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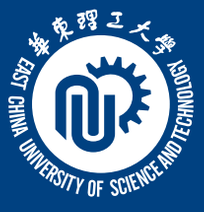

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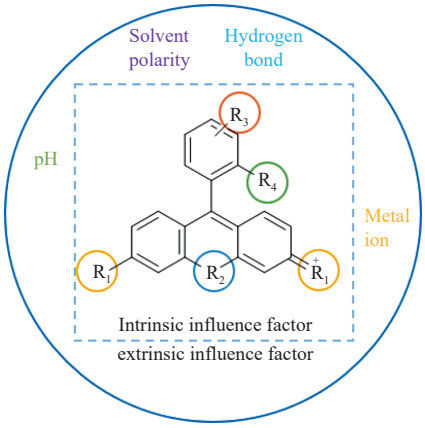
Reviews

Progress on Si-Rhodamine Fluorescent Probes

YAO Yongkang, TANG Junma, YANG Qin, FU Yang, PENG Yiyuan, GUO Zhiqian

Journal of East China University of Science and Technology, 2019, 45(6): 845-852.

Upon replacing the oxygen bridge atom by silicon, the resulting Si-rhodamines have been developed as novel near-infrared (NIR) fluorescent cores with remaining the key advantages of conventional rhodamine chromophore, and also generating the bathochromic shift in their emission wavelengths to NIR region. Based on the essential properties of Si-rhodamine, this paper mainly focuses on the principle of the red shift in the emission wavelength, the regulation of fluorescence wavelength and fluorescence quantum yield, and the design mechanism and application of Si-rhodamine fluorescent probes.



Papers

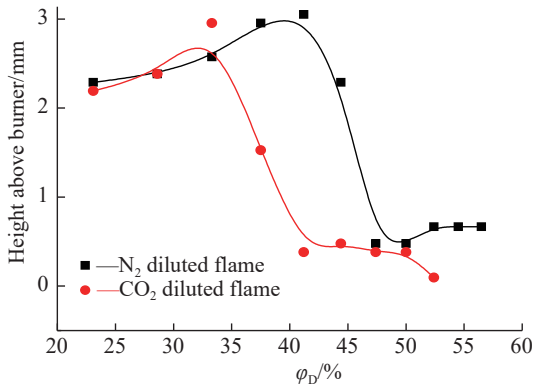
· Chemical Engineering ·

Effects of N_2/CO_2 on the Reaction Zone and Structure Characteristics of the CH_4/O_2 Diffusion Flame

YANG Jiabao, HE Lei, ZHU Huiwen, GUO Qinghua, GONG Yan, YU Guangsuo

Journal of East China University of Science and Technology, 2019, 45(5): 853-859.

With the increase of diluent content, the peak position of OH* shifted toward flame downstream followed by a sudden shift towards the region near the outlet of the nozzle and finally leveled off at a constant. The increase of the diluent content in the oxidant led to the change of dominant reaction for the formation of OH*, resulting in a displacement of the flame core reaction zone.



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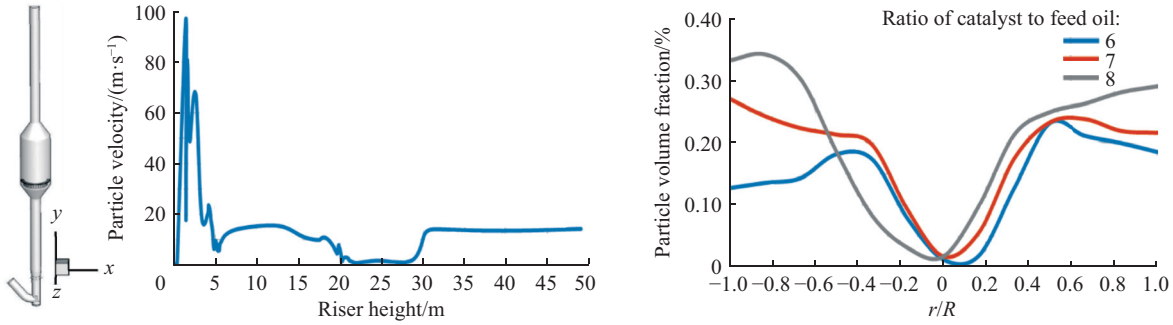
Numerical Simulation of the Gas-Solid Two-Phase Flow Characteristics in the Industrial Grade MIP Riser Reactor

YU Miao, QIAN Feng, HU Guihua, LONG Jian, LI Tianyue

Journal of East China University of Science and Technology, 2019, 45(5): 860-867.



The industrial maximizing *iso*-paraffins (MIP) riser reactor is taken as an example to carry out the three-dimensional cold simulation of the flow behavior of gas-solid two-phase flow in reactor via Eulerian-Eulerian two-fluid model. The effect of the ratio of catalyst to feed oil on the flow characteristics is investigated.

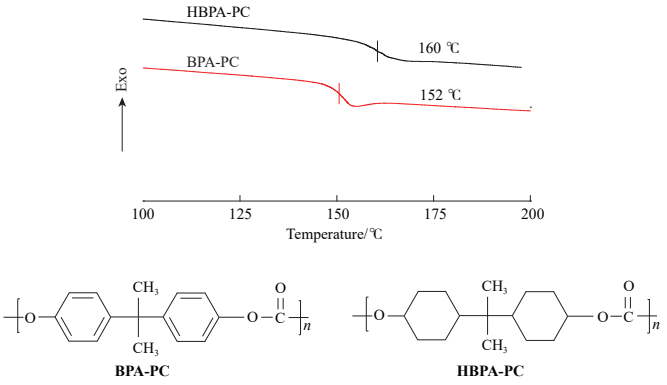
· Materials Science and Engineering ·

Synthesis of Hydrogenated Bisphenol A Polycarbonate via Melt Transesterification

LU Wenfang, ZHANG Ming, WU Guozhang

Journal of East China University of Science and Technology, 2019, 45(5): 868-872.

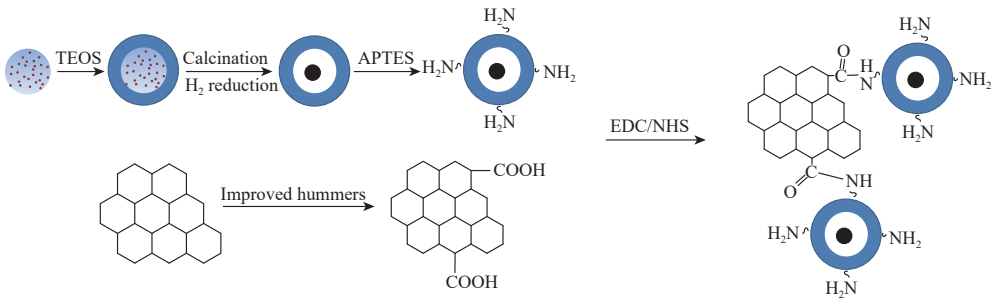
Hydrogenated bisphenol A (HBPA) instead of BPA was used to synthesize HBPA polycarbonate (HBPA-PC) by performing a melt transesterification reaction with diphenyl carbonate (DPC). The main chain of HBPA-PC is composed of cyclohexanes, showing that T_g of HBPA-PC is higher than that of S3000 which belongs to BPA-PC.



Preparation and Drug Delivery of Graphene Oxide Decorated Hollow Magnetic Nanoparticles

YIN Hongxia, YANG Yuxiang, HUANG Yan, ZHAO Yi, NI Chaoying

Journal of East China University of Science and Technology, 2019, 45(5): 873-882.



Hollow magnetic nanoparticles were prepared by dual templates method and etching. Aiming at increasing surface area and improving the drug loading, graphene oxide was grafted onto the hollow magnetic nanoparticles to form composite nanoparticles by the use of crosslinking reagent.

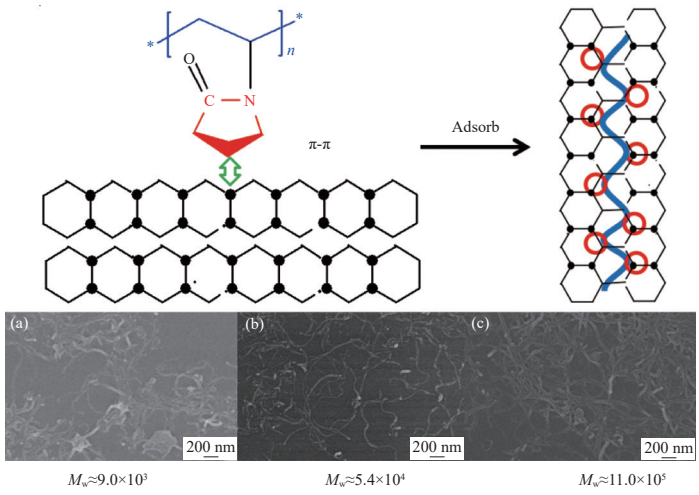
万方数据

Influence of Polyvinylpyrrolidone with Different Molecular Weights on the Dispersion of Multiwalled Carbon Nanotubes

SHANG Xu, JING Xiwei, XU Jian, ZHENG Baicun, GONG Weiguang

Journal of East China University of Science and Technology, 2019, 45(5): 883-890.

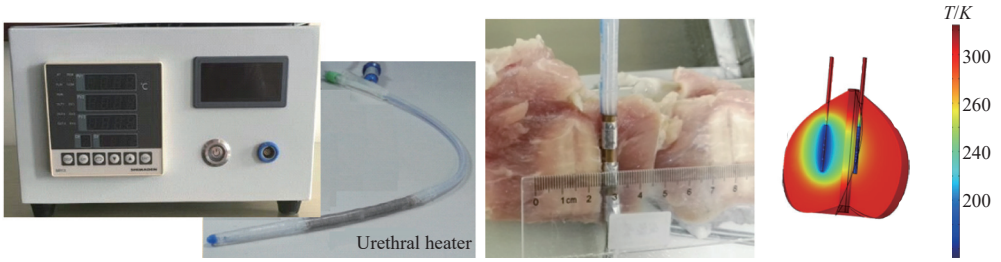
The molecular weight of PVP influenced the interactions between PVP and MWCNTs. The PVP with medium molecular weights showed stronger π-π interaction and had more adsorption amount, thereby leading to better dispersibility of the MWCNTs.



Apparatus for Electrical Urethral Heater Used in Prostate Cryoablation

ZHAO Hongli, QIAN Bin, XU Binkai, LAN Minbo

Journal of East China University of Science and Technology, 2019, 45(5): 891-898.



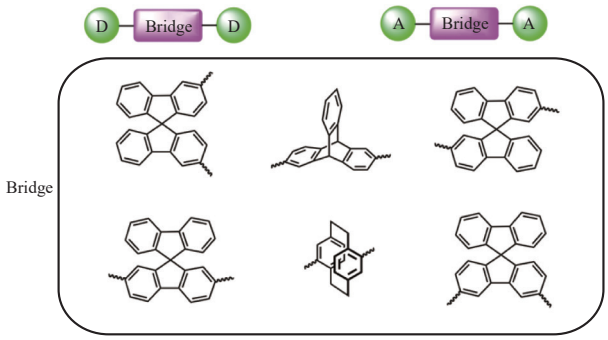
An effective temperature-controlled electrical urethral system was constructed. The precise 3D prostate models were established and combined with following experiments *in vitro* to verify its feasibility and controllability. This design facilitates the intelligent, rational and accurate control over temperature around the urethra in prostate cryoablation, reducing the negative impacts led by extra energy on the ablation area.

Influences of Intramolecular Weak Interactions on Conjugation

ZHANG Rong, ZHOU Ying, YAN Qifan

Journal of East China University of Science and Technology, 2019, 45(5): 899-909.

To explore the influences of intramolecular weak interactions on conjugation, we have designed and synthesized a series of compounds containing homo-conjugation, cross-conjugation, π-π stacking and direct conjugation. The compounds are synthesized by Buchwald-Harting/Suzuki coupling reactions. Due to the intramolecular weak interactions, conjugation is effectively affected.



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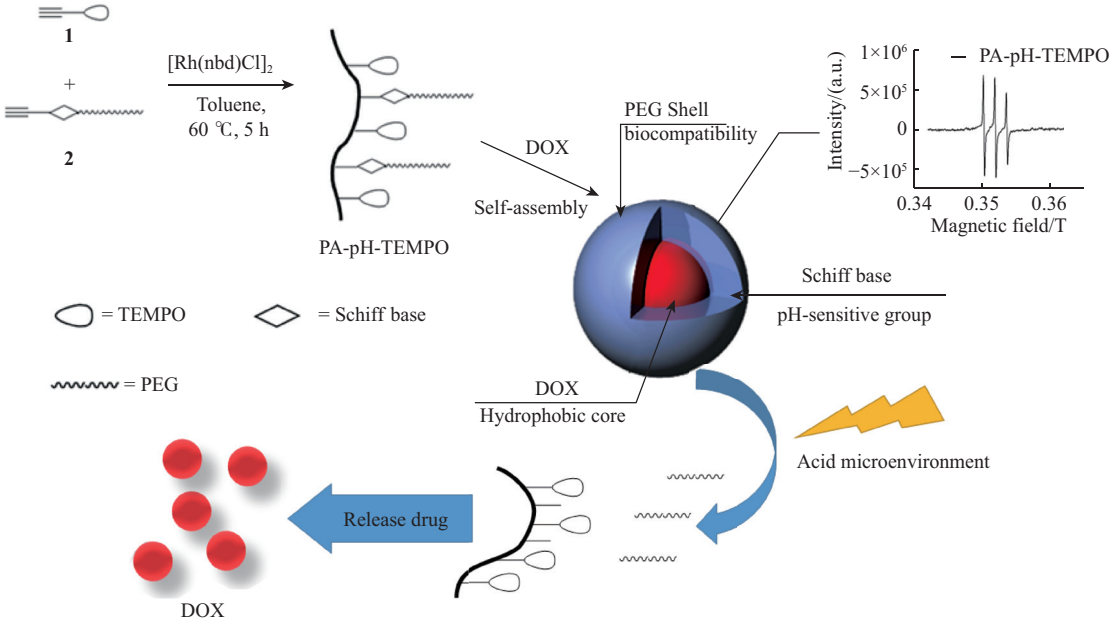
EPR-Detectable and pH-Responsive Drug-Loaded Micelles: Preparation and *in Vitro* Evaluation

WANG Zhaodong, SHI Lulu, ZHAO Hongli, HONG Yayun, ZHOU Lifang, LAN Minbo

Journal of East China University of Science and Technology, 2019, 45(5): 910-917.



pH-responsive drug-loaded micelles (DOX@PA-pH-TEMPO) modified by 2,2,6,6-tetramethylpiperidine-1-oxyl (TEMPO) were successfully prepared via polymerization of acetylene using Schiff's base as acid responsive group. The micelles showed a good pH-responsive ability and could be used for electron paramagnetic resonance (EPR) detection *in vitro*.

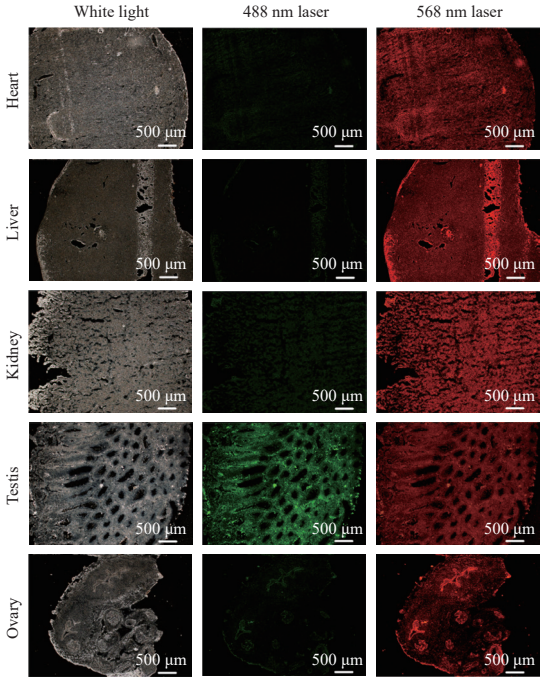
· Bioengineering ·

A Testis-Specific Expression of Cre Recombinase in Transgenic Mice Testis by *Kap*147/Kpn Hybrid Promoter

LIU Fei, MENG Jun, FAN Liqiang

Journal of East China University of Science and Technology, 2019, 45(5): 919-927.

The transgenic mice of Cre recombinase guided by the heterozygous promoter *Kap*147/Kpn were constructed. The gene expression of Cre recombinase in Cre-F0-2 transgenic mice was strictly limited in testis and regulated by androgen. The successful loxP-dependent DNA recombination in testis was confirmed by crossing *Cre* transgenic mice with double fluorescent reporter mice.

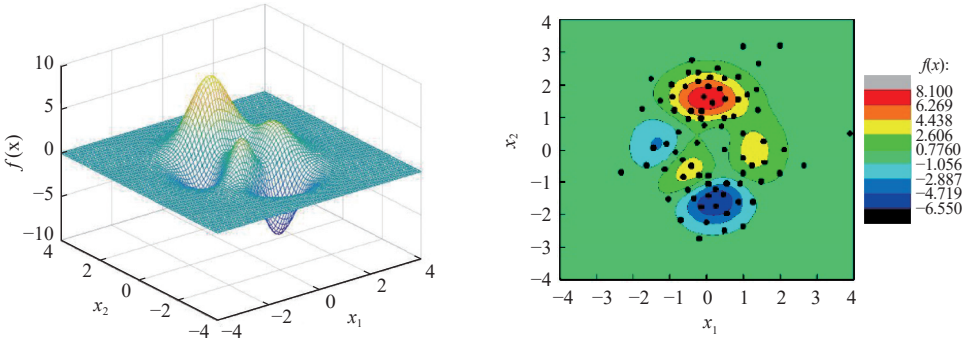


万方数据

Surrogate Model of Catalytic Reforming Process Based on a New Adaptive Sampling Algorithm

ZHANG Jianchao, DU Wenli, QIN Shui

Journal of East China University of Science and Technology, 2019, 45(5): 928-937.



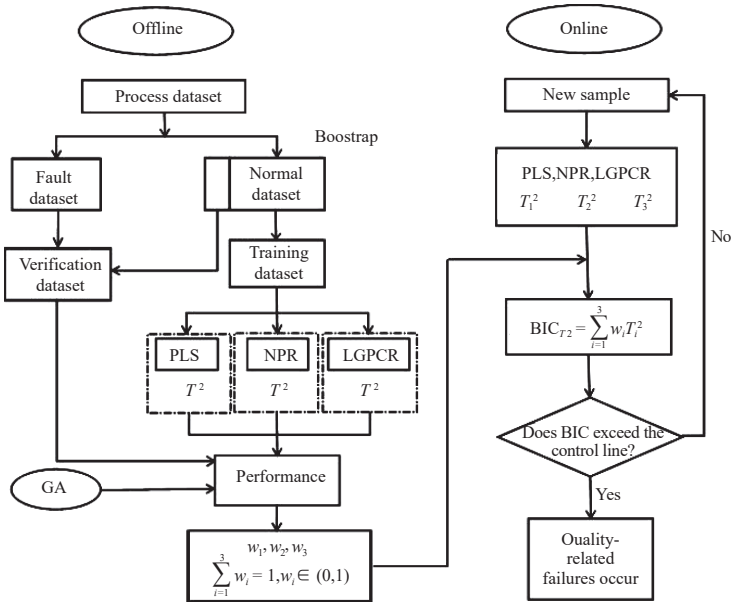
Sampling strategy has direct impact on the speed and accuracy of surrogate model. This paper proposes an effective method to generate a series of sampling points in the region that contains local extreme points. By using the effective sampling method, the corresponding surrogate model is established through the sampling points and its real response value.

Integrated Quality Monitoring Method Based on Multiple Data Structure

XUE Min, YANG Jian, TAN Shuai, SHI Hongbo

Journal of East China University of Science and Technology, 2019, 45(5): 938-945.

In order to avoid the lack of information, an integrated quality monitoring framework that combines multiple data structure features is proposed. Meanwhile, a new monitoring index is introduced to obtain the optimal integration weight via the optimization algorithm.

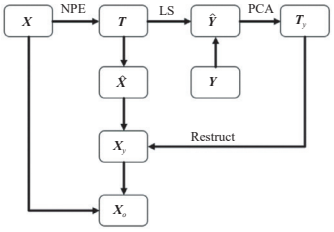


Dynamic Process Quality Monitoring Based on T-TSNPR

LYU Zheng, YANG Jian, SHI Hongbo, TAN Shuai

Journal of East China University of Science and Technology, 2019, 45(5): 945-953.

A novel total time series neighborhood preserving regression (T-TSNPR) modeling approach for quality monitoring in dynamic processes is reported. T-TSNPR can deal with the correlation between variables and dynamic characteristics in processes and extract the quality-related information through total projection regression.

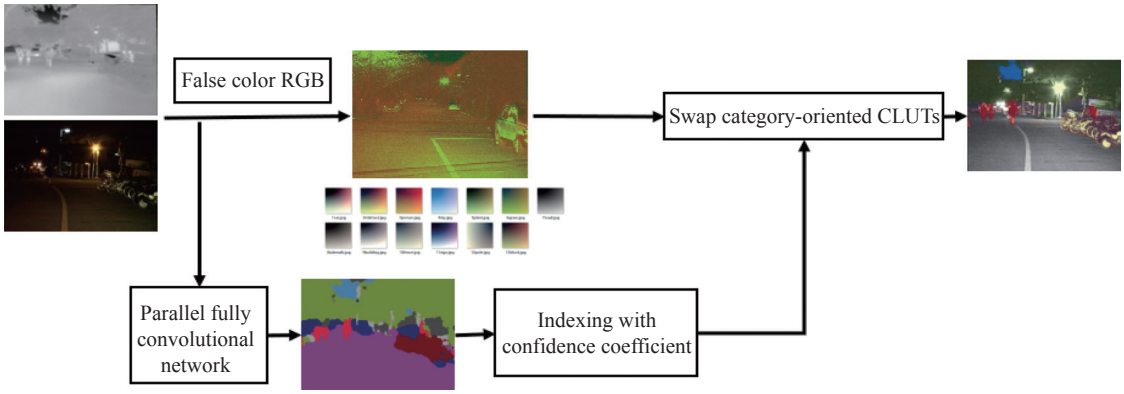


万方数据

Night-Vision Colorization Based on Category-Oriented Color Lookup Tables

ZHANG Weiwen, GU Xiaojing, GU Xingsheng

Journal of East China University of Science and Technology, 2019, 45(5): 954-961.



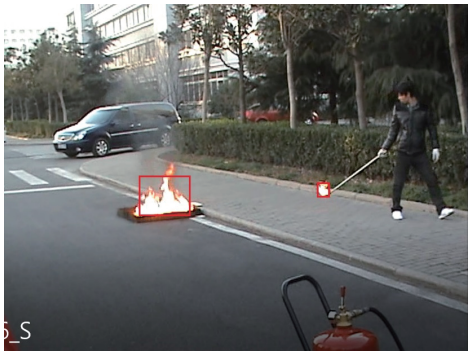
A night-vision colorization method of category-oriented color lookup tables is proposed. The semantic segmentation and color lookup tables are combined to deal with the night-time images of dual bands. The completed structure and experiment results verify the significant improvements.

Multi-information Fusion Flame Detection Based on Ohta Color Space

LIU Jiali, YE Jiongyao

Journal of East China University of Science and Technology, 2019, 45(5): 962-969.

It is shown that the Ohta color space, the Otsu threshold segmentation, and the proposed algorithm combined with the saturation can accurately detect the flame region. Compared with RGB and HSI color segmentation methods, the proposed method can eliminate objects resembling flames, attain high accuracy and robustness, and prevent fires from occurring in time.

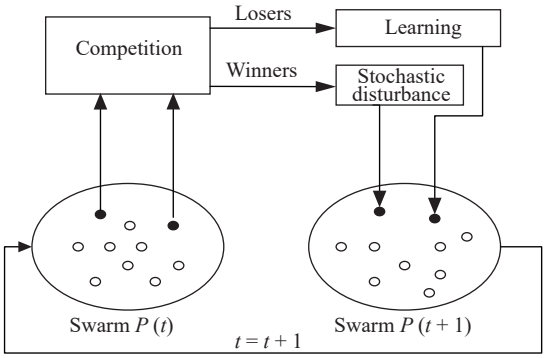


Differential Evolution Algorithm with Competition Mechanism for Simultaneous Synthesis of Heat Exchanger Network without Split Streams

CHEN Peng, LUO Na

Journal of East China University of Science and Technology, 2019, 45(5): 970-979.

In order to obtain the optimal design of heat exchanger network synthesis, this paper proposes a differential evolution algorithm with competition mechanism by using competition mechanism to divide the evolutionary population into two groups. And then, the two groups are competed and evolved by different strategies. It is shown via case study that the proposed algorithm can obtain the solution with lower total annual cost efficiently for medium scale heat exchanger network.



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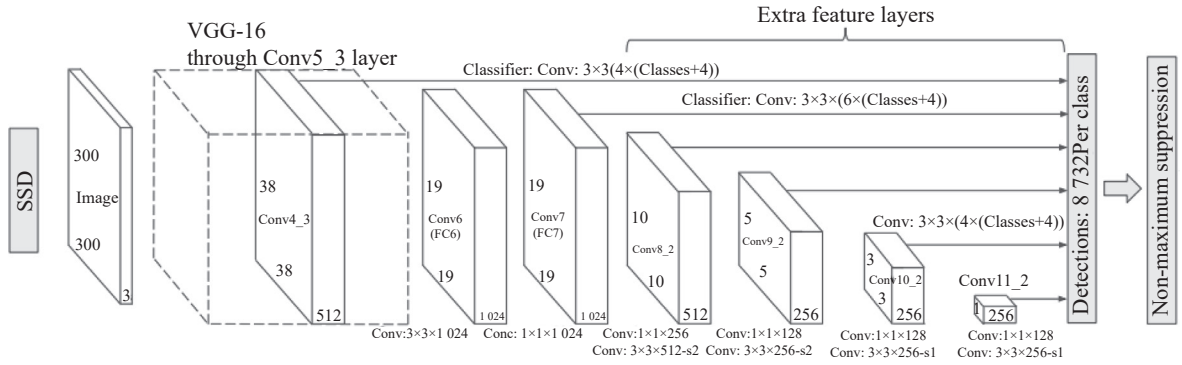
Deep Learning Based Key Object Detection and Extraction for Driving Scene

ZHANG Xueqin, WEI Yifan

Journal of East China University of Science and Technology, 2019, 45(5): 980-988.



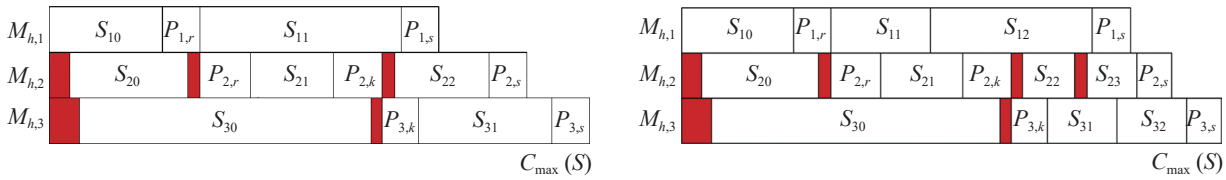
An improved algorithm based on single shot multi-box detector (SSD) with aspect ratio selection strategy (SSD_ARS) is proposed in this work for object detection in driving scene. Momentum optimization is used in the gradient descent algorithm and learning rate reduction strategy is optimized. Aspect ratio selection strategy can be effectively improved when generating the priori box.

· Mathematics ·

An Approximation Algorithm for the Parallel Three-Stage Flowshop Scheduling

CAO Yilin, YU Wei

Journal of East China University of Science and Technology, 2019, 45(5): 989-994.

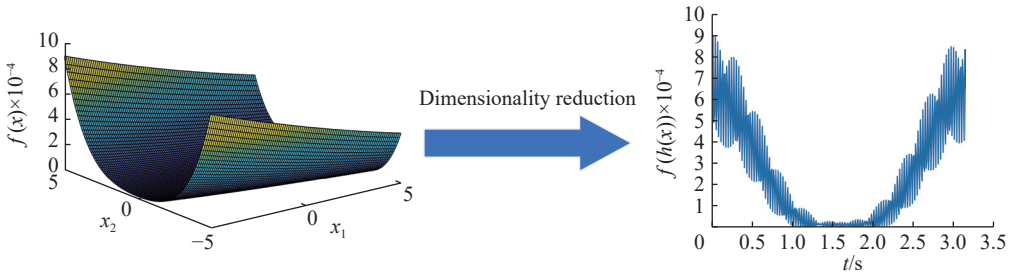


We classified the artifacts into two categories, where the artifacts can be sorted in a variety of ways, and we presented a more general sort as shown in the figure, making the problem more representative.

Approximate Solution of Global Optimization Problem Based on Dimensionality Reduction

CHEN Dandan, WANG Wei, XU Yifan

Journal of East China University of Science and Technology, 2019, 45(5): 995-1000.



The dimensionality reduction was used to transform a multi-variable objective function into a one-variable function. A global optimization approximation algorithm based on dimensionality reduction method was proposed for the nonlinear global optimization problem with box constraints. The theoretical characteristics of the approximate algorithm were investigated.

万方数据