A Cape Open Compliant Simulation Module For An Ammonia

Progress of thermodynamics has been stimulated by the

findings of a variety of fields of science and technology. The principles of thermodynamics are so general that the application is widespread to such fields as solid

state physics, chemistry, biology, astronomical science, materials science, and chemical engineering. The contents of this book should be of help to many scientists

and engineers.

The idea of editing a book on modern software architectures and tools for CAPE (Computer Aided Process Engineering) came about when the editors of

this volume realized that existing titles relating to CAPE did not include references to the design and development of CAPE software. Scientific software is needed to

solve CAPE related problems by industry/academia for research and development, for education and training and much more. There are increasing demands for

CAPE software to be versatile, flexible, efficient, and reliable. This means that the role of software architecture is also gaining increasing importance. Software

architecture needs to reconcile the objectives of the software; the framework defined by the CAPE methods; the computational algorithms; and the user needs and

tools (other software) that help to develop the CAPE software. The object of this book is to bring to the reader, the software side of the story with respect to computer

aided process engineering. This book includes papers presented at ESCAPE-10, the 10th European Symposium on Computer Aided Process -Engineering, held in

Florence, Italy, 7-10th May, 2000. The scientific program reflected two complementary strategic objectives of the 'Computer Aided Process Engineering' (CAPE)

Working Party: one checked the status of historically consolidated topics by means of their industrial application and their emerging issues, while the other was addressed to

opening new windows to the CAPE audience by inviting adjacent Working Parties to co-operate in the creation of the technical program. The former CAPE strategic objective was

covered by the topics: Numerical Methods, Process Design and Synthesis, Dynamics & Control, Process Modeling, Simulation and Optimization. The latter

CAPE strategic objective derived from the European Federation of Chemical Engineering (EFCE) promotion of scientific activities which autonomously and

transversely work across the Working Parties' terms of references. These activities enhance the exchange of the know-how and knowledge acquired by different Working Parties

in homologous fields. They also aim to discover complementary facets useful to the dissemination of tools and of novel procedures. As a consequence, the Working

Parties 'Environmental Protection', 'Loss Prevention and Safety Promotion' and 'Multiphase Fluid Flow' were invited to assist in the organization of sessions

in the area of: A Process Integrated Approach for: Environmental Benefit, Loss Prevention and Safety, Computational Fluid Dynamics. A total of 473 abstracts from all

over the world were evaluated by the International Scientific Committee. Out of them 197 have been finally selected for the presentation and reported into this book.

Their authors come from thirty different countries. The selection of the papers was carried out by twenty-eight international reviewers. These proceedings will be

a major reference document to the scientific and industrial community and will contribute to the progress in Computer Aided Process Engineering.

This book contains papers

presented at the 14th European Symposium on Computer Aided Process Engineering (ESCAPE-14). The ESCAPE symposia bring together scientists, students and engineers

from academia and industry, who are active in the research and application of Computer Aided Process Engineering. The objective of ESCAPE-14 is to highlight the use of

computers and information technology tools on five specific themes: 1. Product and Process Design, 2. Synthesis and Process Integration, 3. Process Control and

Analysis, 4. Manufacturing & Process Operations, 5. New Challenges in CAPE. - Provides this year's comprehensive overview of the current state of affairs in the CAPE

community - Contains reports from the frontiers of science by the field's most respected scientists - Special Keynote by Professor Roger Sargent, Long Term Achievement CAPE

Award winner

Proceedings of the 26th International Conference on Very Large Data Bases

A Perspective for the Future, Second Edition

Mathematical Modeling of

Fluid Flow and Heat Transfer in Petroleum Industries and Geothermal Applications
Towards the E-Society
Package Equivalent Reactor Networks as Reduced Order

Models for Use with CAPE-OPEN Compliant Simulation The Multi-Agent Transport Simulation MATSim

27th European Symposium on Computer Aided Process Engineering, Volume 40

contains the papers presented at the 27th European Society of Computer-Aided Process Engineering (ESCAPE) event held in Barcelona, October 1-5, 2017. It is a valuable resource for chemical engineers,

chemical process engineers, researchers in industry and academia, students, and consultants for chemical industries. Presents findings and discussions from the 27th European Society of Computer-

Aided Process Engineering (ESCAPE) event

26th European Symposium on Computer Aided Process Engineering contains the papers presented at the 26th European Society of Computer-

Aided Process Engineering (ESCAPE) Event held at Portorož Slovenia, from June 12th to June 15th, 2016. Themes discussed at the conference include Process-product Synthesis, Design and

Integration, Modelling, Numerical analysis, Simulation and Optimization, Process Operations and Control and Education in CAPE/PSE. Presents findings and discussions from the 26th

European Society of Computer-Aided Process Engineering (ESCAPE) Event

The 17th European Symposium on Computed Aided Process Engineering contains papers presented at

the 17th European Symposium of Computer Aided Process Engineering (ESCAPE 17) held in Bucharest, Romania, from 27-30 May 2007. The ESCAPE series serves as a forum for scientists and engineers from

academia and industry to discuss progress achieved in the area of Computer Aided Process Engineering (CAPE). The main goal was to emphasize the continuity in research of innovative

concepts and systematic design methods as well the diversity of applications emerged from the demands of sustainable development. ESCAPE 17 highlights the progresss software

technology needed for implementing simulation based tools. The symposium is based on 5 themes and 27 topics, following the main trends in CAPE area: Modelling, Process and

Products Design, Optimisation and Optimal Control and Operation, System Biology and Biological Processes, Process Integration and Sustainable Development. Participants from 50 countries

attended and invited speakers presented 5 plenary lectures tackling broad subjects and 10 keynote lectures. Satellite events added a plus to the scientific dimension to this symposium. * All contributions

are included on the CD-ROM attached to the book * Attendance from 50 countries with invited speakers presenting 5 plenary lectures tackling broad subjects and 10 keynote lectures

This book presents a concise framework for assessing technical and sustainability impacts of existing biorefineries and provides a possible road map for development of novel

biorefineries. It offers a detailed, integrated approach to evaluate the entire biomass production chain, from the agricultural feedstock production and transportation, to the industrial conversion

and commercialization & use of products. The Brazilian sugarcane biorefinery is used as a case study; however, the methods and concepts can be applied to almost any biomass alternative. Chapters explore

the main issues regarding biorefinery assessment, including feedstock production and transportation modeling, biofuels and green chemistry products, as well as assessment of sustainability

impacts. This book is a valuable source of information to researchers in bioenergy, green chemistry and sustainability fields. It also provides a useful framework for government agencies,

investors and the energy industry to evaluate and predict the success of current and future biorefinery alternatives.

European Symposium on Computer Aided Process

Engineering - 11
Computer Aided Process and Product Engineering
Design for Energy and the Environment
10th International Symposium on Process Systems

Engineering - PSE2009

Thermodynamics

Chemical Engineering Progress

Geothermal energy is the thermal energy generated and stored in the Earth's core,

mantle, and crust. Geothermal technologies are used to generate electricity and to heat and cool buildings. To develop accurate models for heat and mass transfer applications involving fluid flow in

geothermal applications or reservoir engineering and petroleum industries, a basic knowledge of the rheological and transport properties of the materials involved (drilling fluid, rock properties,

etc.)—especially in high-temperature and high-pressure environments—are needed. This Special Issue considers all aspects of fluid flow and heat transfer in geothermal applications, including the

ground heat exchanger, conduction and convection in porous media. The emphasis here is on mathematical and computational aspects of fluid flow in conventional and unconventional reservoirs,

geothermal engineering, fluid flow, and heat transfer in drilling engineering and enhanced oil recovery (hydraulic fracturing, CO2 injection, etc.) applications. The MATSim (Multi-Agent

Transport Simulation) software project was started around 2006 with the goal of generating traffic and congestion patterns by following individual synthetic travelers through their daily or

weekly activity programme. It has since then evolved from a collection of stand-alone C++ programs to an integrated Java-based framework which is publicly hosted, open-source available, automatically

regression tested. It is currently used by about 40 groups throughout the world. This book takes stock of the current status. The first part of the book gives an introduction to the most important concepts,

with the intention of enabling a potential user to set up and run basic simulations. The second part of the book describes how the basic functionality can be extended, for example by adding schedule-based public

transit, electric or autonomous cars, paratransit, or within-day replanning. For each extension, the text provides pointers to the additional documentation and to the code base. It is also discussed how people with

appropriate Java programming skills can write their own extensions, and plug them into the MATSim core. The project has started from the basic idea that traffic is a consequence of human behavior, and thus

humans and their behavior should be the starting point of all modelling, and with the intuition that when simulations with 100 million particles are possible in computational physics, then behavior-oriented

simulations with 10 million travelers should be possible in travel behavior research. The initial implementations thus combined concepts from computational physics and complex adaptive systems with

concepts from travel behavior research. The third part of the book looks at theoretical concepts that are able to describe important aspects of the simulation system; for example, under certain

conditions the code becomes a Monte Carlo engine sampling from a discrete choice model. Another important aspect is the interpretation of the MATSim score as utility in the microeconomic sense, opening

up a connection to benefit cost analysis. Finally, the book collects use cases as they have been undertaken with MATSim. All current users of MATSim were invited to submit their work, and many followed with

sometimes crisp and short and sometimes longer contributions, always with pointers to additional references. We hope that the book will become an invitation to explore, to build and to

extend agent-based modeling of travel behavior from the stable and well tested core of MATSim documented here.
Under the auspices of a US-UK Memorandum of Understanding and Implementing Agreement

for fossil energy R&D (http://us-uk.fossil.energy.gov/), the US Department of Energy's (DOE) National Energy Technology Laboratory (NETL) and the UK Department of Trade and Industry (DTI) have recently

completed a three-year collaboration on virtual plant modeling and simulation technology for advanced fossil-energy power generation systems. The R&D collaboration was aimed at taking full

advantage of the synergies between NETL's ongoing Advanced Process Engineering Co-Simulator (APECS) project and the UK's three-year Virtual Plant Demonstration Model (VPDM) project. The key

objective of this collaboration has been the development of compatible, open standards-based US and UK technology for process/equipment co-simulation. To achieve plug-and-play model interoperability, the

collaboration leveraged the process-industry CAPE-OPEN (CO) software standard which is managed and disseminated by the CO Laboratories Network (www.colan.org).

The Chemical Sciences

Roundtable provides a forum for discussing chemically related issues affecting government, industry and government. The goal is to strengthen the chemical sciences by foster

communication among all the important stakeholders. At a recent Roundtable meeting, information technology was identified as an issue of increasing importance to all sectors of the chemical

enterprise. This book is the result of a workshop convened to explore this topic.

17th European Symposium on Computed Aided Process Engineering

Process Heat Transfer

Handbook of Control Room Design and Ergonomics

18th European Symposium on Computer Aided Process Engineering

Integrated Design and Simulation of Chemical

Processes

Powder and Particle

While the PSE community continues its focus on understanding, synthesizing, modeling, designing, simulating, analyzing, diagnosing, operating, controlling, managing, and

optimizing a host of chemical and related industries using the systems approach, the boundaries of PSE research have expanded considerably over the years. While early PSE research was largely concerned with individual units and plants, the current research spans wide ranges of scales

in size (molecules to processing units to plants to global multinational enterprises to global supply chain networks; biological cells to ecological webs) and time (instantaneous molecular interactions to months of plant operation to years of strategic planning). The changes and

challenges brought about by increasing globalization and the the common global issues of energy, sustainability, and environment provide the motivation for the theme of PSE2012: Process Systems Engineering and Decision Support for the Flat World. Each theme includes

an invited chapter based on the plenary presentation by an eminent academic or industrial researcher Reports on the state-of-the-art advances in the various fields of process systems engineering Addresses common global problems and the research being done to solve

them

This book contains papers presented at the 11th Symposium of Computer Aided Process Engineering (ESCAPE-11), held in Kolding, Denmark, from May 27-30, 2001. The objective of ESCAPE-11 is to highlight the use of computers and information

technology tools, that is, the traditional CAPE topics as well as the new CAPE topics of current and future interests. The main theme for ESCAPE-11 is process and tools integration with emphasis on hybrid processing, cleaner and efficient technologies (process integration), computer aided

systems for modelling, design, synthesis, control (tools integration) and industrial case studies (application of integrated strategies). The papers are arranged in terms of the following themes: computer aided control/operations, computer aided manufacturing, process and tools

integration, and new frontiers in CAPE. A total of 188 papers, consisting of 5 keynote and 183 contributed papers are included in this book.

Package Equivalent Reactor Networks as Reduced Order Models for Use with CAPE-OPEN Compliant Simulation Process Heat Transfer is a reference

on the design and implementation of industrial heat exchangers. It provides the background needed to understand and master the commercial software packages used by professional engineers in the design and analysis of heat exchangers. This book focuses on types of heat exchangers most

widely used by industry: shell-and-tube exchangers (including condensers, reboilers and vaporizers), air-cooled heat exchangers and double-pipe (hairpin) exchangers. It provides a substantial introduction to the design of heat exchanger networks using pinch technology, the most efficient

strategy used to achieve optimal recovery of heat in industrial processes. Utilizes leading commercial software. Get expert HTRI Xchanger Suite guidance, tips and tricks previously available via high cost professional training sessions. Details the development of initial configuration

for a heat exchanger and how to systematically modify it to obtain an efficient final design. Abundant case studies and rules of thumb, along with copious software examples, provide a complete library of reference designs and heuristics for readers to base their own designs on.

Proceedings of the Seventh International Conference on the Foundations of Computer-Aided Process Design

11th European Symposium of the Working Party on Computer Aided Process Engineering

Thermal Engineering in Power

Systems
Revue de L'Institut Français Du Pétrole
37th European Symposium of the Working Party on Computer-Aided Process Engineering

The 19th European Symposium

on Computer Aided Process Engineering contains papers presented at the 19th European Symposium of Computer Aided Process Engineering (ESCAPE 19) held in Cracow, Poland, June 14-17, 2009. The ESCAPE series serves as a forum for scientists

*and engineers from academia and industry to discuss progress achieved in the area of CAPE. * CD-ROM that accompanies the book contains all research papers and contributions * International in scope with guest speeches and keynote talks from leaders in*

*science and industry * Presents papers covering the latest research, key top areas and developments in computer aided process engineering (CAPE)*
I3E 2001 is the first in a series of conferences on e-commerce, e-business, and- government

organised by the three IFIP committees TC6, TC8, and TC11. It provides a forum, where users, engineers, and scientists from academia, industry, and government can present their latest findings in e-commerce, e-business, and- government

applications and the underlying technology to support those applications. The conference comprises a main track and mini tracks dedicated to special topics. The papers presented in the main track were rigorously refereed and selected by the International

Programme Committee of the conference. Thematically they were grouped in the following sessions: – Sessions on security and trust, comprising nine papers referring to both trust and security in general as well as presenting specific concepts for

enhancing trust in the digital society. – Session on inter-organisational transactions, covering papers related to auditing of inter-organizational trade procedures, cross-organizational workflow and transactions in Business to

Business platforms. – Session on virtual enterprises, encompassing papers describing innovative approaches for creating virtual enterprises as well as describing examples of virtual enterprises in specific industries. – Session on online communities containing

three papers, which provide case studies of specific online communities and various concepts on how companies can build and harness the potential of online communities. – Sessions on strategies and business models with papers describing specific

business models as well as general overviews of specific approaches for E- Strategy formulation.

This report summarizes the work accomplished during the Phase II development effort of the Advanced Process Engineering Co-

Simulator (APECS). The objective of the project is to develop the tools to efficiently combine high-fidelity computational fluid dynamics (CFD) models with process modeling software. During the course of the project, a robust integration controller

was developed that can be used in any CAPE-OPEN compliant process modeling environment. The controller mediates the exchange of information between the process modeling software and the CFD software. Several approaches to reducing the time

disparity between CFD simulations and process modeling have been investigated and implemented. These include enabling the CFD models to be run on a remote cluster and enabling multiple CFD models to be run simultaneously.

Furthermore, computationally fast reduced-order models (ROMs) have been developed that can be 'trained' using the results from CFD simulations and then used directly within flowsheets. Unit operation models (both CFD and ROMs) can be uploaded to a

model database and shared between multiple users.
This comprehensive work shows how to design and develop innovative, optimal and sustainable chemical processes by applying the principles of process systems engineering,

leading to integrated sustainable processes with 'green' attributes. Generic systematic methods are employed, supported by intensive use of computer simulation as a powerful tool for mastering the complexity of physical models. New to the second edition are

chapters on product design and batch processes with applications in specialty chemicals, process intensification methods for designing compact equipment with high energetic efficiency, plantwide control for managing the key factors affecting the plant

dynamics and operation, health, safety and environment issues, as well as sustainability analysis for achieving high environmental performance. All chapters are completely rewritten or have been revised. This new edition is suitable as teaching material for

Chemical Process and Product Design courses for graduate MSc students, being compatible with academic requirements world-wide. The inclusion of the newest design methods will be of great value to professional chemical engineers. Systematic approach

to developing innovative and sustainable chemical processes Presents generic principles of process simulation for analysis, creation and assessment Emphasis on sustainable development for the future of process industries

European Symposium on Computer Aided Process Engineering - 12
Oil & Gas Science and Technology Part A and B
Ecosystems and Sustainable Development VIII
Natural Gas Processing from

Midstream to Downstream Kona

First published two decades ago, the first edition of Handbook of Control Room Design and Ergonomics: A Perspective

for the Future became a benchmark for the field. Current-day process control encompasses a new generation of computer systems with enormous capabilities, including

new display technologies. These new and emerging technologies integrated with human factors create an interconnectivity that enhances organizational development. This new

edition of the handbook addresses developments in the concept of "Control Rooms". It includes modern approaches that emphasize the role of people in learning for self-

development and in shaping their work environments. New in the Second Edition: Extensive coverage of the use of the control room and its related computer system outside the work of

monitoring and supervising the processes Discussion and explanation of how the control room can also be used for the purposes of education and simulation training Discussion of the

use of the control system for optimizing and developing the existing systems and processes A section on new ideas and philosophies about organizational design and

job design as these are applied to control room related work Proposed organizational designs of the future Theoretical background about learning, learning in the workplace,

and lifelong learning Creativity and learning are rapidly becoming integral parts of the design of work environments and work processes and utilize the

ICT potential of modern control systems. Using original case studies, the authors describe and illustrate some creative and exciting organizational designs of

the future, including new perspectives learning, learning in the workplace, and lifelong learning. Taking a holistic view, they make a strong argument for integrating

in the workplace of the new control centers in the context of society as a whole, including global concerns such as environmental protection, energy conservation, and

sustainability.

Research and development in thermal engineering for power systems are of significant importance to many scientists who are engaged in research and

design work in power-related industries and laboratories. This book focuses on variety of research areas including Components of Compressor and Turbines that are used

for both electric power systems and aero engines, Fuel Cells, Energy Conversion, and Energy Reuse and Recycling Systems. To be competitive in today's market, power

systems need to reduce the operating costs, increase capacity factors and deal with many other tough issues. Heat Transfer and fluid flow issues are of great significance and it

is likely that a state-of-the-art edited book with reference to power systems will make a contribution for design and R&D engineers and the development towards

sustainable energy systems.
Engineering simulations of coal gasifiers are typically performed using computational fluid dynamics (CFD) software,

where a 3-D representation of the gasifier equipment is used to model the fluid flow in the gasifier and source terms from the coal gasification process are captured using discrete-

phase model source terms. Simulations using this approach can be very time consuming, making it difficult to imbed such models into overall system simulations for plant

design and optimization. For such system-level designs, process flowsheet software is typically used, such as Aspen Plus® [1], where each component where each component is

modeled using a reduced-order model. For advanced power-generation systems, such as integrated gasifier/gas-turbine combined-cycle systems (IGCC), the critical

components determining overall process efficiency and emissions are usually the gasifier and combustor. Providing more accurate and more computationally efficient

reduced-order models for these components, then, enables much more effective plant-level design optimization and design for control. Based on the CHEMKIN-PRO and

ENERGICO software, we have developed an automated methodology for generating an advanced form of reduced-order model for gasifiers and combustors. The reducedorder model

offers representation of key unit operations in flowsheet simulations, while allowing simulation that is fast enough to be used in iterative flowsheet calculations.

Using high-fidelity fluiddynamics models as input, Reaction Design's ENERGICO® [2] software can automatically extract equivalent reactor networks (ERNs) from a CFD

solution. For the advanced reduced-order concept, we introduce into the ERN a much more detailed kinetics model than can be included practically in the CFD simulation. The

state-of-the-art chemistry solver technology within CHEMKIN-PRO allows that to be accomplished while still maintaining a very fast model turn-around time. In this way, the ERN

becomes the basis for high-fidelity kinetics simulation, while maintaining the spatial information derived from the geometrically faithful CFD model. The reduced-

order models are generated in such a way that they can be easily imported into a process flowsheet simulator, using the CAPE-OPEN architecture for unit operations. The

ENERGICO/CHEMKIN-PRO software produces an ERN-definition file that is read by a dynamically linked library (DLL) that can be easily linked to any CAPE-OPEN compliant

software. The plug-in unitoperation module has been successfully demonstrated for complex ERNs of coal gasifiers, using both Aspen Plus and COFE process flowsheet

simulators through this published CAPE-OPEN interface.

This book contains 182 papers presented at the 12th Symposium of Computer Aided Process Engineering

(ESCAPE-12), held in The Hague, The Netherlands, May 26-29, 2002. The objective of ESCAPE-12 is to highlight advances made in the development and use of computing methodologies

and information technology in the area of Computer Aided Process Engineering and Process Systems Engineering. The Symposium addressed six themes: (1) Integrated Product&Process

Design; (2) Process Synthesis & Plant Design; (3) Process Dynamics & Control; (4) Manufacturing & Process Operations; (5) Computational Technologies; (6)

Sustainable CAPE Education and Careers for Chemical Engineers. These themes cover the traditional core activities of CAPE, and also some wider conceptual perspectives, such as the

increasing interplay between product and process design arising from the often complex internal structures of modern products; the integration of production

chains creating the network structure of the process industry and optimization over life span dimensions, taking sustainability as the ultimate driver.

The ChemSep Book
An Optimization Strategy for Renewable Carbon Valorization
Cellulose Chemistry and Technology
Use of CAPE-OPEN Standard

in US-UK Collaboration on Virtual Plant Simulation Chemical Engineering European Symposium on Computer Aided Process Engineering - 14

The biennial series of ECOSUD

conferences, originating from the work of the late Nobel laureate, Ilya Prigogine, challenges us to seeking to integrate thermodynamics, ecology and economics into “ecodynamics.” It is not only a

platform to present novel research related to ecological problems from all over the world, but it also gives opportunities for new emergent ideas in science arising from the cross

fertilization of different disciplines, including mathematical models and eco-informatics, evolutionary thermodynamics and biodiversity, structures in ecosystems modelling and

landscapes to mention but a few. This book contains papers presented at the the Eighth International Conference in the well-established conference series on Ecosystems and Sustainable

Development. Conference topics include : Greenhouse Gas Issues; Ecosystems Modelling; Mathematical and System Modelling; Natural Resources Management; Environmental Indicators;

Sustainability Studies; Recovery of Damaged Areas; Energy and the Environment; Socio Economic Factors; Soil Contamination; Waste Management; Water Resources; Environmental

Management; and Modelling of alternative futures.

The 18th European Symposium on Computer Aided Process Engineering contains papers presented at the 18th European Symposium

of Computer Aided Process Engineering (ESCAPE 18) held in Lyon, France, from 1-4 June 2008. The ESCAPE series brings the latest innovations and achievements by leading professionals from the

industrial and academic communities. The series serves as a forum for engineers, scientists, researchers, managers and students from academia and industry to: - present new

computer aided methods, algorithms, techniques related to process and product engineering, - discuss innovative concepts, new challenges, needs and trends in the area of CAPE. This

research area bridges fundamental sciences (physics, chemistry, thermodynamics, applied mathematics and computer sciences) with the various aspects of process and product engineering. The

special theme for ESCAPE-18 is CAPE for the Users! CAPE systems are to be put in the hands of end users who need functionality and assistance beyond the scientific and technological capacities which

are at the core of the systems. The four main topics are: - off-line systems for synthesis and design, - on-line systems for control and operation, - computational and numerical solutions strategies, -

integrated and multi-scale modelling and simulation, Two general topics address the impact of CAPE tools and methods on Society and Education. * CD-ROM that accompanies the book contains

all research papers and contributions * International in scope with guest speeches and keynote talks from leaders in science and industry * Presents papers covering the latest research, key top areas

and developments in Computer Aided Process Engineering

IMPROVE stands for "Information Technology Support for Collaborative and Distributed Design Processes

in Chemical Engineering" and is a joint project of research institutions. This volume summarizes the results after nine years of cooperative research work.
A comprehensive review of the

current status and challenges for natural gas and shale gas production, treatment and monetization technologies Natural Gas Processing from Midstream to Downstream presents an international

perspective on the production and monetization of shale gas and natural gas. The authors review techno-economic assessments of the midstream and downstream natural gas processing technologies.

Comprehensive in scope, the text offers insight into the current status and the challenges facing the advancement of the midstream natural gas treatments. Treatments covered include

gas sweeting processes, sulfur recovery units, gas dehydration and natural gas pipeline transportation. The authors highlight the downstream processes including physical treatment

and chemical conversion of both direct and indirect conversion. The book also contains an important overview of natural gas monetization processes and the potential for shale gas to

play a role in the future of the energy market, specifically for the production of ultra-clean fuels and value-added chemicals. This vital resource: Provides fundamental chemical engineering aspects

of natural gas technologies Covers topics related to upstream, midstream and downstream natural gas treatment and processing Contains well-integrated coverage of several

technologies and processes for treatment and production of natural gas Highlights the economic factors and risks facing the monetization technologies Discusses supply chain, environmental and

safety issues associated with the emerging shale gas industry Identifies future trends in educational and research opportunities, directions and emerging opportunities in natural gas

monetization Includes contributions from leading researchers in academia and industry Written for Industrial scientists, academic researchers and government agencies working on

developing and sustaining state-of-the-art technologies in gas and fuels production and processing, Natural Gas Processing from Midstream to Downstream provides a broad overview of the current status

and challenges for natural gas production, treatment and monetization technologies.

E-Commerce, E-Business, and E-Government

19th European Symposium on Computer Aided Process

Engineering
Results of the IMPROVE Project
A COMPUTATIONAL WORKBENCH ENVIRONMENT FOR VIRTUAL POWER PLANT

SIMULATION

ESCAPE-19: June 14-17, 2009, Cracow, Poland

Software Architectures and Tools for Computer Aided Process Engineering

"*Process design is the focal point*

of chemical engineering practice: the creative activity through which engineers continuously improve facility operations to create products that enhance life. Effective chemical engineering design requires students to

integrate a broad spectrum of knowledge and intellectual skills, so they can analyze both the big picture and minute details - and know when to focus on each. Through three previous editions, this book has established itself as

the leading resource for students seeking to apply what they've learned in real-world, open-ended process problems. The authors help students hone and synthesize their design skills through expert coverage of preliminary equipment

sizing, flowsheet optimization, economic evaluation, operation and control, simulation, and other key topics. This new Fourth Edition is extensively updated to reflect new technologies, simulation techniques, and process control

strategies, and to include new pedagogical features including concise summaries and end-of-chapter lists of skills and knowledge."--pub. desc.

The 10th International Symposium on Process Systems Engineering,

PSE'09, will be held in Salvador-Bahia, Brazil on August 16-20, 2009. The special focus of PSE 2009 is Sustainability, Energy and Engineering. PSE 2009 is the tenth in the triennial series of international symposia on process

systems engineering initiated in 1982. The meeting is brings together the worldwide PSE community of researchers and practitioners who are involved in the creation and application of computing-based methodologies

for planning, design, operation, control and maintenance of chemical and petrochemical process industries. PSE'09 will look at how the PSE methods and tools can support sustainable resource systems and emerging

technologies in the areas of green engineering: environmentally conscious design of industrial processes. PSE methods and tools support: - sustainable resource systems - emerging technologies in the areas of green engineering -

environmentally conscious design of industrial processes

An examination of systematic techniques for the design of sustainable processes and products, this book covers reducing energy consumption,

preventing pollution, developing new pathways for biofuels, and producing environmentally friendly and high-quality products. It discusses innovative design approaches and technological pathways that impact energy and

environmental issues of new and existing processes. Highlights include design for sustainability and energy efficiency, emerging technologies and processes for energy and the environment, design of biofuels, biological

processes and biorefineries, energy systems design and alternative energy sources, multi-scale systems uncertain and complex systems, and product design.

In this report is described the work

effort to develop and demonstrate a software framework to support advanced process simulations to evaluate the performance of advanced power systems. Integrated into the framework are a broad range of models, analysis

tools, and visualization methods that can be used for the plant evaluation. The framework provides a tightly integrated problem-solving environment, with plug-and-play functionality, and includes a hierarchy of models,

ranging from fast running process models to detailed reacting CFD models. The framework places no inherent limitations on the type of physics that can be modeled, numerical techniques, or programming languages used to

implement the equipment models, or the type or amount of data that can be exchanged between models. Tools are provided to analyze simulation results at multiple levels of detail, ranging from simple tabular outputs to

advanced solution visualization methods. All models and tools communicate in a seamless manner. The framework can be coupled to other software frameworks that provide different modeling capabilities. Three

software frameworks were developed during the course of the project. The first framework focused on simulating the performance of the DOE Low Emissions Boiler System Proof of Concept facility, an advanced

pulverized-coal combustion-based power plant. The second framework targeted simulating the performance of an Integrated coal Gasification Combined Cycle - Fuel Cell Turbine (IGCC-FCT) plant configuration. The coal gasifier

models included both CFD and process models for the commercially dominant systems. Interfacing models to the framework was performed using VES-Open, and tests were performed to demonstrate

interfacing CAPE-Open compliant models to the framework. The IGCC-FCT framework was subsequently extended to support Virtual Engineering concepts in which plant configurations can be constructed and interrogated in a

three-dimensional, user-centered, interactive, immersive environment. The Virtual Engineering Framework (VEF), in effect a prototype framework, was developed through close collaboration with NETL supported

research teams from Iowa State University Virtual Reality Applications Center (ISU-VRAC) and Carnegie Mellon University (CMU). The VEF is open source, compatible across systems ranging from inexpensive desktop

PCs to large-scale, immersive facilities and provides support for heterogeneous distributed computing of plant simulations. The ability to compute plant economics through an interface that coupled the CMU IECM tool to

the VEF was demonstrated, and the ability to couple the VEF to Aspen Plus, a commercial flowsheet modeling tool, was demonstrated. Models were interfaced to the framework using VES-Open. Tests were performed

for interfacing CAPE-Open-compliant models to the framework. Where available, the developed models and plant simulations have been benchmarked against data from the open literature. The VEF has

been installed at NETL. The VEF provides simulation capabilities not available in commercial simulation tools. It provides DOE engineers, scientists, and decision makers with a flexible and extensible simulation system that

can be used to reduce the time, technical risk, and cost to develop the next generation of advanced, coal-fired power systems that will have low emissions and high efficiency. Furthermore, the VEF provides a common simulation

system that NETL can use to help manage Advanced Power Systems Research projects, including both combustion- and gasification-based technologies.

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