

Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

This monograph provides foundations, methods, guidelines and examples for monitoring and improving resource efficiency during the operation of processing plants and for improving their design. The measures taken to improve their energy and resource efficiency are strongly influenced by regulations and standards which are covered in Part I of this book. Without changing the actual processing equipment, the way how the processes are operated can have a strong influence on the resource efficiency of the plants and this potential can be exploited with much smaller investments than needed for the introduction of new process technologies. This aspect is the focus of Part II. In Part III we discuss physical changes of the process technology such as heat integration, synthesis and realization of optimal processes, and industrial symbiosis. The last part deals with the people that are needed to make these changes possible and discusses the path towards a resource efficiency culture. Written with industrial solutions in mind, this text will benefit practitioners as well as the academic community.

Introduction to Process Control, Second Edition provides a bridge between the traditional view of process control and the current, expanded role by blending conventional topics with a broader perspective of more integrated

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

process operation, control, and information systems. Updating and expanding the content of its predecessor, this second edition addresses issues in today's teaching of process control. Teaching & Learning Principles Presents a concept first followed by an example, allowing students to grasp theoretical concepts in a practical manner Uses the same problem in each chapter, culminating in a complete control design strategy Includes 50 percent more exercises Content Defines the traditional and expanded roles of process control in modern manufacturing Introduces the link between process optimization and process control (optimizing control), including the effect of disturbances on the optimal plant operation, the concepts of steady-state and dynamic backoff as ways to quantify the economic benefits of control, and how to determine an optimal transition policy during a planned production change Incorporates an introduction to the modern architectures of industrial computer control systems with real case studies and applications to pilot-scale operations Discusses the expanded role of process control in modern manufacturing, including model-centric technologies and integrated control systems Integrates data processing/reconciliation and intelligent monitoring in the overall control system architecture Web Resource The book's website offers a user-friendly software environment for interactively studying the examples in the text. The site contains the MATLAB® toolboxes for process control education as well as the main simulation examples from the book. Access the site through the authors' websites at www.pseonline.net and

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

www.chms.ucdavis.edu/research/web/pse/ahmet/

Drawing on the authors' combined 50 years of teaching experiences, this classroom-tested text is designed for chemical engineering students but is also suitable for industrial practitioners who need to understand key concepts of process control and how to implement them. The authors help readers see how traditional process control has evolved into an integrated operational environment used to run modern manufacturing facilities. This is the first in-depth presentation in book form of current analytical methods for optimal design, selection and evaluation of instrumentation for process plants. The presentation is clear, concise and systematic-providing process engineers with a valuable tool for improving quality, costs, safety, loss prevention, and production accounting.

This User's Guide is intended to support the design, implementation, analysis, interpretation, and quality evaluation of registries created to increase understanding of patient outcomes. For the purposes of this guide, a patient registry is an organized system that uses observational study methods to collect uniform data (clinical and other) to evaluate specified outcomes for a population defined by a particular disease, condition, or exposure, and that serves one or more predetermined scientific, clinical, or policy purposes. A registry database is a file (or files) derived from the registry. Although registries can serve many purposes, this guide focuses on registries created for one or more of the following purposes: to describe the natural history of disease, to determine clinical effectiveness or cost-effectiveness of

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

health care products and services, to measure or monitor safety and harm, and/or to measure quality of care.

Registries are classified according to how their populations are defined. For example, product registries include patients who have been exposed to biopharmaceutical products or medical devices. Health services registries consist of patients who have had a common procedure, clinical encounter, or hospitalization. Disease or condition registries are defined by patients having the same diagnosis, such as cystic fibrosis or heart failure. The User's Guide was created by researchers affiliated with AHRQ's Effective Health Care Program, particularly those who participated in AHRQ's DEcIDE (Developing Evidence to Inform Decisions About Effectiveness) program. Chapters were subject to multiple internal and external independent reviews.

Computer techniques have made online measurements available at every sampling period in a chemical process. However, measurement errors are introduced that require suitable techniques for data reconciliation and improvements in accuracy. Reconciliation of process data and reliable monitoring are essential to decisions about possible system modifications (optimization and control procedures), analysis of equipment performance, design of the monitoring system itself, and general management planning. While the reconciliation of the process data has been studied for more than 20 years, there is no single source providing a unified approach to the area with instructions on implementation. Data Processing and Reconciliation for Chemical Process Operations is that source. Competitiveness on the world

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

market as well as increasingly stringent environmental and product safety regulations have increased the need for the chemical industry to introduce such fast and low cost improvements in process operations. Introduces the first unified approach to this important field Bridges theory and practice through numerous worked examples and industrial case studies Provides a highly readable account of all aspects of data classification and reconciliation Presents the reader with material, problems, and directions for further study

This book provides a systematic and comprehensive treatment of the variety of methods available for applying data reconciliation techniques. Data filtering, data compression and the impact of measurement selection on data reconciliation are also exhaustively explained. Data errors can cause big problems in any process plant or refinery. Process measurements can be corrupted by power supply fluctuations, network transmission and signal conversion noise, analog input filtering, changes in ambient conditions, instrument malfunctioning, miscalibration, and the wear and corrosion of sensors, among other factors. Here's a book that helps you detect, analyze, solve, and avoid the data acquisition problems that can rob plants of peak performance. This indispensable volume provides crucial insights into data reconciliation and gross error detection techniques that are essential for optimal process control and information systems. This book is an invaluable tool for engineers and managers faced with the selection and implementation of data reconciliation software, or for those developing such software. For industrial personnel

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

and students, Data Reconciliation and Gross-Error Detection is the ultimate reference.

In this volume, because the differences in methodological approaches are so great, the focus is switched to the major issues in the hope of achieving a 'reconciliation', if not a perfect agreement, among the scholars of different disciplines. The keyword for the meeting was 'balance' — a balanced view over the results from different disciplines.

Data collection, compression, storage, and interpretation have become mature technologies over the years. Extraction of meaningful information from the process historical database seems to be a natural and logical choice. In view of this, the proposed book aims to apply the data driven knowledge base in ensuring safe process operation through timely detection of process abnormal and normal operating conditions, assuring product quality and analyzing biomedical signal leading to diagnostic tools. The book poses an open invitation for an interface which is required henceforth, in practical implementation of the propositions and possibilities referred in the book. It poses a challenge to the researchers in academia towards the development of more sophisticated algorithms. The proposed book also incites applications in diversified areas. Key Features: Presents discussion of several modern and popular chemometric techniques Introduces specific illustrative industrial

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

applications using the chemometric techniques
Demonstrates several applications to beverage quality monitoring Provides all the algorithms developed for the automated device design, data files, sources for biomedical signals and their pre-processing steps, and all the process models required to simulate process normal/faulty data Includes casestudy-based approach to the topics with MATLAB and SIMULINK source codes
A complete guide to the key statistical concepts essential for the design and construction of clinical trials As the newest major resource in the field of medical research, *Methods and Applications of Statistics in Clinical Trials, Volume 1: Concepts, Principles, Trials, and Designs* presents a timely and authoritative review of the central statistical concepts used to build clinical trials that obtain the best results. The reference unveils modern approaches vital to understanding, creating, and evaluating data obtained throughout the various stages of clinical trial design and analysis. Accessible and comprehensive, the first volume in a two-part set includes newly-written articles as well as established literature from the *Wiley Encyclopedia of Clinical Trials*. Illustrating a variety of statistical concepts and principles such as longitudinal data, missing data, covariates, biased-coin randomization, repeated measurements, and simple randomization, the book also provides in-depth coverage of the various trial designs found

within phase I-IV trials. Methods and Applications of Statistics in Clinical Trials, Volume 1: Concepts, Principles, Trials, and Designs also features: Detailed chapters on the type of trial designs, such as adaptive, crossover, group-randomized, multicenter, non-inferiority, non-randomized, open-labeled, preference, prevention, and superiority trials Over 100 contributions from leading academics, researchers, and practitioners An exploration of ongoing, cutting-edge clinical trials on early cancer and heart disease, mother-to-child human immunodeficiency virus transmission trials, and the AIDS Clinical Trials Group Methods and Applications of Statistics in Clinical Trials, Volume 1: Concepts, Principles, Trials, and Designs is an excellent reference for researchers, practitioners, and students in the fields of clinicaltrials, pharmaceuticals, biostatistics, medical research design, biology, biomedicine, epidemiology, and public health. Energy costs impact the profitability of virtually all industrial processes. Stressing how plants use power, and how that power is actually generated, this book provides a clear and simple way to understand the energy usage in various processes, as well as methods for optimizing these processes using practical hands-on simulations and a unique approach that details solved problems utilizing actual plant data. Invaluable information offers a complete energy-saving approach essential for both the

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

chemical and mechanical engineering curricula, as well as for practicing engineers.

ESCAPE-20 is the most recent in a series of conferences that serves as a forum for engineers, scientists, researchers, managers and students from academia and industry to present and discuss progress being made in the area of "Computer Aided Process Engineering" (CAPE). CAPE covers computer-aided methods, algorithms and techniques related to process and product engineering. The ESCAPE-20 scientific program reflects the strategic objectives of the CAPE Working Party: to check the status of historically consolidated topics by means of their industrial application and to evaluate their emerging issues. * Includes a CD that contains all research papers and contributions * Features a truly international scope, with guest speakers and keynote talks from leaders in science and industry * Presents papers covering the latest research, key topical areas, and developments in computer-aided process engineering (CAPE)

This report focuses on the ways in which stock data enter into the analysis of the flow of external resources between creditor and debtor countries. It describes key terms and the various debt classification systems; outlines methodologies for reconciling differences in debt stocks and debt flows; compares and contrasts the debt and debt-related data systems of the IMF, the OECD, and the World

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

Bank; provides two case studies on data analysis problems and examples of debt restructuring; and outlines the conclusions of the International Working Group on External Debt Statistics.

Wills' Mineral Processing Technology provides practising engineers and students of mineral processing, metallurgy and mining with a review of all of the common ore-processing techniques utilized in modern processing installations. Now in its Seventh Edition, this renowned book is a standard reference for the mineral processing industry. Chapters deal with each of the major processing techniques, and coverage includes the latest technical developments in the processing of increasingly complex refractory ores, new equipment and process routes. This new edition has been prepared by the prestigious J K Minerals Research Centre of Australia, which contributes its world-class expertise and ensures that this will continue to be the book of choice for professionals and students in this field. This latest edition highlights the developments and the challenges facing the mineral processor, particularly with regard to the environmental problems posed in improving the efficiency of the existing processes and also in dealing with the waste created. The work is fully indexed and referenced.

- The classic mineral processing text, revised and updated by a prestigious new team
- Provides a clear exposition of the principles and practice of mineral processing, with examples taken from practice
- Covers the latest technological developments and highlights the challenges facing the mineral processor
- New sections on environmental problems, improving the efficiency of

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

existing processes and dealing with waste.

This book represents the systematic coverage of mass and energy balancing in the process industries. The classical treatment of balances in the available literature is complemented in the following areas: - systematic analysis of large systems by Graph theory - comprehensive thermodynamic analysis (entropy and availability) - balancing on the basis of measured plant data (data reconciliation) - measurement design and optimisation - dynamic balancing - plant-wide regular mass and energy balancing as a part of company's information system. The major areas addressed are: - single- and multi-component balancing - energy balance - entropy and exergy (availability) balances - solvability of balancing problems - balancing with data reconciliation - dynamic balancing - measurement design and optimisation - regular balancing of large industrial systems. The book is directed to chemical engineers, plant designers, technologists, information technology managers, control engineers and instrumentation engineers in process industries. Major areas of applications are process industries and energy production, such as oil refining, natural gas processing, petrochemistry, chemical industries, mineral processing and utility production and distribution systems. University students and teachers of chemical engineering and control will also find the book invaluable.

A PROVEN APPROACH FOR CREATING and IMPLEMENTING EFFECTIVE GOVERNANCE for DATA and ANALYTICS Financial Institution Advantage and the Optimization of Information Processing offers a key

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

resource for understanding and implementing effective data governance practices and data modeling within financial organizations. Sean Keenan—a noted expert on the topic—outlines the strategic core competencies, includes best practices, and suggests a set of mechanisms for self-evaluation. He shows what it takes for an institution to evaluate its information processing capability and how to take the practical steps toward improving it. Keenan outlines the strategies and tools needed for financial institutions to take charge and make the much-needed decisions to ensure that their firm's information processing assets are effectively designed, deployed, and utilized to meet the strict regulatory guidelines. This important resource is filled with practical observations about how information assets can be actively and effectively managed to create competitive advantage and improved financial results. Financial Institution Advantage and the Optimization of Information Processing also includes a survey of case studies that highlight both the positive and less positive results that have stemmed from institutions either recognizing or failing to recognize the strategic importance of information processing capabilities.

This landmark publication distills the body of knowledge that characterizes mineral processing and extractive metallurgy as disciplinary fields. It will inspire and inform current and future generations of minerals and metallurgy professionals. Mineral processing and extractive metallurgy are atypical disciplines, requiring a combination of knowledge, experience, and art. Investing in this trove of valuable information is a must for all those

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

involved in the industry—students, engineers, mill managers, and operators. More than 192 internationally recognized experts have contributed to the handbook's 128 thought-provoking chapters that examine nearly every aspect of mineral processing and extractive metallurgy. This inclusive reference addresses the magnitude of traditional industry topics and also addresses the new technologies and important cultural and social issues that are important today. Contents
Mineral Characterization and Analysis
Management and Reporting
Comminution
Classification and Washing
Transport and Storage
Physical Separations
Flotation
Solid and Liquid Separation
Disposal
Hydrometallurgy
Pyrometallurgy
Processing of Selected Metals, Minerals, and Materials

A description of the use of computer aided modeling and simulation in the development, integration and optimization of industrial processes. The two authors elucidate the entire procedure step-by-step, from basic mathematical modeling to result interpretation and full-scale process performance analysis. They further demonstrate similitude comparisons of experimental results from different systems as a tool for broadening the applicability of the calculation methods. Throughout, the book adopts a very practical approach, addressing actual problems and projects likely to be encountered by the reader, as well as fundamentals and solution strategies for complex problems. It is thus equally useful for student and professional engineers and chemists involved in industrial process and production plant design, construction or upgrading.

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

Data Processing and Reconciliation for Chemical Process Operations Elsevier

For reasons both financial and environmental, there is a perpetual need to optimize the design and operating conditions of industrial process systems in order to improve their performance, energy efficiency, profitability, safety and reliability.

However, with most chemical engineering application problems having many variables with complex inter-relationships, meeting these optimization objectives can be challenging. This is where Multi-Objective Optimization (MOO) is useful to find the optimal trade-offs among two or more conflicting objectives. This book provides an overview of the recent developments and applications of MOO for modeling, design and operation of chemical, petrochemical, pharmaceutical, energy and related processes. It then covers important theoretical and computational developments as well as specific applications such as metabolic reaction networks, chromatographic systems, CO₂ emissions targeting for petroleum refining units, ecodesign of chemical processes, ethanol purification and cumene process design. Multi-Objective Optimization in Chemical Engineering: Developments and Applications is an invaluable resource for researchers and graduate students in chemical engineering as well as industrial practitioners and engineers involved in

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

process design, modeling and optimization.

Chemical Engineering and Chemical Process

Technology is a theme component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated

compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alkalis, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitamins and many others. It also plays significant role in environmental protection, biotechnology, nanotechnology, energy production and sustainable economical development. The Theme on Chemical Engineering and Chemical Process Technology deals, in five volumes and covers several topics such as: Fundamentals of Chemical Engineering; Unit Operations – Fluids; Unit Operations – Solids; Chemical Reaction

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

Engineering; Process Development, Modeling, Optimization and Control; Process Management; The Future of Chemical Engineering; Chemical Engineering Education; Main Products, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Introduction to Process Control, Third Edition continues to provide a bridge between traditional and modern views of process control by blending conventional topics with a broader perspective of integrated process operation, control, and information systems. Updated and expanded throughout, this third edition addresses issues highly relevant to today's teaching of process control: Discusses smart manufacturing, new data preprocessing techniques, and machine learning and artificial intelligence concepts that are part of current smart manufacturing decisions Includes extensive references to guide the reader to the resources needed to solve modeling, classification, and monitoring problems Introduces the link between process optimization and process control (optimizing control), including the effect of disturbances on the optimal plant operation, the concepts of steady-state

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

and dynamic back-off as ways to quantify the economic benefits of control, and how to determine an optimal transition policy during a planned production change Incorporates an introduction to the modern architectures of industrial computer control systems with real case studies and applications to pilot-scale operations Analyzes the expanded role of process control in modern manufacturing, including model-centric technologies and integrated control systems Integrates data processing/reconciliation and intelligent monitoring in the overall control system architecture Drawing on the authors' combined 60 years of teaching experiences, this classroom-tested text is designed for chemical engineering students but is also suitable for industrial practitioners who need to understand key concepts of process control and how to implement them. The text offers a comprehensive pedagogical approach to reinforce learning and presents a concept first followed by an example, allowing students to grasp theoretical concepts in a practical manner and uses the same problem in each chapter, culminating in a complete control design strategy. A vast number of exercises throughout ensure readers are supported in their learning and comprehension. Downloadable MATLAB® toolboxes for process control education as well as the main simulation examples from the book offer a user-friendly software environment for

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

interactively studying the examples in the text. These can be downloaded from the publisher's website.

Solutions manual is available for qualifying professors from the publisher.

Research efforts in the past ten years have led to considerable advances in the concepts and methods of smart manufacturing. Smart Manufacturing: Concepts and Methods puts these advances in perspective, showing how process industries can benefit from these new techniques. The book consolidates results developed by leading academic and industrial groups in the area, providing a systematic, comprehensive coverage of conceptual and methodological advances made to date. Written by leaders in the field from around the world, Smart Manufacturing: Concepts and Methods is essential reading for graduate students, researchers, process engineers, and managers. It is complemented by a companion book titled Smart Manufacturing: Applications and Case Studies, which covers the applications of smart manufacturing concepts and methods in process industries and beyond. Takes a process-systems engineering approach to design, monitoring, and control of smart manufacturing systems Brings together the key concepts and methods of smart manufacturing, including the advances made in the past decade Includes coverage of computation methods for process optimization, control, and safety, as well as

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

advanced modelling techniques

Instrument Engineers' Handbook – Volume 3: Process Software and Digital Networks, Fourth Edition is the latest addition to an enduring collection that industrial automation (AT) professionals often refer to as the "bible." First published in 1970, the entire handbook is approximately 5,000 pages, designed as standalone volumes that cover the measurement (Volume 1), control (Volume 2), and software (Volume 3) aspects of automation. This fourth edition of the third volume provides an in-depth, state-of-the-art review of control software packages used in plant optimization, control, maintenance, and safety. Each updated volume of this renowned reference requires about ten years to prepare, so revised installments have been issued every decade, taking into account the numerous developments that occur from one publication to the next. Assessing the rapid evolution of automation and optimization in control systems used in all types of industrial plants, this book details the wired/wireless communications and software used. This includes the ever-increasing number of applications for intelligent instruments, enhanced networks, Internet use, virtual private networks, and integration of control systems with the main networks used by management, all of which operate in a linked global environment. Topics covered include: Advances in new displays, which help operators to

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

more quickly assess and respond to plant conditions
Software and networks that help monitor, control, and optimize industrial processes, to determine the efficiency, energy consumption, and profitability of operations
Strategies to counteract changes in market conditions and energy and raw material costs
Techniques to fortify the safety of plant operations and the security of digital communications systems
This volume explores why the holistic approach to integrating process and enterprise networks is convenient and efficient, despite associated problems involving cyber and local network security, energy conservation, and other issues. It shows how firewalls must separate the business (IT) and the operation (automation technology, or AT) domains to guarantee the safe function of all industrial plants. This book illustrates how these concerns must be addressed using effective technical solutions and proper management policies and practices.
Reinforcing the fact that all industrial control systems are, in general, critically interdependent, this handbook provides a wide range of software application examples from industries including: automotive, mining, renewable energy, steel, dairy, pharmaceutical, mineral processing, oil, gas, electric power, utility, and nuclear power.
This book contains the proceedings of the 10e of a series of international symposia on process systems engineering (PSE) initiated in 1982. The special

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

focus of PSE09 is how PSE methods can support sustainable resource systems and emerging technologies in the areas of green engineering. *

Contains fully searchable CD of all printed contributions * Focus on sustainable green engineering * 9 Plenary papers, 21 Keynote lectures by leading experts in the field

Data Processing discusses the principles, practices, and associated tools in data processing. The book is comprised of 17 chapters that are organized into three parts. The first part covers the characteristics, systems, and methods of data processing. Part 2 deals with the data processing practice; this part discusses the data input, output, and storage. The last part discusses topics related to systems and software in data processing, which include checks and controls, computer language and programs, and program elements and structures. The text will be useful to practitioners of computer-related fields who wish to have a better comprehension of the inner workings of data processing.

Process Systems Risk Management provides complete coverage of risk management concepts and applications for safe design and operation of industrial and other process facilities. The whole life cycle of the process or product is taken into account, from its conception to decommissioning. The breadth of human factors in risk management is also treated, ranging from personnel and public safety to environmental impact and business interruption. This unique approach to process risk management is firmly grounded in systems engineering. Numerous examples are used to illustrate important concepts –drawn from almost 40 years authors' experience in risk analysis, assessment and management, with applications in both on- and off-shore

Bookmark File PDF Data Processing And Reconciliation For Chemical Process Operations Volume 2 Process Systems Engineering

operations. This book is essential reading on the relevant techniques to tackle risk management activities for small-, medium- and large-scale operations in the process industries. It is aimed at informing a wide audience of industrial risk management practitioners, including plant managers, engineers, health professionals, town planners, and administrators of regulatory agencies. A computational perspective on the risk management of chemical processes A multifaceted approach that includes the technical, social, human and management factors Includes numerous examples and illustrations from real life incidents

[Copyright: a9ef4bf719b69202e07ab6df2fc77bc9](https://www.pdfdrive.com/data-processing-and-reconciliation-for-chemical-process-operations-volume-2-process-systems-engineering-p123456789.html)