Contents – Part II

Scheduling and Planning

Hyper-heuristics for the Flexible Job Shop Scheduling Problem with Additional Constraints ................................. 3
  Jacomine Grobler and Andries P. Engelbrecht

On-Orbit Servicing Mission Planning for Multi-spacecraft Using CDPSO ........ 11
  Jianxin Zhang, Ying Zhang, and Qiang Zhang

Solving the Test Task Scheduling Problem with a Genetic Algorithm Based on the Scheme Choice Rule ......................... 19
  Jinhua Shi, Hui Lu, and Kefei Mao

Robust Dynamic Vehicle Routing Optimization with Time Windows ............ 28
  Yinan Guo, Jian Cheng, and Junhua Ji

Task Oriented Load Balancing Strategy for Service Resource Allocation in Cloud Environment ........................................ 37
  He Luo, Zhengzheng Liang, Yanqiu Niu, and Xiang Fang

Solving Flexible Job-Shop Scheduling Problem with Transfer Batches, Setup Times and Multiple Resources in Apparel Industry ..................... 47
  Miguel Ortiz, Dionicio Neira, Genett Jiménez, and Hugo Hernández

A Comparative Analysis of Genetic Algorithms and QAP Formulation for Facility Layout Problem: An Application in a Real Context ............... 59
  Fabricio Niebles, Ivan Escobar, Luis Agudelo, and Genett Jimenez

Machine Learning Methods

An Empirical Evaluation of Machine Learning Algorithms for Image Classification ............................................................... 79
  Thembinkosi Nkonyana and Bhekisipho Twala

An Improved Ensemble Extreme Learning Machine Based on ARPSO and Tournament-Selection ............................................. 89
  Ya-Qi Wu, Fei Han, and Qing-Hua Ling

An Improved LMDS Algorithm ................................................................. 97
  Taiguo Qu and Zixing Cai
Clustering Algorithm

An Improved K-means Clustering Algorithm Based on the Voronoi Diagram Method .............................................. 107
   Jiuyuan Huo and Honglei Zhang

Brain Storm Optimization with Agglomerative Hierarchical Clustering Analysis .............................................. 115
   Junfeng Chen, Jingyu Wang, Shi Cheng, and Yuhui Shi

Discovering Alias for Chemical Material with NGD .......................................................... 123
   Ching Yi Chen, Ping-Yu Hsu, Ming Shien Cheng, Jui Yi Chung, and Ming Chia Hsu

Estimate the Kinematics with EMG Signal Using Fuzzy Wavelet Neural Network for Biomechanical Leg Application .......................................................... 132
   Weiwei Yu, Yangyang Feng, Wenyu Liang, Runxiao Wang, and Kurosh Madani

A Physarum-Based General Computational Framework for Community Mining .............................................. 141
   Mingxin Liang, Xianghua Li, and Zili Zhang

Rank-Based Nondomination Set Identification with Preprocessing .......................................................... 150
   Vikas Palakonda and Rammohan Mallipeddi

Spiking Simplicial P Systems with Membrane Coefficients and Applications in Document Clustering .......................................................... 158
   Jie Xue and Xiyu Liu

Classification

Crop Classification Using Artificial Bee Colony (ABC) Algorithm .......................................................... 171
   Roberto A. Vazquez and Beatriz A. Garro

Classification of Distorted Handwritten Digits by Swarming an Affine Transform Space .......................................................... 179
   Somnuk Phon-Amnuaisuk and Soo-Young Lee

DKDD_C: A Clustering-Based Approach for Distributed Knowledge Discovery .......................................................... 187
   Marwa Bouraoui, Houssem Bezzezi, and Amel Grissa Touzi

Fuzzy Rule-Based Classifier Design with Co-operation of Biology Related Algorithms .......................................................... 198
   Shakhnaz Akhmedova, Eugene Semenkin, and Vladimir Stanovov
Identifying Protein Short Linear Motifs by Position-Specific Scoring Matrix

Chun Fang, Tamotsu Noguchi, Hayato Yamana, and Fuzhen Sun

An Intelligent Identification Model for Classifying Trembling Patterns of Parkinson’s Disease

Yo-Ping Huang and Chih-Hang Chuang

Research on Freshness Detection for Chinese Mitten Crab Based on Machine Olfaction

Peiyi Zhu, Chensheng Chen, Benlian Xu, and Mingli Lu

Image Classification and Encryption

Texture Feature Selection Using GA for Classification of Human Brain MRI Scans

M. Nouman Tajik, Atiq ur Rehman, Waleed Khan, and Baber Khan

Spiking Neural Networks Trained with Particle Swarm Optimization for Motor Imagery Classification

Ruben Carino-Escobar, Jessica Cantillo-Negrete, Roberto A. Vazquez, and Josefina Gutierrez-Martinez

Methods and Algorithms of Image Recognition for Mineral Rocks in the Mining Industry

Olga E. Baklanova and Mikhail A. Baklanov

Image Encryption Technology Based on Chaotic Hash Function and DNA Splicing Model

Guoyu Lv, Changjun Zhou, Hongye Niu, and Bin Wang

Design of a Low-Latency Multiplication Algorithm for Finite Fields

Kee-Won Kim and Seung-Hoon Kim

Data Mining

A Directional Recognition Algorithm of Semantic Relation for Literature-Based Discovery

Xiaoyong Liu, Hui Fu, and Chaoyong Jiang

Research on Pattern Representation and Reliability in Semi-Supervised Entity Relation Extraction

Feiyeue Ye and Nan Tang

Pushing Decision Points Backward to the Latest Possible Positions with a Workflow Log

Su-Tzu Hsieh, Ping-Yu Hsu, Ming Shien Cheng, and Hui-Ting Huang
A DPSO-Based Load Balancing Virtual Network Embedding Algorithm
with Particle Initialization Strategy .......................... 306
Cong Wang, Yuxuan Liu, Ying Yuan, Guorui Li, and Qiaohong Wang

Sensor Networks and Social Networks

MISTER: An Approximate Minimum Steiner Tree Based Routing
Scheme in Wireless Sensor Networks .......................... 317
Guorui Li, Ying Wang, Cong Wang, and Biao Luo

Based on PSO and Evaluation of Environment Variables ........... 324
Qingjian Ni

Efficient Routing in a Sensor Network Using Collaborative Ants ....... 333
Md. Shaifur Rahman, Mahmuda Naznin, and Toufique Ahamed

Community-Based Link Prediction in Social Networks ............ 341
Rong Kuang, Qun Liu, and Hong Yu

Comparative Statistical Analysis of Large-Scale Calling and SMS Network ... 349
Jian Li, Wenjun Wang, Pengfei Jiao, and Haodong Lyu

Neural Networks

Distributed Perception Algorithm ............................... 361
Anthony Brabazon and Wei Cui

Predicting Virtual Machine’s Power via a RBF Neural Network ........ 370
Hao Xu, Xingquan Zuo, Chuanyi Liu, and Xinchao Zhao

The Energy Saving Technology of a Photovoltaic System’s Control
on the Basis of the Fuzzy Selective Neuronet .................... 382
Ekaterina A. Engel and Igor V. Kovalev

Swarm intelligence in Management Decision Making and Operations Research

An Augmented Artificial Bee Colony with Hybrid Learning ........... 391
Guozheng Hu, Xianghua Chu, Ben Niu, Li Li, Yao Liu, and Dechang Lin

A Multiobjective Bacterial Optimization Method Based on Comprehensive
Learning Strategy for Environmental/Economic Power Dispatch .......... 400
Lijing Tan, Hong Wang, Fangfang Zhang, and Yuanyue Feng

Modified Brain Storm Optimization Algorithms Based on Topology
Structures .......................................................... 408
Li Li, F.F. Zhang, Xianghua Chu, and Ben Niu
Brain Storm Optimization for Portfolio Optimization .......................... 416
   Ben Niu, Jia Liu, Jing Liu, and Chen Yang

Comprehensive Learning PSO for Solving Environment Heterogeneous
Fixed Fleet VRP with Time Windows ................................................. 424
   X.B. Gan, L.J. Liu, J.S. Chen, and Ben Niu

Neighborhood Learning Bacterial Foraging Optimization for Solving
Multi-objective Problems ............................................................... 433
   Ben Niu, Jing Liu, Jingsong Chen, and Wenjie Yi

Robot Control

Robot Control by Computed Torque Based on Support Vector Regression . . 443
   Nacereddine Djelal, Isma Boudouane, Nadia Saadia,
   and Amar Ramdane-Cherif

Control Nonholonomic Mobile Robot with Hybrid Sliding Mode/Neuro
Fuzzy Controller ................................................................. 451
   Mohamed Nabil Houam, Nadia Saadia, Amar Ramdane-Cherif,
   and Nacereddine Djelal

Swarm Robotics

Formation Splitting and Merging ..................................................... 461
   Krishna Raghuwaiya, Jito Vanualailai, and Bibhya Sharma

A Grouping Method for Multiple Targets Search Using Swarm Robots ....... 470
   Qirong Tang, Fangchao Yu, and Lu Ding

A Comparative Study of Biology-Inspired Algorithms Applied to Swarm
Robots Target Searching ............................................................... 479
   Qirong Tang, Lei Zhang, Wei Luo, Lu Ding, Fangchao Yu,
   and Jian Zhang

Thrust Optimal Allocation for Broad Types of Underwater Vehicles ............ 491
   Hai Huang, Guo-cheng Zhang, Yi Yang, Jin-yu Xu, Ji-yong Li,
   and Lei Wan

Fuzzy Sliding-Mode Formation Control for Multiple Underactuated
Autonomous Underwater Vehicles ................................................ 503
   Hai Huang, Guo-cheng Zhang, Yue-ming Li, and Ji-yong Li

Temporarily Distributed Hierarchy in Unmanned Vehicles Swarms ............. 511
   Hong-an Yang, Luis Carlos Velasco, Ya Zhang, Ting Zhang,
   and Jingguo Wang
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-goal Motion Planning of an Autonomous Robot in Unknown Environments by an Ant Colony Optimization Approach</td>
<td>519</td>
</tr>
<tr>
<td>Chaomin Luo, Hongwei Mo, Furao Shen, and Wenbing Zhao</td>
<td></td>
</tr>
<tr>
<td>Robot Indoor Navigation Based on Computer Vision and Machine Learning</td>
<td>528</td>
</tr>
<tr>
<td>Hongwei Mo, Chaomin Luo, and Kui Liu</td>
<td></td>
</tr>
<tr>
<td>Improved Hormone-Inspired Model for Hierarchical Self-organization in Swarm Robotics</td>
<td>535</td>
</tr>
<tr>
<td>Yuquan Leng, Xiaoning Han, Wei Zhang, and Weijia Zhou</td>
<td></td>
</tr>
<tr>
<td>Triangle Formation Based Multiple Targets Search Using a Swarm of Robots</td>
<td>544</td>
</tr>
<tr>
<td>Jie Li and Ying Tan</td>
<td></td>
</tr>
<tr>
<td>A Bio-inspired Autonomous Navigation Controller for Differential Mobile Robots Based on Crowd Dynamics</td>
<td>553</td>
</tr>
<tr>
<td>Alejandro Rodriguez-Angeles, Henk Nijmeijer, and Fransis J.M. van Kuijk</td>
<td></td>
</tr>
<tr>
<td>Intelligent Energy and Communications Systems</td>
<td></td>
</tr>
<tr>
<td>Reliability Evaluation of a Zonal Shipboard Power System Based on Minimal Cut Set</td>
<td>563</td>
</tr>
<tr>
<td>Wenzeng Du, GenKe Yang, Jie Bai, Changchun Pan, and Qingsong Gong</td>
<td></td>
</tr>
<tr>
<td>Design of DS/FH Hybrid Spread Spectrum System Based on FPGA</td>
<td>573</td>
</tr>
<tr>
<td>Longjun Liu, Hongwei Ding, Qianlin Liu, Weifeng Zhang, and Zhenggang Liu</td>
<td></td>
</tr>
<tr>
<td>The Cost Performance of Hyper-Threading Technology in the Cloud Computing Systems</td>
<td>581</td>
</tr>
<tr>
<td>Xiao Zhang, Ani Li, Boyang Zhang, Wenjie Liu, Xiaonan Zhao, and Zhanhuai Li</td>
<td></td>
</tr>
<tr>
<td>Combining Query Ambiguity and Query-URL Strength for Log-Based Query Suggestion</td>
<td>590</td>
</tr>
<tr>
<td>Feiyue Ye and Jing Sun</td>
<td></td>
</tr>
<tr>
<td>Intelligent Interactive and Tutoring Systems</td>
<td></td>
</tr>
<tr>
<td>Interactive Generator of Commands</td>
<td>601</td>
</tr>
<tr>
<td>Eugene Larkin, Alexey Ivutin, Vladislav Kotov, and Alexander Privalov</td>
<td></td>
</tr>
</tbody>
</table>
A Personalized Intelligent Tutoring System of Primary Mathematics
Based on Perl ................................................. 609
Bo Song, Yue Zhuo, and Xiaomei Li

The Construction and Determination of Irreducible Polynomials
Over Finite Fields ............................................. 618
Yun Song and Zhihui Li

Author Index ..................................................... 625
## Contents – Part I

### Trend and Models of Swarm Intelligence Research

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swarm Intelligence in Architectural Design</td>
<td>3</td>
</tr>
<tr>
<td><em>Sebastian Wiesenhuetter, Andreas Wilde, and Joerg Rainer Noennig</em></td>
<td></td>
</tr>
<tr>
<td>Shaping Influence and Influencing Shaping: A Computational Red Teaming Trust-Based Swarm Intelligence Model.</td>
<td>14</td>
</tr>
<tr>
<td><em>Jiangjun Tang, Eleni Petraki, and Hussein Abbass</em></td>
<td></td>
</tr>
<tr>
<td>Research Hotspots and Trends in Swarm Intelligence: From 2000 to 2015</td>
<td>24</td>
</tr>
<tr>
<td><em>Zili Li, Li Zeng, Hua Zhong, and Jinhong Wu</em></td>
<td></td>
</tr>
</tbody>
</table>

### Novel Swarm-Based Optimization Algorithms

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duelist Algorithm: An Algorithm Inspired by How Duelist Improve Their Capabilities in a Duel</td>
<td>39</td>
</tr>
<tr>
<td><em>Totok Ruki Biyanto, Henokh Yernias Fibrianto, Gunawan Nugroho, Agus Muhamad Hatta, Erny Listijorini, Titik Budiati, and Hairul Huda</em></td>
<td></td>
</tr>
<tr>
<td>Framework for Robust Optimization Combining Surrogate Model, Memetic Algorithm, and Uncertainty Quantification</td>
<td>48</td>
</tr>
<tr>
<td><em>Pramudita Satria Palar, Yohanes Bimo Dwianto, Lavi Rizki Zuhal, and Takeshi Tsuchiya</em></td>
<td></td>
</tr>
<tr>
<td>Autonomous Search in Constraint Satisfaction via Black Hole: A Performance Evaluation Using Different Choice Functions</td>
<td>56</td>
</tr>
<tr>
<td><em>Ricardo Soto, Broderick Crawford, Rodrigo Olivares, Stefanie Niklander, and Eduardo Olguín</em></td>
<td></td>
</tr>
<tr>
<td>Scatter Search for Homology Modeling</td>
<td>66</td>
</tr>
<tr>
<td><em>Mouses Stamboulian and Nashat Mansour</em></td>
<td></td>
</tr>
<tr>
<td>Cuckoo Search Algorithm Inspired by Artificial Bee Colony and Its Application</td>
<td>74</td>
</tr>
<tr>
<td><em>Yin Gao, Xiujuan Lei, and Cai Dai</em></td>
<td></td>
</tr>
<tr>
<td>An Ideal Fine-Grained GAC Algorithm for Table Constraints</td>
<td>86</td>
</tr>
<tr>
<td><em>Limeng Qiao, Zhenhui Xu, Jin Dong, Yuan Shao, Xin Tong, and Zhanshan Li</em></td>
<td></td>
</tr>
<tr>
<td>Particle Filter Optimization: A Brief Introduction</td>
<td>95</td>
</tr>
<tr>
<td><em>Bin Liu, Shi Cheng, and Yuhui Shi</em></td>
<td></td>
</tr>
</tbody>
</table>
Swarming Behaviour

Quantifying Swarming Behaviour .................................................. 119
John Harvey, Kathryn Merrick, and Hussein Abbass

A Simulation Study on Collective Motion of Fish Schools .................. 131
Fatih Cemal Can and Hayrettin Şen

Swarmscape: A Synergistic Approach Combining Swarm Simulations,
Body Movement and Volumetric Projections to Generate Immersive
Interactive Environments ................................................................. 142
Nimish Biloria and Jia-Rey Chang

Fundamental Diagrams of Single-File Pedestrian Flow for Different
Age Groups ....................................................................................... 154
Shuchao Cao, Jun Zhang, Daniel Salden, and Jian Ma

Some Swarm Intelligence Algorithms and Their Applications

A Discrete Monarch Butterfly Optimization for Chinese TSP Problem ...... 165
Gai-Ge Wang, Guo-Sheng Hao, Shi Cheng, and Quande Qin

Truss Structure Optimization Using Co-variance Based Artificial Bee
Colony Algorithm ............................................................................. 174
Shashank Gupta, Divya Kumar, and K.K. Mishra

Solving Manufacturing Cell Design Problems by Using a Bat
Algorithm Approach ......................................................................... 184
Ricardo Soto, Broderick Crawford, Andrés Alarcón, Carolina Zec,
Emanuel Vega, Victor Reyes, Ignacio Araya, and Eduardo Olguín

Mammographic Mass Classification Using Functional Link Neural
Network with Modified Bee Firefly Algorithm .................................. 192
Yana Mazwin Mohmad Hassim and Rozaida Ghazali

Detecting Firefly Algorithm for Numerical Optimization .................. 200
Yuchen Zhang, Xiujuan Lei, and Ying Tan

Dragonfly Algorithm Based Global Maximum Power Point Tracker
for Photovoltaic Systems ................................................................. 211
Gururaghav Raman, Gurupraamesh Raman, Chakkarapani Manickam,
and Saravana Ilango Ganesan
Traffic Aware Based Tail Optimization of Browsing Applications for Energy Saving

Chao Wang and Wenneng Ma

Linear ODE Coefficients and Initial Condition Estimation with Co-operation of Biology Related Algorithms

Ivan Ryzhikov, Eugene Semenkin, and Shakhnaz Akhmedova

On the Constraint Normalization: An Empirical Study

Chengyong Si, Jianqiang Shen, Xuan Zou, Lei Wang, and Qidi Wu

Logic Gates Designed with Domain Label Based on DNA Strand Displacement

Qianhao Yang, Changjun Zhou, and Qiang Zhang

**Hybrid Search Optimization**

Missing Data Estimation in High-Dimensional Datasets: A Swarm Intelligence-Deep Neural Network Approach

Collins Leke and Tshilidzi Marwala

A Hybrid Search Optimization Technique Based on Evolutionary Learning in Plants

Deblina Bhattacharjee and Anand Paul

Development of Hybrid Memetic Algorithm and General Regression Neural Network for Generating Iterated Function System Fractals in Jewelry Design Applications

Somlak Wannarumon Kielarova

**Particle Swarm Optimization**

Heterogeneous Vector-Evaluated Particle Swarm Optimisation in Static Environments

Dieter Doman, Mardé Helbig, and Andries Engelbrecht

Heterogeneous Bare-Bones Particle Swarm Optimization for Dynamic Environments

Yuanxia Shen, Jian Chen, Chuanhua Zeng, and Linna Wei

A New Particle Acceleration-Based Particle Swarm Optimization Algorithm

Shailesh Tiwari, K.K. Mishra, Nitin Singh, and N.R. Rawal

Dense Orthogonal Initialization for Deterministic PSO: ORTHOinit+

Matteo Diez, Andrea Serani, Cecilia Leotardi, Emilio Fortunato Campana, Giovanni Fasano, and Riccardo Gusso
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Improved Particle Swarm Optimization Algorithm Based on Immune System</td>
<td>331</td>
</tr>
<tr>
<td><em>Xiao Zhang, Hong Fan, Huiyu Li, and Xiaohu Dang</em></td>
<td></td>
</tr>
<tr>
<td>The Impact of Population Structure on Particle Swarm Optimization: A Network Science Perspective</td>
<td>341</td>
</tr>
<tr>
<td><em>Wen-Bo Du, Wen Ying, and Gang Yan</em></td>
<td></td>
</tr>
<tr>
<td>Headless Chicken Particle Swarm Optimization Algorithms</td>
<td>350</td>
</tr>
<tr>
<td><em>Jacomine Grobler and Andries P. Engelbrecht</em></td>
<td></td>
</tr>
<tr>
<td>On the Hybridization of Particle Swarm Optimization Technique for Continuous Optimization Problems</td>
<td>358</td>
</tr>
<tr>
<td><em>Akugbe Martins Arasomwan and Aderemi Oluyinka Adewumi</em></td>
<td></td>
</tr>
</tbody>
</table>

**PSO Applications**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Analysis of Competitive Coevolutionary Particle Swarm Optimizers to Train Neural Network Game Tree Evaluation Functions</td>
<td>369</td>
</tr>
<tr>
<td><em>Albert Volschenk and Andries Engelbrecht</em></td>
<td></td>
</tr>
<tr>
<td>Particle Swarm Optimization for Calculating Pressure on Water Distribution Systems</td>
<td>381</td>
</tr>
<tr>
<td><em>Lala Septem Riza, Azhari Fathurachman Azmi, Waslaluddin, Eka Fitrajaya Rahman, and Kuntjoro Adji Sidarto</em></td>
<td></td>
</tr>
<tr>
<td>Content-Based Image Retrieval Based on Quantum-Behaved Particle Swarm Optimization Algorithm</td>
<td>392</td>
</tr>
<tr>
<td><em>Wei Fang and Xiaobin Liu</em></td>
<td></td>
</tr>
<tr>
<td>An Approach Using Particle Swarm Optimization and Rational Kernel for Variable Length Data Sequence Optimization</td>
<td>401</td>
</tr>
<tr>
<td><em>Saritha Raveendran and S.S. Vinodchandra</em></td>
<td></td>
</tr>
</tbody>
</table>

**Ant Colony Optimization**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Comparative Approach of Ant Colony System and Mathematical Programming for Task Scheduling in a Mineral Analysis Laboratory</td>
<td>413</td>
</tr>
<tr>
<td><em>Fabricio Niebles Atencio, Alexander Bustacara Prasca, Dionicio Neira Rodado, Daniel Mendoza Casseres, and Miguel Rojas Santiago</em></td>
<td></td>
</tr>
<tr>
<td>Understanding the Information Flow of ACO-Accelerated Gossip Algorithms</td>
<td>426</td>
</tr>
<tr>
<td><em>Andreas Janecek and Wilfried N. Ganster</em></td>
<td></td>
</tr>
</tbody>
</table>
Ant Colony Optimization with Neighborhood Search for Dynamic TSP . . . . . 434
  Yirui Wang, Zhe Xu, Jian Sun, Fang Han, Yuki Todo, and Shangce Gao

A Self-Adaptive Control Strategy of Population Size for Ant Colony
  Optimization Algorithms . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 443
  Yuxin Liu, Jindan Liu, Xianghua Li, and Zili Zhang

MPPT of a Partially Shaded Photovoltaic Module by Ant Lion Optimizer . . 451
  Ekaterina A. Engel and Igor V. Kovalev

A Hybrid ACO-ACM Based Approach for Multi-cell Image Segmentation . . 458
  Dongmei Jiang, Qinglan Chen, Benlian Xu, and Mingli Lu

Brain Storm Optimization

Brain Storm Optimization in Objective Space Algorithm for Multimodal
  Optimization Problems . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 469
  Shi Cheng, Quande Qin, Junfeng Chen, Gai-Ge Wang, and Yuhui Shi

Multi-objective Brain Storm Optimization Based on Estimating in Knee
  Region and Clustering in Objective-Space . . . . . . . . . . . . . . . . . . . . . . . . . . 479
  Yali Wu, Lixia Xie, and Qing Liu

Optimal Impulsive Thrust Trajectories for Satellite Formation via Improved
  Brainstorm Optimization . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 491
  Olukunle Kolawole Soyinka and Haibin Duan

Parameter Estimation of Vertical Two-Layer Soil Model via Brain Storm
  Optimization Algorithm . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 500
  Tiew On Ting and Yuhui Shi

Fireworks Algorithms

Chaotic Adaptive Fireworks Algorithm . . . . . . . . . . . . . . . . . . . . . . . . . . . . 515
  Chibing Gong

Support Vector Machine Parameters Optimization by Enhanced
  Fireworks Algorithm . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 526
  Eva Tuba, Milan Tuba, and Marko Beko

A Modified Fireworks Algorithm for the Multi-resource Range
  Scheduling Problem . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 535
  Zhenbao Liu, Zuren Feng, and Liangjun Ke

Discrete Fireworks Algorithm for Aircraft Mission Planning . . . . . . . . . . . 544
  Jun-Jie Xue, Ying Wang, Hao Li, and Ji-yang Xiao
**Multi-Objective Optimization**

Multi-objective Reconfiguration of Power Distribution System Using an ILS Approach

*Abdelkader Dekdouk, Hiba Yahyaoui, Saoussen Krichen, and Abderezak Touzene*

Cooperative Co-evolutionary Algorithm for Dynamic Multi-objective Optimization Based on Environmental Variable Grouping

*Biao Xu, Yong Zhang, Dunwei Gong, and Miao Rong*

Novel Local Particle Swarm Optimizer for Multi-modal Optimization

*Yuechao Jiao, Lei Yang, Boyang Qu, Dingming Liu, J.J. Liang, and Junming Xiao*

Interval Cost Feature Selection Using Multi-objective PSO and Linear Interval Programming

*Yong Zhang, Dunwei Gong, Miao Rong, and Yinan Guo*

Hybrid Differential Evolution-Variable Neighborhood Search to Solve Multi-objective Hybrid Flowshop Scheduling with Job-Sequence Dependent Setup Time

*Budi Santosa and Ong Andre Wahyu Riyanto*

Objective Space Partitioning with a Novel Conflict Information Measure for Many-Objective Optimization

*Naili Luo, Jianping Luo, and Xia Li*

Adaptive Multi-level Thresholding Segmentation Based on Multi-objective Evolutionary Algorithm

*Yue Zheng, Feng Zhao, Hanqiang Liu, and Jun Wang*

**Large-Scale Global Optimization**

Large-Scale Global Optimization Using a Binary Genetic Algorithm with EDA-Based Decomposition

*Evgenii Sopov*

Grouping Particle Swarm Optimizer with \( P_{best} \)'s Guidance for Large Scale Optimization

*Weian Guo, Ming Chen, Lei Wang, and Qidi Wu*

**Biometrics**

Achievement of a Multi DOF Myoelectric Interface for Hand Prosthesis

*Sofiane Ibrahim Benchabane, Nadia Saadia, and Amar Ramdane-Cherif*
Suspicious Face Detection Based on Key Frame Recognition
Under Surveillance Video .................................................. 645
   Xiaohui Zheng, Yi Ning, Xianjun Chen, and Yongsong Zhan

Author Index ................................................................. 653