



# Sustaining Power Resources through Energy Optimization and Engineering

Pandian Vasant  
*Universiti Teknologi PETRONAS, Malaysia*

Nikolai Voropai  
*Energy Systems Institute SB RAS, Russia*

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# Table of Contents

<b>Foreword</b> by <i>Valeriy V. Kharchenko</i> .....	xvii
<b>Foreword</b> by <i>Vassili N Kolokoltsov</i> .....	xviii
<b>Foreword</b> by <i>Gerhard-Wilhelm Weber &amp; N. Serhan Aydın &amp; Erik Kropat</i> .....	xix
<b>Preface</b> .....	xxi
<b>Acknowledgment</b> .....	xxv
<b>Chapter 1</b>	
Assessment and Enhancement of the Energy Supply System Efficiency with Emphasis on the Cogeneration and Renewable as Main Directions for Fuel Saving.....	1
<i>Sergey Zharkov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<b>Chapter 2</b>	
Problems of Modeling and Optimization of Heat Supply Systems: Methods to Comprehensively Solve the Problem of Heat Supply System Expansion and Reconstruction .....	26
<i>Valery Stennikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<i>Tamara Oshchepkova, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<i>Nikolay Stennikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<b>Chapter 3</b>	
Problems of Modeling and Optimization of Heat Supply Systems: Bi-Level Optimization of the Competitive Heat Energy Market .....	54
<i>Valery Stennikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<i>Andrey Penkovskii, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	
<i>Oleg Khamisov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia</i>	

#### **Chapter 4**

Problems of Modeling and Optimization of Heat Supply Systems: New Methods and Software for Optimization of Heat Supply System Parameters ..... 76

*Valery Stennikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

*Evgeny Barakhtenko, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

*Dmitry Sokolov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

*Tamara Oshchepkova, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

#### **Chapter 5**

Problems of Modeling and Optimization of Heat Supply Systems: Methodological Support for a Comprehensive Analysis of Fuel and Heat Supply Reliability ..... 102

*Valery A. Stennikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

*Ivan V. Postnikov, Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, Russia*

#### **Chapter 6**

Fuzzy Random Regression-Based Modeling in Uncertain Environment ..... 127

*Nureize Arbaiy, University Tun Hussein Onn Malaysia, Malaysia*

*Junzo Watada, Waseda University, Japan*

*Pei-Chun Lin, Waseda University, Japan*

#### **Chapter 7**

A Novel Optimization Algorithm for Transient Stability Constrained Optimal Power Flow ..... 147

*Sourav Paul, Dr. B. C. Roy Engineering College, India*

*Provas Kumar Roy, Jalpaiguri Government Engineering College, India*

#### **Chapter 8**

Improved Pseudo-Gradient Search Particle Swarm Optimization for Optimal Power Flow Problem 177

*Jirawadee Polprasert, Asian Institute of Technology, Thailand*

*Weerakorn Ongsakul, Asian Institute of Technology, Thailand*

*Vo Ngoc Dieu, Ho Chi Minh City University of Technology, Vietnam*

#### **Chapter 9**

Engineering QoS and Energy Saving in the Delivery of ICT Services ..... 208

*Alessandra Pieroni, Guglielmo Marconi University of Study, Italy*

*Giuseppe Iazeolla, Guglielmo Marconi University of Study, Italy*

#### **Chapter 10**

Mathematical Modelling of the Thermal Process in the Aquatic Environment with Considering the Hydrometeorological Condition at the Reservoir-Cooler by Using Parallel Technologies ..... 227

*Alibek Issakhov, al-Farabi Kazakh National University, Kazakhstan*

<b>Chapter 11</b>	
A Novel Evolutionary Optimization Technique for Solving Optimal Reactive Power Dispatch Problems .....	244
<i>Provas Kumar Roy, Jalpaiguri Government Engineering College, India</i>	
<b>Chapter 12</b>	
Application of Adaptive Tabu Search Algorithm in Hybrid Power Filter and Shunt Active Power Filters: Application of ATS Algorithm in HPF and APF .....	276
<i>Saifullah Khalid, IEEE, India</i>	
<b>Chapter 13</b>	
Recent Techniques to Identify the Stator Fault Diagnosis in Three Phase Induction Motor .....	309
<i>K. Vinoth Kumar, Karunya Institute of Technology and Sciences University, India</i>	
<i>S. Suresh Kumar, Dr. N. G. P. Institute of Technology, India</i>	
<i>A. Immanuel Selvakumar, Karunya Institute of Technology and Sciences University, India</i>	
<i>R. Saravana Kumar, Vellore Institute of Technology University, India</i>	
<b>Chapter 14</b>	
Optimal Reactive Power Dispatch Incorporating TCSC-TCPS Devices Using Different Evolutionary Optimization Techniques .....	326
<i>Provas Kumar Roy, Jalpaiguri Government Engineering College, India</i>	
<i>Susanta Dutta, Dr. B. C. Roy Engineering College, India</i>	
<i>Debashis Nandi, National Institute of Technology, India</i>	
<b>Chapter 15</b>	
Scope of Biogeography-Based Optimization for Economic Load Dispatch and Multi-Objective Unit Commitment Problem .....	360
<i>Vikram Kumar Kamboj, I. K. Gujral Punjab Technical University, India</i>	
<i>S. K. Bath, Giani Zail Singh Campus College of Engineering &amp; Technology, Bathinda, India</i>	
<b>Chapter 16</b>	
Modern Optimization Algorithms and Applications in Solar Photovoltaic Engineering .....	390
<i>Igor Tyukhov, All-Russian Research Institute for Electrification of Agriculture (VIESH), Russia</i>	
<i>Hegazy Rezk, Minia University, Egypt</i>	
<i>Pandian Vasant, Universiti Teknologi PETRONAS, Malaysia</i>	
<b>Compilation of References</b> .....	446
<b>About the Contributors</b> .....	486
<b>Index</b> .....	492

# Chapter 10

## Mathematical Modelling of the Thermal Process in the Aquatic Environment with Considering the Hydrometeorological Condition at the Reservoir–Cooler by Using Parallel Technologies

Alibek Issakhov

*al-Farabi Kazakh National University, Kazakhstan*

### ABSTRACT

*This paper presents the mathematical model of the thermal power plant in reservoir under different hydrometeorological conditions, which is solved by three dimensional Navier - Stokes and temperature equations for an incompressible fluid in a stratified medium. A numerical method based on the projection method, which divides the problem into four stages. At the first stage it is assumed that the transfer of momentum occurs only by convection and diffusion. Intermediate velocity field is solved by fractional steps method. At the second stage, three-dimensional Poisson equation is solved by the Fourier method in combination with tridiagonal matrix method (Thomas algorithm). At the third stage it is expected that the transfer is only due to the pressure gradient. Finally stage equation for temperature solved like momentum equation with fractional step method. To increase the order of approximation compact scheme was used. Then qualitatively and quantitatively approximate the basic laws of the hydrothermal processes depending on different hydrometeorological conditions are determined.*

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