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Guest editorial

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Guest editorial

1. Introduction

Researchers are in the pursuit of emerging technologies that enable control systems to meet the evolving requirements (e.g. factory automation, fault diagnosis, fuel consumption monitoring, surveillance, etc.) in industries. With the rapid development of control technology, great progresses have been made in many areas of the control discipline such as new control theory, new controllers, actuators, sensors, new applications and new industrial processes. Accordingly, it is urgent for us to analyse and control industrial systems from a variety of perspectives including, but are not limited to, intelligent control system based on information technology, optimization technology based on the concept of energy saving and emission control, fault diagnosis and reliable control for complex systems, and cyber-physical security in industrial control systems etc.

Due to the ever-increasing complexities and requirements of industrial control systems, many new problems and challenges appear in practical engineering. Thanks to the development of information sciences, these problems can be well dealt with, and this special issue aims to bring together the latest approaches to solve these problems in industrial control systems in a quantitative way. Topics include, but are not limited to, intelligent control, multi-agent systems and distributed control, fault diagnosis and reliable control, green energy technology and control in energy and environment, networked control systems, optimal and coordinated control of systems in many fields of modern industry such as: (1) petroleum industry; (2) power industry; (3) robot industry; (4) mechanical industry; and (5) other fields of industry. We have solicited submissions to this special issue from petroleum engineers, electrical engineers, control engineers, mathematicians, and computer scientists. After a rigorous peer review process, 42 papers have been selected that provide overviews, solutions, or early promises, to manage, analyse, and interpret the new problems in industrial control systems.

2. The special issue papers

2.1. On petroleum industry

The petroleum industry is vital to the manufacture of a wide variety of products and materials which affect the

lives of billions of people. In recent years, some new methods have been proposed in different fields of the petroleum industry, such as oil exploration, drilling engineering, oil recovery engineering, etc.

In the paper entitled ‘A Time-Varying Wavelet Phase Extraction Method Using the Wavelet Amplitude Spectra’ by P. Zhang et al., a new time-varying wavelet phase extraction method is proposed by using the wavelet amplitude information. The propagation and attenuation law of seismic wavelets is analysed, and the relationship between the amplitude and phase spectra of time-varying wavelets is obtained by deriving the wave equation for a viscoelastic medium. Moreover, the wavelet amplitude spectra and initial phase spectrum are estimated based on time–frequency spectral modelling and higher-order cumulants, respectively, so that the phase spectra of time-varying wavelets are estimated by applying the obtained relationship.

In the area of water injection, pulse telemetry is a new and effective communication method which is critical for the intelligent oilfield, and a new adaptive generalized cross-correlation algorithm is proposed to identify pulses in the work entitled ‘Research on Pulse Signal Identification Algorithms Based on Adaptive Filter and Adaptive Generalized Cross-Correlation’ by Y. Yang et al. By using a new weighted function in this algorithm, the interferences and noises in the frequency domain are restrained, and the pulse signal can be identified more easily. In order to reduce the cost and increase the profit of sucker-rod pumping wells, a novel working condition recognition method is proposed based on Hessian-regularized weighted multi-view canonical correlation analysis in the paper entitled ‘Hessian-Regularized Weighted Multi-View Canonical Correlation Analysis for Working Condition Recognition of Sucker-Rod Pumping Wells’ by B. Zhou et al. Moreover, this method is applied to the recognition of eleven kinds of working conditions from sixty sucker-rod pumping wells in a certain block in Shengli Oilfield, China.

In the work entitled ‘Condition Monitoring and Fault Diagnosis of Electric Submersible Pump Based on Well-head Electrical Parameters and Production Parameters’ by L. Li et al., the algorithms are designed for the fault diagnosis of the electric submersible pump by combining the electric parameters in the electric cabinet with the

production parameters. The problem of iterative learning fault-tolerant control for networked batch processes, which contains possible event-triggered transmission strategy and packet dropouts in network transmission, is studied in 'Iterative Learning Fault-Tolerant Control for Networked Batch Processes with Event-Triggered Transmission Strategy and Data Dropouts' by J. Tang and L. Sheng. By means of the base-scale entropy and root mean square energy analysis methods, a simple and quick strategy is presented to extract the features of the gas-liquid two-phase flow and to characterize the different flow patterns in 'Base-scale entropy and energy analysis of flow characteristics of two-phase flow' by C. Fan et al.

2.2. On power industry

Recently, with the development of intelligent technology of power grid, more and more attention has been paid to the monitoring and control on system state in power industry, such as smart grid scheduling and control, microgrid fault diagnosis, photovoltaic generation control, etc.

In the paper entitled 'Set-membership Filtering for Generator Dynamic State Estimation with Delayed Measurements' by C. Cheng et al., the set-membership filtering problem is investigated for the dynamic state estimation of the synchronous generator with delayed measurements. The set-membership filter is capable of confining the state estimate to a certain ellipsoidal region, and the ellipsoidal set including all possible states is obtained by convex optimization approach solving a recursive linear matrix inequality (RLMI). A Newton method based on particle swarm optimization is proposed to control the multi-peak maximum power point is presented in 'A New Maximum Power Point Control Algorithm of Photovoltaic Generation System' by X. Sun et al. The algorithm first optimizes the inertia weight of the particle swarm algorithm, utilizes the optimized particle swarm algorithm to search for the multi-peak maximum power point, and the Newton method is adopted to solve the maximum value to achieve multi-peak maximum power point. In the paper entitled 'A Novel Control Strategy of Virtual Synchronous Generator in Island Micro-Grids' by Y. Yu et al., a hybrid control method is proposed to optimize the frequency curve of the system and enhance the stability of the system. By exploiting this method, the decay rate of frequency under load disturbance becomes slower, and the recovery rate of frequency becomes faster. A low-power grid-connected photovoltaic power generation system based on automatic solar tracking is presented in 'Research and Design of low-power grid-connected PV power generation system based on automatic solar tracking' by Y. Liu et al.

The method of hybrid tracking is adopted to increase the accuracy of automatic solar tracking. Pin-cushion two-dimensional position sensitive detector (PSD) and four silicon PV cells are used as the photosensitive element. In addition, an adaptive topological structure of the main circuit based on a cascaded Boost converter circuit and the H6-type inverter topology are designed for the system. The MPPT algorithm combined modified constant voltage algorithm with modified variable step-size increment conductance algorithm is proposed in order to improve the efficiency of PV power generation.

Moreover, extensive research has been focused on the scheduling and control of power grid to facilitate the efficient operation of the power system. In the paper entitled 'Smart Grid Scheduling and Control Based on Master-Slave Game' by R. Liang et al., a scheduling model on master-slave game is proposed, in which the power grid company is designated as the game leader and the power plants are the game followers, and the cuckoo algorithm is adopted to optimize the master-slave game model. In the work entitled 'Optimal Dispatching and Game Analysis of Power Grid Considering Demand Response and Pumped Storage' by X. Ji et al., a two-player zero-sum game model is formulated to balance multiple optimization goals, and the multi-objective optimization problem is converted to a single-objective optimization problem with the weighted coefficients. The case studies show that both the cost of power generation and the carbon emissions of the system have decreased after the introduction of demand response and pumped-storage units, and the benefits of co-scheduling are obvious. In the work entitled 'Two-Level Reconfiguration Algorithm of Branch Exchange and Variable Neighbourhood Search for Active Distribution Network' by Q. Hao et al., a two-level algorithm is proposed to solve the distribution network reconfiguration with the objective of minimum power loss. In the first level, switches of maximum power loss reduction are disconnected by the branch exchange algorithm. Moreover, neighbourhoods of disconnected switches are constructed by the deterministic transform method in the second level. In addition, the obtained results demonstrate that the proposed method has both high stability and rapidity comparatively. In the paper entitled 'An Electric Power Generation Forecasting Method Using Support Vector Machine' by L. Guo et al., a power generation predication method is put forward based on the support vector machine. The nonlinear relation of electric net power generation is explored by historical monthly recorded data, and this relation can help the predication of net electric generation for the next month. In the paper entitled 'Stability Analysis of Wide Area Power System under the Influence of Interval Time-Varying Delay' by C. Wang et al., the stability problem

is studied for the wide area power system with interval time-varying delays.

Up to now, the anomaly detection and fault diagnosis of power grid has also received considerable research attention. In the paper entitled 'Synchronization Signal Extraction Method Based on Enhanced DSSOGI-FLL in Power Grid Distortion' by X. Ren et al., the structure of second order generalized integrator (SOGI) is improved, the difference node and adaptive filter are added on the basis of SOGI, and the method of synchronous signal extraction based on improved dual self-turning second order is proposed. This method can eliminate the effect of asymmetrical, dc components and multiple harmonics, and can extract the positive and negative sequence components, phase and frequency information accurately and quickly. An improved redundant coding Petri net reasoning algorithm is proposed in 'Micro Grid Fault Diagnosis Based on Redundant Embedding Petri Net' by X. Chen et al., which is based on the fault clearance layer of the Petri net model. In addition, a high transplantable fault diagnosis model for the fault features in microgrid is established, and a simple inference algorithm with good error-detecting capability is presented. A new recovery scheme based on heuristic algorithm and multi-population genetic algorithm is proposed in 'Fault Recovery of Distribution Network Containing Distributed Generation Based on Heuristic Search Algorithm and Multi-Population Genetic Algorithm' by Z. Xu et al., which aims to solve the low optimization efficiency and 'premature convergence' of the traditional genetic algorithm in the fault recovery of distribution network with DG. Before the failure recovery, it determines whether to put into load shedding by using repeated power flow method. In the work entitled 'A New Approach to Fault-Line Selection of Small Current Neutral Grounding System' by Y. Chen et al., a new approach combining BP neural network with fuzzy Petri net is developed to deal with the issue of fault-line selection of the small current neutral grounding system. The fault-line selection model is detailedly described to explain the new feature representation that fuses multiple fault features of the lines, including the wavelet energy, the active component and the fifth harmonic component. In the work entitled 'Fault diagnosis of transformer based on fuzzy clustering and optimized wavelet neural network' by W. Teng, an improved fault diagnosis method is proposed based on fuzzy clustering and flower pollination algorithm. Firstly, fuzzy clustering is applied to deal with transformer fault sample data so as to remove the bad data; secondly, flower pollination algorithm is applied to obtain the optimal parameters of the wavelet neural network (WNN).

2.3. On robot industry

In recent years, the robot techniques have attained prominent development, which have been applied to many application scenarios, for instance, target tracking, automatic control and so on, which would improve the intelligent management capability of the system operation. In the paper entitled 'Improved Line of Sight Robot Tracking Toward a Moving Target' by S. Feng et al., the line of sight (LOS) guidance law is improved to implement tracking toward a moving target. An optimal information fusion filtering algorithm weighted by scalars is utilized for two-sensor information fusion, which would improve the trajectory tracking precision. Under the communication delay, n -step ahead Kalman predictor compensates for communication delay and provides LOS guidance law with more accurate target estimates. In the work entitled 'Trajectory Tracking Control for a Quadrotor UAV via Extended State Observer' by W. Gai, the PD-type trajectory tracking controller with the extended state observer (ESO) is proposed for the quadrotor unmanned aerial vehicle (UAV) with the wind disturbance. A six-degrees of freedom quadrotor UAV model with the hyperbolic tangent saturation function is built, and the PD-type trajectory tracking controller with the ESO is designed to track the desired attitude and trajectory command. In the work entitled 'A Novel Hybrid Meta-Heuristic Algorithm for Optimization Problems' by W. Gai et al., a novel hybrid meta-heuristic algorithm called HMGSG is presented to solve the optimization problems. In the proposed HMGSG algorithm, a spiral shaped path for grey wolf optimization is used to ensure both a faster convergence rate and diversity. Moreover, the HMGSG algorithm is used to optimizing the fractional-order PID controller parameters for roll attitude control of UAV.

In addition, in order to realize the accurate automatic charge docking, an economic and practical method combined with the infrared sensor and laser sensor is developed in 'Design and Implementation of an Automatic Charging System for Intelligent Patrol Robot' by Z. Zhang et al. The phase-shifted full-bridge ZVS-PWM converter is adopted to design an automatic charging pile, which uses a constant voltage limited current charging mode and improve the efficiency of the charging. The energy balance between individual lithium-ion batteries in electric vehicles is an important factor that affects the efficiency and long-time operation of the entire system. The control method of three-resonant-state LC converters is presented in the paper entitled 'Design of Active Equalizer for Lithium-Ion Battery Pack Based on Double-Tiered Modular Resonance' by L. Zhu et al. The resonance process not only improves the transferable energy of the capacitor

but also realizes the zero current switch of the circuit, reducing the circuit switching loss and electromagnetic interference.

2.4. On mechanical industry

In recent year, a number of control algorithms have been put forward for varieties of mechanical systems such as the robotic system, the pavement loading facility, the 2-axis stable platform, the gear box, the motor system and so on. It is worth noting that, in engineering practice, the controlled systems have a variety of complexities, such as the parameter perturbation, internal/external disturbance, unmodeled dynamics, and stochastic noises. Therefore, it makes tremendous practical sense to design motion control algorithms which exhibit adaptiveness, robustness, learning ability and anti-disturbance property.

In the paper entitled 'Dynamic Learning from Adaptive Neural Control for Flexible Joint Robot with Tracking Error Constraints Using One Approximator' by M. Wang and A. Yang, the dynamic learning method from adaptive neural control with prescribed tracking error performance is proposed for flexible joint robot included unknown dynamics. By combining a high gain observer and the backstepping method, the adaptive neural controller is presented to stabilize the unconstrained error system. Under the satisfaction of the partial persistent excitation condition, the adaptive neural controller is shown to be capable of achieving knowledge acquisition and storage of unknown dynamics.

In the work entitled 'Research of the Feedforward Control System of 3-axis Stable Platform Based on Disturbance Observer' by T. Sui et al., the feed-forward controller and based on disturbance observer (DOB) of the angular loop for the 3-axis stabilized platform is added at the traditional PID control system. The composite control based on the DOB stable platform has a significant compensation effect, and the simulation results show that this control scheme has a more favourable control performance. It is known to most researchers that the stacker is an important part of automatic storage and the safety and health of the running track are the primary premise to ensure the stable operation of the stacker. In the paper entitled 'A Synergetic Locating Method for Abnormal Interval of Stacker Safety Maintenance' by L. Ni et al., a new combinational method to locate abnormal interval for running track of stacker is proposed. The validity of the algorithm proposed in this paper is verified by the running current data of the stacker in the intelligent operation and maintenance warehouse of the national power grid.

The amplitude of vibration signal in gearbox of motor driving system is low, resulting in easy system disturbance and vibration noise effect, and it is difficult to extract the characterization of gearbox fault correctly. A method of incipient fault feature enhancement based on the wavelet packet and the minimum entropy deconvolution is proposed in the paper entitled 'The incipient fault feature enhancement method of gearbox based on the Wavelet Packet and the Minimum Entropy Deconvolution' by L. Zhao et al. In the work entitled 'PMLSM Position Control Based on Continuous Projection Adaptive Sliding Mode Controller' by A. Jaleel, the design of projection-based adaptive sliding mode controller is presented for position control of permanent magnet linear synchronous motor (PMLSM) with unknown mover mass. Based on the Lyapunov method, the stability of adaptive sliding mode-controlled PMLSM is proven and the adaptive law has been developed. Additionally, a continuous projection operator is applied to adaptive law such as to enforce the estimated mover mass within a pre-specified bound. The performance of ASMC based on continuous projection operator is investigated via simulation results within MATLAB environment. In the paper entitled 'Distributed Leader-Follower Consensus of Nonlinear Multi-Agent Systems with Unconsensusable Switching Topologies and Its Application to Flexible-Joint Manipulators' by C. Ma and W. Wu, the distributed consensus problem is addressed for multi-agent systems with switching topologies under a leader-follower framework, and an illustrative example with application to multiple flexible-joint manipulators is provided to verify the effectiveness of the designed method.

2.5. On other fields of industry

It is well known that material recognition is an important problem in the industrial automation community. In the paper entitled 'Wood Material Recognition for Industrial Applications' by H. Fu et al., a machine learning method is designed to identify the wood material by extracting various feature descriptors from sound signals. An improved QPSO algorithm is proposed in the paper entitled 'An improved QPSO Algorithm Base on Social Learning and Lévy Flights' by X. Yuan. Firstly, the social learning strategy is used to update the non-optimal particle and improve the global search ability. Then, the Lévy flights strategy is introduced to overcome the shortcoming of the low efficiency of the optimal particle in the social learning mechanism, and further improve the convergence accuracy and search efficiency of the algorithm.

In the paper entitled 'Research on Harmonic Detection Based on Wavelet Threshold and FFT Algorithm' by S. Zhao et al., a harmonic detection method based

on wavelet threshold preprocessing noise elimination and windowed interpolation FFT algorithm is proposed. Firstly, the selected signal is de-noised, and the wavelet coefficients are used to select the wavelet threshold to eliminate the noise in the signal. Then the signal after the denoising is selected by the Nuttall window to interpolate the FFT algorithm, and the calculation formula is derived by using the amplitude information content of the four spectral lines. In the paper entitled 'A SVM Fall Recognition Algorithm Based on a Gravity Acceleration Sensor' by M. Hou et al., a method of detecting human movements using smart-phones is proposed to decrease the risk of accidents in the elderly. The method proposed in this paper uses a mobile phone that has an embedded acceleration sensor to record human motion information that is divided into daily activities and falling down.

In the paper entitled 'Static Output Feedback H_2/H_∞ Control with Spectrum Constraints for Stochastic Systems Subject to Multiplicative Noises' by P. Ma et al., the problem of static output feedback H_2/H_∞ control with spectrum constraints is investigated for linear continuous-time stochastic systems with state-dependent noises by using the spectrum technique. In the work entitled by 'State Estimation for Neural Networks with Random Delays and Stochastic Communication Protocol' by F. Zeng and L. Sheng, the state estimation problem is considered for delayed neural networks under stochastic communication protocol by means of Markov chain and stochastic analysis method. In the paper entitled 'Design and Analysis of Fault Observer of MIMO System with Systematic Error and Measurement Error' by X. Hua et al., a fault observer is designed for the MIMO feedback fault systems with measurement error and system error. In the work entitled 'Event-triggered H_∞ filtering for discrete-time Markov jump delayed neural networks with quantizations' by T. Zhang et al., the problem of event-triggered H_∞ filtering is studied for discrete-time Markov jump neural networks with network-induced delays and quantizations. In the paper entitled 'Outer Synchronization between Dynamic Varying Networks under Noisy Condition' by H. Liang et al., the problem of outer synchronization is addressed for the dynamic network scenarios with non-identical topological structures, nonlinear inner coupling connections and time-delayed node characteristics.

Considering the alarm performance indices alarm rate, missed alarm rate, and average alarm delay for generalized alarm delay-timer are not obtained easily. In the paper entitled 'A Generalized Alarm Delay-Timer's Performance Indices Computing Method' by J. Lin et al., a generalization computing method is proposed in the form of three formulas based on the Markov models. In addition, the application range of generalized alarm

delay-timer and conventional alarm delay-timer are compared through numerical simulation. In view of local extreme problem of the gradient descent algorithm, which makes the working face of mine gas emission prediction uncertainly, combined wolf pack algorithm with complex neural network nonlinear prediction method, a new prediction model is established in the paper entitled 'Prediction Method of Mine Gas Emission Based on Complex Neural Work Optimized by Wolf Pack Algorithm' by L. Xu et al. The Wolf pack algorithm shows good global convergence and computational robustness in the solving process of complex high-dimensional functions. The prediction results are very close to the real value, and the change trend is highly consistent with the actual situation.

Acknowledgments

This special issue is a timely reflection of the research progress in the new advances on industrial control. The authors would like to acknowledge all authors for their efforts in submitting high-quality papers. We are also very grateful to the reviewers for their thorough and on time reviews of the papers. Last, but not least, our deepest gratitude goes to Professor Zidong Wang, Editor-in-Chief of *Systems Science & Control Engineering* for his consideration, encouragement, and advice to publish this special issue.

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Appendix: Published papers in the order they appear in the editorial

Papers on Topic of Petroleum Industry

1. TSSC-2018-0045, A time-varying wavelet phase extraction method using the wavelet amplitude spectra, Peng Zhang, Yongshou Dai (Contact), Yongcheng Tan, Hongqian Zhang & Chunxian Wang, 2018, VOL. 6, NO. 3, 10–18.

2. TSSC-2018-0121, Research on pulse signal identification algorithms based on adaptive filter and adaptive generalized cross-correlation, Yisen Yang, Chenquan Hua (Contact), Jinglong Kan, Kai Zhang, Lu Li & Xuan Xu, 2018, VOL. 6, NO. 3, 153–161.
3. TSSC-2018-0091, Hessian-regularized weighted multi-view canonical correlation analysis for working condition recognition of sucker-rod pumping wells, Bin Zhou, Yanjiang Wang (Contact), Weifeng Liu & Baodi Liu, 2018, VOL. 6, NO. 3, 215–226.
4. TSSC-2018-0122, Condition monitoring and fault diagnosis of electric submersible pump based on wellhead electrical parameters and production parameters, Lu Li, Chenquan Hua (Contact) & Xuan Xua, Accepted.
5. TSSC-2018-0098, Iterative learning fault-tolerant control for networked batch processes with event-triggered transmission strategy and data dropouts, Jirui Tang & Li Sheng (Contact), 2018, VOL. 6, NO. 3, 44–53.
6. TSSC-2018-0096, Base-scale entropy and energy analysis of flow characteristics of two-phase flow, Chunling Fan (Contact), Qihua Fan & Haojie Li, Accepted.

Papers on Topic of Power Industry

7. TSSC-2018-0105, Set-membership filtering for generator dynamic state estimation with delayed measurements, Cheng Cheng, Xingzhen Bai (Contact), Qingqing Zhang & Congyang Huang, 2018, VOL. 6, NO.3, pp. 35–43.
8. TSSC-2018-0118, A new maximum power point control algorithm of photovoltaic generation system, Xiujuan Sun (Contact), Xiaoxue Bian & Zhuo Yang, Revision.
9. TSSC-2018-0092, A novel control strategy of virtual synchronous generator in island micro-grids, Yongjin Yu (Contact), Like Cao & Xingmin Zhao, 2018, VOL. 6, NO.3, pp. 136–145.
10. TSSC-2018-0066, Research and design of low-power grid-connected PV power generation system based on automatic solar tracking, Yongan Liu, Maofa Gong, Longjin Liang, Qingxue Liu (Contact) & Yan Gao, Revision.
11. TSSC-2018-0067, Smart grid scheduling and control based on master-slave game, Rongbo Liang, Yongjin Yu (Contact) & Feiran Yang, 2018, VOL. 6, NO.3, pp. 162–168.
12. TSSC-2018-0089, Optimal dispatching and game analysis of power grid considering demand response and pumped storage, Xingquan Ji (Contact), Yao Li, Yongjin Yu & Shuxian Fan, Accepted.
13. TSSC-2018-0084, Two-level reconfiguration algorithm of branch exchange and variable neighbourhood search for active distribution network, Qingxiang Hao, Zhengzhong Gao (Contact), Xingzhen Bai & Maoyong Cao, 2018, VOL. 6, NO.3, pp. 109–117.
14. TSSC-2018-0095, An electric power generation forecasting method using support vector machine, Li Guo (Contact), Jinhao Chen, Fukui Wu & Manran Wang, 2018, VOL. 6, NO. 3, pp. 191–199.
15. TSSC-2018-0083, Stability analysis of wide area power system under the influence of interval time-varying delay, Chenchen Wang, Wei Qian (Contact), Bingfeng Li & Yunji Zhao, 2018, VOL. 6, NO. 3, pp. 1–9.
16. TSSC-2018-0087, Synchronization signal extraction method based on enhanced DSSOGI-FLL in power grid distortion, Xuhu Ren (Contact), Zhenyang Lv, Dewen Li, Zhen Zhang & Shengkun Zhang, Accepted.
17. TSSC-2018-0099, Micro grid fault diagnosis based on redundant embedding Petri net, Xiangmin Chen, Xingzhen Bai (Contact) & Qingqing Zhang, Accepted.
18. TSSC-2018-0068, Fault recovery of distribution network containing distributed generation based on heuristic search algorithm and multi-population genetic algorithm, Zhe Xu, Zhijing Zhang, Wen Jiang, Shuxian Fan (Contact) & Maofa Gong, 2018, VOL. 6, NO. 3, pp. 100–108.
19. TSSC-2018-0110, A new approach to fault-line selection of small current neutral grounding system, Yujie Chen, Huiwei Chen, Baoye Song (Contact), Yanni Liu & Peixue Liu, Accepted.
20. TSSC-2018-0108, Fault diagnosis of transformer based on fuzzy clustering and optimized wavelet neural network, Wenhui Teng, Shuxian Fan (Contact), Zheng Gong, Wen Jiang & Maofa Gong, Revision.

Papers on Topic of Robot Industry

21. TSSC-2018-0115, Improved line of sight robot tracking toward a moving target, Shulin Feng, Guilin Zhang (Contact), Yihua Dong, Xianwen Zhang & Peiliang Wang, Accepted.
22. TSSC-2018-0104, Trajectory tracking control for a quadrotor UAV via extended state observer, Wendong Gai, Jie Liu, Chengzhi Qu & Jing Zhang (Contact), 2018, VOL. 6, NO. 3, 126–135.
23. TSSC-2018-0075, A novel hybrid meta-heuristic algorithm for optimization problems, Wendong Gai, Chengzhi Qu, Jie Liu & Jing Zhang (Contact), 2018, VOL. 6, NO. 3, pp. 64–73.
24. TSSC-2018-0116, Design and implementation of an automatic charging system for intelligent patrol robot, Zhigang Zhang, Yao Meng, Baoye Song (Contact), Xiangzhong Meng & Jinbao Li, Accepted.
25. TSSC-2018-0113, Design of active equalizer for lithium-ion battery pack based on double-tiered modular resonance, Lingzhen Zhu, Xiujuan Sun (Contact), Pengfei Zhang & Mengchang Lin, Revision.

Papers on Topic of Mechanical Industry

26. TSSC-2018-0044, Dynamic learning from adaptive neural control for flexible joint robot with tracking error constraints using high-gain observer, Zhiguang Chen, Min Wang (Contact) & Anle Yang, 2018, VOL. 6, NO. 3, pp. 177–190.
27. TSSC-2018-0101, Research of the feedforward control system of 3-axis stable platform based on disturbance observer, Tao Sui (Contact), Fei Cheng, Xiuzhi Liu, He Li & Yi Wang, Accepted.
28. TSSC-2018-0102, A synergetic locating method for abnormal interval of stacker safety maintenance, Ling Ni, Yongchao Wang, Jian Wang, Wenjuan Dong, Hongliang Liu, Yudong Xing, Darong Huang (Contact) & Lanyan Ke, 2018, VOL. 6, NO. 3, 169–176.
29. TSSC-2018-0112, The incipient fault feature enhancement method of gear box based on the wavelet packet and the minimum entropy deconvolution, Ling Zhao, Jing Ding,

Darong Huang, Bo Mi, Lanyan Ke & Yang Liu, 2018, VOL. 6, NO. 3, 235–241.

30. TSSC-2018-0120, PMLSM position control based on continuous projection adaptive sliding mode controller, Amjad Jaleel Humaidi & Akram Hashim Hameed, Accepted.
 31. TSSC-2018-0124, Distributed leader-follower consensus of nonlinear multiagent systems with unconsensusable switching topologies and its application to flexible-joint manipulators, Chao Ma & Wei Wu, 2018, VOL. 6, NO. 3, 200–207.
- Papers on Topic of Other Fields of Industry**
32. TSSC-2018-0035, Wood material recognition for industrial applications, Haibin Fu, Huaping Liu (Contact), Xiaoyan Deng & Fuchun Sun, Accepted.
 33. TSSC-2018-0111, An improved QPSO Algorithm base on social learning and Lévy flights, XiaoPing Yuan, Peng Jin (Contact) & Guopeng Zhou, Accepted.
 34. TSSC-2018-0119, Research on harmonic detection based on wavelet threshold and FFT algorithm, Shuaishuai Zhao, Chuangjiang Wang (Contact) & Xiaoxue Bian, Revision.
 35. TSSC-2018-0144, A SVM fall recognition algorithm based on a gravity acceleration sensor, Mengqi Hou (Contact), Haixia Wang, Zechen Xiao & Guilin Zhang, 2018, VOL. 6, NO. 3, pp. 208–214.
 36. TSSC-2018-0100, Static output feedback H_2/H_∞ control with spectrum constraints for stochastic systems subject to multiplicative noises, Pingping Ma, Zhengmao Zhu & Li Sheng (Contact), 2018, VOL. 6, NO. 3, 118–125.
 37. TSSC-2018-0123, State estimation for neural networks with random delays and stochastic communication protocol, Fei Zeng & Li Sheng (Contact), 2018, VOL. 6, NO. 3, 54–63.
 38. TSSC-2018-0114, Design and analysis of fault observer of MIMO system with systematic error and measurement error, Xingxing Hua, Darong Huang & Bo Mi, 2018, VOL. 6, NO. 3, 146–152.
 39. TSSC-2018-0088, Event-triggered H_∞ filtering for discrete-time Markov jump delayed neural networks with quantizations, Tingting Zhang, Jinfeng Gao & Jiahao Li, 2018, VOL. 6, NO. 3, 74–84.
 40. TSSC-2018-0033, Outer synchronization between dynamic varying networks under noisy condition, Hao Liang, Yumei Sun, Ronghu Chi, Xinli Fang & Jiaming Wang, 2018, VOL. 6, NO. 3, 92–99.
 41. TSSC-2018-0107, A generalized alarm delay-timer's performance indices computing method, Jingqiu Lin, Donghao Sun, Xingzhen Bai (Contact) & Lida Chen, Accepted.
 42. TSSC-2018-0053, Prediction method of mine gas emission based on complex neural work optimized by wolf pack algorithm, Liqiang Xu, Binguo Wang (Contact), Xuedong Du, 2018, VOL.6, NO.3, 85–91.