2006-09-22 Focusing on the application of mathematics to chemical engineering Applied Mathematical Methods for Chemical Engineers Second Edition addresses the setup and verification of mathematical models using experimental or other independently derived data An expanded and updated version of its well respected predecessor this book uses worked Mathematical Methods in Chemical Engineering V. G. Jensen, G. V. Jeffreys, 1977 Mathematical Methods in Chemical Engineering Mathematical methods in chemical **engineering** Victor G. Jenson, Godfrey V. Jeffreys, 1972 MATHEMATICAL METHODS IN CHEMICAL ENGINEERING S. PUSHPAVANAM, 1998-01-01 This comprehensive well organized and easy to read book presents concepts in a unified framework to establish a similarity in the methods of solutions and analysis of such diverse systems as algebraic equations ordinary differential equations and partial differential equations The distinguishing feature of the book is the clear focus on analytical methods of solving equations The text explains how the methods meant to elucidate linear problems can be extended to analyse nonlinear problems The book also discusses in detail modern concepts like bifurcation theory and chaos To attract engineering students to applied mathematics the author explains the concepts in a clear concise and straightforward manner with the help of examples and analysis The significance of analytical methods and concepts for the engineer scientist interested in numerical applications is clearly brought out Intended as a textbook for the postgraduate

students in engineering the book could also be of great help to the research students Applied Mathematical Methods for <u>Chemical Engineers, Second Edition</u> Norman W. Loney, 2006-09-22 Focusing on the application of mathematics to chemical engineering Applied Mathematical Methods for Chemical Engineers Second Edition addresses the setup and verification of mathematical models using experimental or other independently derived data An expanded and updated version of its well respected predecessor this book uses worked examples to illustrate several mathematical methods that are essential in successfully solving process engineering problems The book first provides an introduction to differential equations that are common to chemical engineering followed by examples of first order and linear second order ordinary differential equations ODEs Later chapters examine Sturm Liouville problems Fourier series integrals linear partial differential equations PDEs and regular perturbation The author also focuses on examples of PDE applications as they relate to the various conservation laws practiced in chemical engineering The book concludes with discussions of dimensional analysis and the scaling of boundary value problems and presents selected numerical methods and available software packages New to the Second Edition Two popular approaches to model development shell balance and conservation law balance One dimensional rod model and a planar model of heat conduction in one direction Systems of first order ODEs Numerical method of lines using MATLAB and Mathematica where appropriate This invaluable resource provides a crucial introduction to mathematical methods for engineering and helps in choosing a suitable software package for computer based algebraic applications Mathematical Methods for Chemical Engineers, Third Edition Norman W. Loney, 2015-10-16 This book focuses on the application of mathematics to chemical engineering and addresses the setup and verification of mathematical models using experimental or other independently derived data An expanded and updated version of its well respected predecessor this book uses worked examples to illustrate several mathematical methods that are essential in successfully solving process engineering problems The book provides an introduction to differential equations common to chemical engineering followed by examples of first order and linear second order ordinary differential equations Later chapters examine Sturm Liouville problems Fourier series integrals linear partial differential equations and regular perturbation **Linear Mathematical** Models In Chemical Engineering (Second Edition) Martin Aksel Hjortso, Peter R Wolenski, 2018-07-13 Mathematics remains a core area of engineering Formulating and analyzing mathematical models of basic engineering systems is an essential skill that all engineering students should endeavor to acquire This book will serve as an excellent introduction to linear mathematics for engineering students both seniors and graduate students It is the result of a collaboration between a chemical engineer and a mathematician both of whom have taught classes on modelling and applied mathematics It provides a broad collection of chemical engineering modelling examples to train students in model formulation and model simplification as well as give a thorough coverage of the mathematical tools used to analyze and solve linear chemical engineering models Solution manual is provided for free to instructors who adopt this textbook Please send your request to

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Multi-objective Optimization: Techniques And Applications In Chemical Engineering (Second Edition) Gade Pandu Rangaiah,2016-12-22 Optimization is now essential in the design planning and operation of chemical and related processes Although process optimization for multiple objectives was studied in the 1970s and 1980s it has attracted active research in the last 15 years spurred by the new and effective techniques for multi objective optimization MOO To capture this renewed interest this monograph presents recent research in MOO techniques and applications in chemical engineering Following a brief introduction and review of MOO applications in chemical engineering since 2000 the book presents selected MOO techniques and many chemical engineering applications in detail In this second edition several chapters from the first edition have been updated one chapter is completely revised and three new chapters have been added One of the new chapters describes three MS Excel programs useful for MOO of application problems All the chapters will be of interest

to researchers in MOO and or chemical engineering Several exercises are included at the end of many chapters for use by both practicing engineers and students Chemical Engineering Dynamics John Ingham, Irving J. Dunn, Elmar Heinzle, Jiri E. Prenosil, Jonathan B. Snape, 2008-02-08 In this book the modelling of dynamic chemical engineering processes is presented in a highly understandable way using the unique combination of simplified fundamental theory and direct hands on computer simulation The mathematics is kept to a minimum and yet the nearly 100 examples supplied on www wiley vch de illustrate almost every aspect of chemical engineering science Each example is described in detail including the model equations They are written in the modern user friendly simulation language Berkeley Madonna which can be run on both Windows PC and Power Macintosh computers Madonna solves models comprising many ordinary differential equations using very simple programming including arrays It is so powerful that the model parameters may be defined as sliders which allow the effect of their change on the model behavior to be seen almost immediately Data may be included for curve fitting and sensitivity or multiple runs may be performed. The results can be seen simultaneously on multiple graph windows or by using overlays. The resultant learning effect of this is tremendous The examples can be varied to fit any real situation and the suggested exercises provide practical guidance The extensive experience of the authors both in university teaching and international courses is reflected in this well balanced presentation which is suitable for the teacher the student the chemist or the engineer This book provides a greater understanding of the formulation and use of mass and energy balances for chemical engineering in a most stimulating manner This book is a third edition which also includes biological environmental and food Chemical Process Equipment - Selection and Design (Revised 2nd Edition) James R. Couper, W process examples Roy Penney, James R. Fair PhD, 2009-08-11 A facility is only as efficient and profitable as the equipment that is in it this highly influential book is a powerful resource for chemical process or plant engineers who need to select design or configures plant sucessfully and profitably It includes updated information on design methods for all standard equipment with an emphasis on real world process design and performance The comprehensive and influential guide to the selection and design of a wide range of chemical process equipment used by engineers globally Copious examples of successful applications with supporting schematics and data to illustrate the functioning and performance of equipment Revised edition new material includes updated equipment cost data liquid solid and solid systems and the latest information on membrane separation technology Provides equipment rating forms and manufacturers data worked examples valuable shortcut methods rules of thumb and equipment rating forms to demonstrate and support the design process Heavily illustrated with many line drawings and schematics to aid understanding graphs and tables to illustrate performance data Applied Mathematics And Modeling For Chemical Engineers Richard G. Rice, Duong D. Do, 2012-09-25 Enables chemical engineers to use mathematics to solve common on the job problems With its clear explanations examples and problem sets Applied Mathematics and Modeling for Chemical Engineers has enabled thousands of chemical engineers to apply mathematical principles to successfully solve

practical problems The book introduces traditional techniques to solve ordinary differential equations as well as analytical methods to deal with important classes of finite difference equations. It then explores techniques for solving partial differential equations from classical methods to finite transforms culminating with numerical methods including orthogonal collocation. This Second Edition demonstrates how classical mathematics solves a broad range of new applications that have arisen since the publication of the acclaimed first edition Readers will find new materials and problems dealing with such topics as Brain implant drug delivery Carbon dioxide storage Chemical reactions in nanotubes Dissolution of pills and pharmaceutical capsules Honeycomb reactors used in catalytic converters. New models of physical phenomena such as bubble coalescence Like the first edition this Second Edition provides plenty of worked examples that explain each step on the way to finding a problem s solution Homework problems at the end of each chapter are designed to encourage readers to more deeply examine the underlying logic of the mathematical techniques used to arrive at the answers Readers can refer to the references also at the end of each chapter to explore individual topics in greater depth Finally the text's appendices provide additional information on numerical methods for solving algebraic equations as well as a detailed explanation of numerical integration algorithms Applied Mathematics and Modeling for Chemical Engineers is recommended for all students in chemical engineering as well as professional chemical engineers who want to improve their ability to use mathematics to solve common on the job problems

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