

# **2015 International Conference on Fluid Power and Mechatronics (FPM 2015)**

**Harbin, China  
5-7 August 2015**

**Pages 1-699**



**IEEE Catalog Number: CFP1599K-POD  
ISBN: 978-1-4799-8771-9**

**Copyright © 2015 by the Institute of Electrical and Electronic Engineers, Inc  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\*This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1599K-POD
ISBN 13:	978-1-4799-8771-9

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# FPM2015- Table of Contents

<b>Topic: Fluid Mechanics, Fundamental Theory of Fluid Power and Transmission</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Characteristics of Water Hammer Induced by Valve-Valve Systems <i>Yajun Liu, Ziyang Huang, Changcheng Jiang</i>	<b>1</b>
Numerical Investigation of Turbulent Flow in an Open Rotor-Stator System* <i>Chenhui Hu, Wei Wu, Jibin Hu, Shihua Yuan</i>	<b>6</b>
Experiment Study on a Hydraulic Oil Purifier Based on HIGEE Technology <i>Hui Ji, Songlin Nie, Jinguo Hu, Kaiqiang Yang</i>	<b>12</b>
Investigation of the Flow Field inside an Oil Distribution Mechanism at High Speed <i>Zhao Xiong, Shihua Yuan, Wei Wu, Jibin Hu</i>	<b>17</b>
Modeling and Analysis of the Churning Losses Characteristics of Swash Plate Axial Piston Pump <i>Bing Xu, Ying Li, Junhui Zhang, Qun Chao</i>	<b>22</b>
Research on the Friction of the Pneumatic Servo System <i>Yang Song, Leisheng Huang, Tao Wang, Wei Fan</i>	<b>27</b>
Fluid Effects on the Pipe's Isolation Plugging Tool by Large-eddy Simulation <i>Hong Zhao, Lihao Yang, Xiaoli Jia</i>	<b>31</b>
Research on the Performance of Hydraulic Excavator with Pump and Valve Combined Separate Meter In and Meter Out Circuits <i>Lei Ge, Zhixin Dong, Weinan Huang, Long Quan, Jing Yang, Wenyong Li</i>	<b>37</b>
Rotational Speed Characteristic of Rotor Immersed in Oil Within an Electric Motor-pump <i>Jinlin Wang, Hong Ji, Wei Ren, Jiming Zhang</i>	<b>42</b>
An Integrated Model of Hydrodynamic Lubricating for Piston/Cylinder Interface <i>Jihai Jiang, Kelong Wang</i>	<b>47</b>
Analysis of the Flow Ripple Stochastic Characteristics in Dual-pump Converging System <i>Jing Li, Pan Liao, Mu Li</i>	<b>53</b>
On the Application of Reynolds Theory to Thermo-piezo-viscous Lubrication in Oil Hydraulics <i>Per Johansen, Daniel B. Roemer, Torben O. Andersen, Henrik C. Pedersen</i>	<b>58</b>
Analytical Method of Thermal-fluid Transients in Aero-hydraulic Systems <i>Mingxue Wang, Zongxia Jiao, Yuanzhi Xu</i>	<b>63</b>
Experimental Validation of Modelled Fluid Forces in Fast Switching Hydraulic On/Off Valves <i>Christian Noergaard, Michael M. Bech, Daniel B. Roemer and Lasse Schmidt</i>	<b>68</b>
Pressure Distribution Analysis of Elastohydrodynamic Journal Bearing Under Grease Lubrication <i>Chao Zhang, Shaoping Wang, Yanwei Zhang</i>	<b>74</b>
Research on the Modeling and Simualtion of Reaction Thrust Characteristics of Water Jet <i>Zhaocun Shi, Jian Yu, Xiaohui Luo</i>	<b>80</b>

Study on The Sinkage Behaviour of Legged Robot's Rigid Foot in Soft Soil Based on MM-ALE Method <i>Peng Hu, Gang He, Jiawei Xu, Xiaolong Li, Denglin Zhu</i>	84
Research on Two Kinds of Servo Control Elements Effect on Highly Integrated Valve-controlled Cylinder <i>Kaixian Ba, Bin Yu, Yuan Cao, Zitong Wang, Xiangdong Kong</i>	88
Research on Natural Vibration Characteristic of Metal Pipelines with Different Length <i>Xiangdong Kong, Yuan Cao, Lingxiao Quan, Dong Li</i>	94
Test and Numerical Analysis of Flow Distribution for Indoor Aero-engine Test Bed <i>Simu Zhang, Anping Hou, Yingxiu Chen, Wei Tuo</i>	99
The Study of Normal Force Model for the Flow of Lunar Dust Particles <i>Wanjing Pan, Xuyan Hou, Dewei Tang, Tianxiang Ding, Qiquan Quan, Zongquan Deng, Lixia Sun</i>	104
Research on the Shape Model of Particles in Lunar Regolith Fluid Based on the Fractal Theory <i>Tianxiang Ding, Xuyan Hou, Wanjing Pan, Lixia Sun, Shengyuan Jiang, Qiquan Quan</i>	109
Fatigue Analysis of the Cylinder in The Axial Piston Pump <i>Lingxiao Quan, Yuan Cao, Hongliang Luo, Rui Guo, Haixin Guo</i>	116
Comparative Analysis of Braking Performance for DualTorus Hydrodynamic Retarder with Bowed Blade and Straight Blade <i>Qingdong Yan, Hongbin Mu, Wei Wei</i>	123
Flow Pattern Evolution Analysis and Reduction Order Modeling for the Two-phase Flow in a Hydrodynamic Retarder <i>Wei Wei, Xueyong Han, Hongbin Mu, Qingdong Yan</i>	128
Motion Response Prediction on Transit Condition of Jack-Up <i>Yazhou Zhu, Yansong Fan, Bin Jiang, Hongde Qin, Haihua Lin</i>	133
The Study on Sensibility of Self-elevating Unit Legs Strength to Different Bay Heights under Storm Environment Condition <i>Yazhou Zhu, Yansong Fan, Bin Jiang, Hongde Qin, Chengmeng Sun</i>	138
Optimization of Internal Flow Channel of a Right-Angle Globe Valve Based on CFD <i>Gang Yang, Fabing Tan, Baoren Li, Cheng Wu, Zhendong Wei</i>	144
Research on Cross-Coupled Synchronization Fuzzy Control of Double Valve <i>Baoren Li, Fa Li, Bangkai Shi, Haifeng Deng</i>	148
<b>Topic: Hydraulic Components and Systems with Innovative Applications</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
The Optimal Design of Frequency Conversion Controlled Vapor Recovery System Based on the Flow and Temperature Signals <i>Yajun Liu, Maoqing Li, Yeqing Chen</i>	152
Stiffness Modeling of Thrust Cylinder in Hardrock Tunnel Boring Machine <i>Yajin Wu, Jianfeng Tao, Chengliang Liu, Lin Li</i>	157

Performance Analysis of a Constant Temperature Hydraulic Tank Cooling System Based on Semiconductor Refrigeration Technology <i>Rui Guo, Zhenmiao Zhang, Jingyi Zhao, Chao Ning, Bingliang Li</i>	<b>163</b>
Simulation Analysis for the Attenuation-Spring Type Damper of the Pump-Valve Composite Control System <i>JunHua Hu, Chao Wu, XuYao Mao, Hui Tang</i>	<b>171</b>
Simulation and Analysis of Pressure Closed-Loop Control of Closed Slewing System of Supersized Hydraulic Excavator <i>Bo Sun, Haifeng Yang, Haigang Ding, Guozhi Han, Bo Wang, Zong Li, Jiyun Zhao</i>	<b>176</b>
Application of Hydraulic Energy Storage Technology for Urban Rail Transit Systems <i>Liuyang Zhang, Shihua Yuan, Wei Wu, Jibin Hu</i>	<b>181</b>
A New Method of Improving Comprehensive Performances of Variable Speed Pump Control Systems with Large Power: Valve-pump Parallel Variable Structure Control <i>Jiyun Zhao, Haigang Ding, Guozhi Han, Haifeng Yang</i>	<b>187</b>
Research on Novel Integrated Rudder Servo System for Aircraft Aerodynamic Control Based on Double Digital Closed Channels of Power Management and Load Damping <i>Yuexuan Wang, Junjie Chen, Zhongzhe Zhang, Zesheng Cao, Dongbo Gong</i>	<b>194</b>
Characteristics of a Piloted Digital Flow Valve Based on Flow Amplifier <i>Taotao Li, Jiahai Huang, Yanhong Bai, Long Quan, Shengguo Wang</i>	<b>200</b>
Research on the Performance of Electro-hydraulic Proportional Flow Valve Controlled by Pilot Pump <i>Yunxiao Hao, Jiahai Huang, Wenyong Li, Long Quan, Bin Zhao</i>	<b>205</b>
A New Pressure Impact Method of Closed Hydraulic Rotation System with Large Inertia in the Process of Rapid Startup and Stop: Parallel Valve Controlled Variable Damping Control <i>Haigang Ding, Guozhi Han, Zong Li, Jiyun Zhao</i>	<b>211</b>
Optimization of a Spool Valve to Reduce Pressure Ripple in a Collaborative Rectification Pump <i>Zimeng Wang, Zongxia Jiao, Yang Li</i>	<b>216</b>
A New Design of the Variable-pressure Hydraulic Pump <i>Xiaoyan Su, Zongxia Jiao, Yuanzhi Xu</i>	<b>221</b>
Morphological Topology Generation of a Digital Fluid Power Displacement Unit using Chebychev-Grübler-Kutzbach Constraint <i>Per Johansen, Daniel B. Roemer, Torben O. Andersen, Henrik C. Pedersen</i>	<b>227</b>
On the Method of Selecting the Reference Operating Conditions for Valve Plates Design in Axial Piston Pumps <i>Jun Kai, Ming Liu, Yongqiang Zhao</i>	<b>231</b>
Study of Control Parameters Tuning Method for Hydro-viscous Driver System <i>Deyang Zhang, Shoukun Wang, Junzheng Wang, Ligang Ma</i>	<b>236</b>
Design and Experimental Test of an On-line Particle Detection Sensor based on Symmetrical Magnetic Field <i>Haokuo Liu, Shaoping Wang, Wei Hong, Chao Zhang, Xingjian Wang</i>	<b>241</b>

Structure Design and Dynamic Simulation of Load Compensation Valve for Gear Type Synchronous Motor <i>Tao Liu, Dongsheng Wang</i>	<b>246</b>
Simulation and Indirect Verification of an over Flow Protection Valve Under Shock Condition <i>Zuyao Yu, Zhuang Chen, Yuedong Zou, Shupeng Chen</i>	<b>250</b>
Investigation on Sealing Gap between Ring Gear and Case in Internal Gear Machines <i>Ruilong Du, Yinglong Chen, Hua Zhou</i>	<b>256</b>
Thermal Modeling of Axial Piston Pump and Application <i>Di Wu, Shaoping Wang, Jian Shi</i>	<b>262</b>
Modelling and Simulation of a Novel Dual-Redundancy Electro-Hydrostatic Actuator <i>Haitao Qi, Yating Teng, Zilong Liu, Xi XIAO, Tigao LEI</i>	<b>270</b>
Design and Experimental Study of Two-dimensional(2D) Electro-hydraulic Proportional Directional Valve <i>Guowen Liu, Jian Ruan, Shen Li, Bin Meng</i>	<b>276</b>
Flow Forces Acting on Particles in the Flow in a Well and Slotted Filter <i>Alexander Ledkov, Songjing Li</i>	<b>283</b>
Reducing the Steady Flow Force Acting on the Spool by Using a Simple Jet-Guiding Groove <i>Zar Aung Nay, Jinghui Peng, Songjing Li</i>	<b>289</b>
Structural Optimization and Characteristics Analysis of Innovative Flapper Shape in a Flapper-Nozzle Pilot Valve <i>Jinghui Peng, Zar Aung Nay, Songjing Li</i>	<b>295</b>
Modeling of Armature-flapper Assembly in a Hydraulic Servo Valve by Finite Element Analysis and Acoustic Excitation Measurements <i>Jinghui Peng, Yongbo Fan, Songjing Li</i>	<b>301</b>
Applicability of Principle Components Analysis (PCA) to Evaluate the Dynamic Characteristics of Cavitation from Captured Images <i>Shengzhuo Zhang, Hongguang Xu, Songjing Li</i>	<b>307</b>
A Numerical Study of Flow Field in a Flapper-Nozzle Pilot Valve under Working Condition <i>Shengzhuo Zhang, Hongguang Xu, Songjing Li</i>	<b>312</b>
Test and Analysis of Self-excited Pressure Oscillations and Noise in a Hydraulic Jet-pipe Servo-valve <i>Wei Zhang, Songjing Li, Min Zhang</i>	<b>317</b>
Vibration Characteristics of Armature Assembly in a Torque Motor with Magnetic Fluids <i>Hasiaoqier Han, Songjing Li, Yi Li, Peng Yu, Xianwei Yang, Jinghui Peng</i>	<b>323</b>
Analysis of Proportional Multi-way Directional Valve Fault Simulation <i>Zhengmao Ye, Hui Zhang, Yuzhuan Wang, Yuanli Xu, Xianguo Jiang</i>	<b>328</b>
Dynamic Characteristic Analysis of Monostable Torque Motor Valve of Bipropellant Thrusters <i>Changbin Guan, Jun Chen, Zongxia Jiao</i>	<b>332</b>
Maximum Wave Power Absorption by a Control Strategy Through Combining Hydraulic Cylinders <i>Changhai Liu, Qingjun Yang, Wei Feng, Gang Bao</i>	<b>337</b>

Simulation of a Pilot Control Valve Using Pseudo Bond Graph Approach <i>Zhiwen Wang, Wei Xiong, Haitao Wang, Zuwen Wang</i>	<b>344</b>
<b>Topic: Pneumatic Components and Systems with Innovative Applications</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Research on Variable Gain Feedforward Trajectory Control of Pneumatic Servo System <i>Yanbo Wang, Tao Deng, Jianming Li, gang Bao</i>	<b>350</b>
An Intelligent Secretion Clearance System based on Pneumatics <i>Yan Shi, Shuai Ren, Jinglong Niu, Maolin Cai, Weiqing Xu</i>	<b>355</b>
Study on Energy-saving Supply Strategy of Smart Pneumatic Pipeline Grid <i>Yushou Gai, Guanwei Jia, Yan Shi, Maolin Cai</i>	<b>360</b>
A Review of HPR and its Applications -Control of Air Turbine Spindle and Hybrid Electro-pneumatic Ultra-precision Vertical Positioning Stage- <i>Kato Tomonori</i>	<b>364</b>
A Study on Structural Deformation of Platform Screen Door Based on Artificial Neural Network <i>Zhifei Wang, Tingming Kan, Yu Wang, Yanfang Zuo, Dechun Xia, Dong Chen, Ansheng Sun, Pengfei Han</i>	<b>370</b>
Basic Investigation of a Contactless Air Conveyor for Flat Products Using Viscous Traction <i>Wei Zhong, Zhiyuan Ge, Xin Li, Guoliang Tao, Toshiharu Kagawa</i>	<b>374</b>
Method for Resultant and Calculating the Flow-rate Characteristics of Pneumatic Circuit <i>Fan Yang, Gangyan Li, Jian Hu, Wengfeng Liu, Wang Qi</i>	<b>379</b>
Analysis of Configuration Space of Flexible Parallel Joints Driven by Group of Pneumatic Artificial Muscles <i>Kejiang Zang, Wanshun Zang, Caihua Li, Junfeng Shuai, Xingchun Gui</i>	<b>385</b>
Design of the Experimental Table of a Parallel Mechanism Driven by Pneumatic Artificial Muscles <i>Kejiang Zang, Wanshun Zang, Yuehui Wang, Guoling Niu, Xiuchen Li</i>	<b>390</b>
Measurement on Temperature Change during Dynamic Suction Process of Pneumatic Ejector <i>Zhonghua Guo, Xiaoning Li, Zhongsheng Sun</i>	<b>394</b>
Design and Implementation of the Span Greenhouse Agriculture Internet of Things System <i>Tiantian Guo, Weizhu Zhong</i>	<b>398</b>
Structural Optimization and Analysis of Pneumatic 6-DOF Parallel Platform <i>Jun Li, Kai Shi, Wei Wang, JianChao Zhou</i>	<b>402</b>
Experimental Research on the Friction Force of Pneumatic Cushion Cylinder <i>Tianze Zhang, Haitao Wang, Luyao Wang</i>	<b>409</b>
Design and Simulation Analysis of a Novel Pneumatic-Piezoelectric Generator <i>Yingting Wang, Liang Wang, Tinghai Cheng, Feng Qin, Zhaoyang Song</i>	<b>413</b>
Design of a Novel Rotary-Linear Pneumatic Actuator Integrated with Ultrasonic Motion Control Mechanism <i>Liang Wang, Yingting Wang, Tinghai Cheng, Tuo Wang, Mengfei Yin</i>	<b>417</b>

Study on Static Characteristic of a Regulator Valve with Large Flow Capacity <i>Xinglong Chen, Dong Zhu, Gang Bao</i>	<b>421</b>
Ultrasonic Friction Reduction Investigation on a Longitudinal-Vibration-Mode Pneumatic Cylinder <i>Han Gao, Dong Zhu, Tinghai Cheng, Gang Bao, Chengfeng Xiao</i>	<b>426</b>
Research on Elastic Deformation Compensation System for Three Axis Air Bearing Platform <i>Dong Xiang, Qingjun Yang, Dong Zhu, Changhai Liu, Shaoshuai Cheng</i>	<b>431</b>
Design and Characteristic Study of a Pneumatically Actuated Earthworm-like Soft Robot <i>Qing Qi, Yan Teng, Xiaoning Li</i>	<b>435</b>
An Introduction of Dynamic Air Pressure Controller with High Precision <i>Jingmin Du, Lu Tan*, Cheng Wu</i>	<b>440</b>
<b>Topic: Electrohydraulic Servo Simulation and Test Equipment</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Iterative Approach of Tire-Coupled Road Simulator Based on Singularity Threshold Criterion <i>Zhidong Yang, Yanyan Zhang, Dacheng Cong, Yunjia Yu</i>	<b>444</b>
Space End Effector Capturing Hybrid Simulation System <i>Desheng Zeng, Yu Yang, Dacheng Cong, Chifu Yang</i>	<b>448</b>
New Approach for Hydraulic Force Control based on Hydraulic Compliance <i>Job Angel Ledezma, Victor Juliano De Negri, Edson Roberto De Pieri</i>	<b>454</b>
An Investigation on the Nonlinear Adaptive Servo Control of an Electrohydraulic System <i>Hao Liu, Jae-Cheon Lee</i>	<b>460</b>
Analysis of Vibration Characteristics of the Pantograph Catenary System based on the Theory of Timoshenko Beam <i>Zhiyong Qu, Yu Yang, Yong Zhao</i>	<b>465</b>
Direct Load Sensitive Electro-Hydrostatic Force control Actuator for Asymmetric Cylinder with Switch Valve : Design and Simulation <i>Yaoping Shang, Weiyi Hao, Zongxiao Jiao, Zengning Song</i>	<b>469</b>
A Position Synchronization Control for HA/EHA System <i>Waheed UR Rehman, Shaoping Wang, Xingjian Wang, Ali Kamran</i>	<b>473</b>
Design and Implement a Novel Embedded Servo Controller for 6-DOF Motion System <i>Shupeng Zheng, Changhong Gao, Zhongbao Luo, Junwei Han</i>	<b>483</b>
Research on the Degree of Freedom Control Strategy for Redundant-drive Shaking Tables <i>Lianpeng Zhang, Yu Yang, Chifu Yang, Junwei Han</i>	<b>488</b>
The Model Based on Internal Force Space to Reduce Internal Force <i>Deshan Liu, Yu Yang, Chifu Yang, Changhong Gao, Junwei Han</i>	<b>493</b>
Electro-Hydraulic Drive with Separate Control of Piston Groups <i>Pavel Shcherbachev</i>	<b>498</b>



Design and Control of a Position Servo System in the Zero Gravity Simulation of Space Manipulators <i>Haijun Shi, Mingying Huo, ShuGen Ma, Naiming Qi</i>	<b>501</b>
A Study on Performance of Electro-hydraulic Load Simulator Based on Pressure Servo Valve <i>Jianming Cui, Biao Zhang, Yanliang Dong</i>	<b>505</b>
Investigation on Synchronous Control of Electro-hydraulic Servo System Based on MRAC <i>Hongjie Wang, Jian Zhang, Deyou Li, Hao Wang, Ruzhi Gong</i>	<b>510</b>
<b>Topic: Hydraulic, Pneumatic, and Mechatronic Control in Vehicle and Mobile Machinery</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
New Circuit Strategy of the Variable Ballast System for a Deep Sea Submersible <i>So-Nam Yun, Joung-Bog Ham, Yoshito Tanaka, Pan-Mook Lee</i>	<b>514</b>
Research on the Effect Law of Damping Orifice on Flow Characteristics of Proportional Multi-way Valve <i>Chao Ai, Juan WANG, Xiangdong Kong, Jiacheng Lin, Xiaolong Zhao</i>	<b>518</b>
Wiener Recurrent Neural Network Adaptive Inverse Controller of Hydraulic flight motion simulator <i>Yifei Zhao, Zongxia Jiao, Shuai Wu</i>	<b>523</b>
Non-linear Stiffness Analyzing of a Hydraulic Assisted Turning System in Low-Floor Trams <i>Jing Li, Xianliang Zhu, Corentin Robineau</i>	<b>529</b>
Aircraft Anti-skid Braking Control with Flow Servo-valve <i>Xiaochao Liu, Yaoxing Shang, Zongxia Jiao, Hong Tang</i>	<b>536</b>
Research On Multi-degree Of Freedom Force Loading System Based On Parallel Mechanism <i>Qitao Huang, Peng Yin</i>	<b>542</b>
Characteristics of Electromagnetic Clutch Hydraulic Power Steering for Heavy Vehicles <i>Haobin Jiang, Hui Zhao</i>	<b>548</b>
Matching Analysis of Pilot Valve and Multi-way Valve for a Type of Bulldozer <i>Lihang Wang, Shuwei Hu, Lele Yang, Lijie Zhang</i>	<b>556</b>
Active Motion Compensation Control Test Bench For Off-highway Vehicle <i>Xu Zhu, Rachel Wang, Fei Wang, Jianying Zhao</i>	<b>561</b>
Dynamic Characteristics of the Solenoid Valve in Air Brake System <i>Fei Yang, Gangyan Li, Li Fan, Jun Xu</i>	<b>566</b>
Pressure Response Delay Test of Vehicle Pneumatic Braking Pipeline Based on dSPACE <i>Li Fan, Gangyan Li, Fei Yang, Ran Zhao, Ran Chen, Jun Xu, Zhanghua Luo</i>	<b>571</b>
Control System Hydropneumatic of Wheel Machine with Variable Elastic Characteristic <i>Maxim Andreev</i>	<b>576</b>
Mathematical Modeling of the Electro-hydraulic Actuation Systems of the Machines with Tree-like Kinematic Structure <i>Stanislav E. Semenov</i>	<b>583</b>

Machine Regulation Volume Hydraulic Drive with Reciprocating Motion of Hydraulic Motors <i>Oleg Nikitin</i>	<b>593</b>
The Steering Hydraulic Drives with Centralized or Independent Power Supplies for the Main Aircrafts <i>Igor Shumilov</i>	<b>596</b>
The Experience of Creating Compact Energy Efficiency Hydrostatic Servo Drive <i>Oleg Tarasov</i>	<b>603</b>
Neural adaptive tracking control for Wheeled Mobile Robots <i>Zhencai Li, Yang Wang, Xingguo Song, Zhen Liu</i>	<b>610</b>
Research on Synchronization Control Strategy for Hydraulic Transmission of Tracked Vehicle <i>Qingjun Yang, Zhao Zhang, Shenghui Zhang, Qingjun Lv, Lei Yang, Qinghui Xiong</i>	<b>618</b>
<b>Topic: Advanced Control Valve and Advanced Actuator System</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Design and Analysis of a Direct Load Sensing Electro-Hydrostatic Actuator <i>Zengning Song, Zongxia Jiao, Yaoxing Shang, Shuai Wu, Wunong Hu</i>	<b>624</b>
Algorithm Research for Increasing Accuracy of Rolling Mill Servo System Under the Condition of State Feedback <i>Gang Chen, Sai Cao, Xintian Jiang, Yiqun Wang, Ru Chang</i>	<b>628</b>
<b>Topic: Water Hydraulics, Sea-water Hydraulics, Sea Rescue</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Research on the Primary Energy Conversion Efficiency of Pendulum Wave Energy Converter <i>Yang Zhang, Yaobao Yin</i>	<b>633</b>
Study on Silt Contamination Properties of Natural Waters Used as Pressure Medium <i>Defa Wu, Yinshui Liu, Donglin Li, Yipan Deng, Yong Liu</i>	<b>639</b>
Design of Hydraulic System for Autonomous Sampler at Deep-sea <i>Wei Song, Shiqiang Zhu</i>	<b>643</b>
Research on a New Type of Water Hydraulic Vane Pump <i>Xiaoming Wu, Kunxing Sun</i>	<b>649</b>
Research on Vulnerability of Seawater Hydraulic System Based on Complex Networks Modeling <i>Yang Miao, Songlin Nie</i>	<b>654</b>
Study of ADRC on Fluid Power Transmission System Control Characteristics of 60MN Hydraulic Press <i>Jingchang Feng, Bin Yu, Xuebing Li, Jing Yao, Xiangdong Kong, Haixin Guo</i>	<b>660</b>
Development of Seawater Hydraulic Pump Tester in Deep-sea Simulated Environment <i>Zhenhua Zhang, Songlin Nie, Limao Zhang, Shaohua Yuan</i>	<b>667</b>
Displacement Estimation of Tap-Water Driven McKibben Muscles <i>Wataru Kobayashi, Kazuhisa Ito</i>	<b>672</b>

Study on the Screening of Materials for the Friction Pairs in an Axial Piston Swashplate Seawater Hydraulic Pump <i>Qunguo Tang, Yuanmei Wang, Haolong Hu, Xiaohui Li</i>	677
<b>Topic: Microfluidic systems and Lab-on-a-chip</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
The Ultrasonic Characteristics Study of Weak Gas Leak <i>Dongying Wang, Fengyang Zhao, Tao Wang</i>	681
Numerical Analysis of Air Bubble Formation in PDMS Micro-channels in Negative Pressure-driven Flow <i>Jixiao Liu, Songjing Li</i>	686
Research on Fast Low-Cost Measurement of Contact Angle Surface Tension and Viscosity <i>Hai Fu, Jixiao Liu, Tianhang Yang, Songjing Li</i>	691
Mathematical Modeling and Realization of A Liquid-filled Multifocal Lens Fabricated with PDMS Membranes <i>Weiliang Jia, Han Shi, Songjing Li</i>	696
Parameter Modification Model of Fluid Flow Rate for a Pneumatically-actuated PDMS Membrane Microvalve <i>Xuling Liu, Jun Liu, Songjing Li</i>	700
Rapid Prototyping of Multilayer Thermoplastic Microfluidic Chip <i>Tianhang Yang, Ye Su, Songjing Li</i>	706
Characterization of Syringe-Pump-Driven Versus Pressure-Driven Microfluidic Flows <i>Wen Zeng, Songjing Li, Zuwen Wang</i>	711
Design and Fabrication of Manual Liquid-Filled Color-Changing Glasses Based on Soft Lithography <i>Min Zhang, Songjing Li</i>	716
An Automatic Liquid-Filled Colour-Changing Glasses Based on Thermo-Pneumatic Technology <i>Min Zhang, Songjing Li</i>	720
Ecological Micro Hydropower Plant with Axial Hydro-Turbine <i>Roman V. Kuzmin, Alexandr S. Meshkov, Viktor I. Susdorf</i>	724
<b>Topic: Functional Fluid and Applications, Intelligent Materials and Smart Structure</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Design and Fabrication of ER Braking Device for Micromouse <i>Xiangxiang Fan, Sayako Sakama, Takahiro Togawa, Yutaka Tanaka</i>	729
Numerical Simulation of Cavitation Washer in Pipe Cleaning <i>Wenqi Ma, Zhiyong Xiao, Meixia Zhang, Hongyi Sun</i>	734
<b>Topic: Healthcare Robotics and Mechatronics</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>

An Attitude Estimation Algorithm for High Dynamic Movement <i>Baoxu Liu, Zongxia Jiao</i>	739
Development of Emotion Recognition Algorithm using Tactual Communication Tool <i>Yasuhiro Matsuda</i>	744
Indoor Objects 3D Modeling Based on RGB-D Camera for Robot Vision <i>Guangsheng Shi, Lijun Zhao, Ke Wang, Yunfeng Gao, Yihuan Liu</i>	750
A New Approach for Attitude Estimation of Unicycle Robot <i>Xiaobing Zhang, Junhong Ji, Long Zhao, Qiang Xu</i>	756
Optimal Multi Virtual Gravity and Control for Robotic Gait Synthesis <i>Lipeng Yuan, Lei Chen, Chikun Gong, Wenlu Wang, Jiateng Jiang</i>	761
<b>Topic: Field Robotics, Aerospace Robotics and Intelligent Mechanism</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
A Survey of Dynamic Robot Legged Locomotion <i>Jawaad Bhatti, Andrew Plummer, Pejman Irvani, Beichen Ding</i>	770
Structure and Machinery Simulink of Three Degrees of Freedom Parallel Pneumatic Robot <i>Dongge Zhang, Tao Wang, Wei Fan</i>	776
A New Approach Based on Undulate Propulsion Theory for Flapping Wing Analysis and Design <i>Longfei Zhao, Yaoxing Shang, Zongxia Jiao</i>	781
A Thermal Vacuum Environment Adaptive Design Method and Test for a Space Manipulator Joint <i>Qinglin Fan, Yanbo Wang, Shuxuan Liu, Jianming Li, Tao Deng, Jiayu Liu</i>	787
A Method of Ground Verification for Energy Optimization in Trajectory Planning for Six DOF Space Manipulator <i>Jiayu Liu, Qiang Huang, Yanbo Wang, Tao Deng</i>	791
A Bio Inspired UAV Model Based on Corvus Splendens <i>Ahsan Jameel, Shahmeer Khalid, Muhammad Khan, Khurram Kamal, Anas Aqeel, Senthana Mathavan, Talha Awais, Tayyab Zafar</i>	797
Research on Zero-finding Method for the Incremental Encoder of Hydraulic Position Servo Motor <i>Fan Yuan, Xuyong Wang, Jianfeng Tao, Baoying Luo, Yong Dai, Zhonghua Miao</i>	803
Vision Calibration for Automated Guided Vehicle Based on Static and Motion Two States <i>Jun Yu, Jianjun Yang</i>	809
Research on the Force Compensation Control Strategy of Machine Part Chamfering Robot <i>Lihua Yang, Guanglin Shi, Qinyang Guo</i>	814
Fish-eye Image of Hemi-cylinder Unwrapping Plane Based on a Flexible Technique <i>Jutamanee Auysakul, Xu He</i>	821
Hybridization of Simulated Annealing with Quenching for Job Shop Scheduling <i>Kashif Akram, Khurram Kamal</i>	825
Effects of Stride Length and Frequency on Mobile Performance of a Hydraulic Hexapod Robot <i>Yiqun Liu, Liang Ding, Zhen Liu, Haitao Yu, Ma Jin, Haibo Gao, Zongquan Deng</i>	830

Stablization of an Aerial Robot for Indoor Environments Using a Vision-based Approach <i>Akash kumar, Khurram kamal, Tayyab Zafar, M Abbas Kararvi, Hassan Afzal, Asad naseer, Senthana Mathavan</i>	<b>836</b>
Turning Gait Planning and Simulation Validation of a Hydraulic Hexapod Robot <i>Haibo Gao, Ma Jin, Yiqun Liu, Liang Ding, Haitao Yu, Zongquan Deng</i>	<b>842</b>
Dynamics Research of the folded-deployable suspension for Planetary Exploration Robot <i>Suojun Li, Shaogang Liu, Jianguo Tao</i>	<b>848</b>
Design of the Special Hand Mechanism for Auto-grabbing Concave-convex Object with Special Curved Surface <i>Fan Li, Yanlong Liu, Qiang Yang</i>	<b>854</b>
Study on Bionic Rotation of A Free-Floating Space Robot <i>Lixian Xu, Liang Wang</i>	<b>859</b>
<b>Topic: Modeling and Simulation, Dynamics and Control</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Nonovershooting Position Control for Unidirectional Proportional Pump Controlled Asymmetric Cylinder with Proportional Controller <i>Jian-feng Tao, Liu-qing Yang, Xuan Wang, Feng-rong Zhang</i>	<b>866</b>
PI Parameters Design for Motion Synchronization of Proportional Pump Controlled Dual Winch on Crawler Crane <i>Jian-feng Tao, Hai-yan Yang, Ya-jin Wu, Cheng-liang Liu</i>	<b>873</b>
Study on Flow Field Characteristics of Lithium Cell Films Drying Cabinet with Whole-Side Exhauster <i>Xujia Li, Hailong Yang, Dianrong Gao</i>	<b>879</b>
CFD Analysis and Experiment Study on the Lubrication Behaviours of Dimpled Surfaces Under Seawater Lubrication <i>Shaofeng Wu, Dianrong Gao</i>	<b>883</b>
Adaptive Backstepping Design of Electro-Hydraulic Actuator Based on State Feedback Control <i>Qing Guo, Tian Yu, Dan Jiang</i>	<b>888</b>
Analysis of Rotation of Pigs during Pigging in Gas Pipeline <i>Xinyu Zhang, Rui Li, Bo Zhang, Lin Zhang, Yuanzhang Jin, Qiao Song, Bo Li, Xiaoli Zhao</i>	<b>892</b>
Design of Bionic Non-smooth Fan-shaped Concave Surface Based on Hydrodynamic Lubrication <i>Yingna Liang, Dianrong Gao, Ran Sui</i>	<b>896</b>
Research on the Energy Storage Characteristics of Diaphragm Accumulator <i>Qilin Zhang, Wei Wu, Jibin Hu, Shihua Yuan</i>	<b>901</b>
Simulation Research of Grease-releasing Mechanism for Oil-retaining Bearing <i>Xiaohui Luo, Jun Guo, Weijie Shi, Hanyang Liu</i>	<b>906</b>
Pressure Compensator (PC) Pressure Overshoot Analysis and Experimental Research of an Open Circuit Pump <i>Carsten Fiebing, Xiujuan Lu, Stanislav Smolka</i>	<b>910</b>

Static Stress and Modal Analysis of Water Hydraulic Reciprocating Piston Pump Driven by the Linear Motor <i>Yeqing Huang, Songlin Nie, Kai Ma, Fan Liu, Lei Li</i>	<b>914</b>
Numerical Simulation of Flow in Concentric Cylinders with the Slit Wall <i>Changqing Chao, Dong Liu, Cheng Tang</i>	<b>918</b>
Direct Nonlinear Control for an Electro-hydraulic System <i>Xuan Ba Dang, Kyoung Kwan Ahn</i>	<b>922</b>
Transient Flow Field Characteristic Analysis of Poppet Valve Based on Dynamic Mesh 6DOF Technique <i>Xiaoxia Guo, Jiahai Huang, Long Quan, Shengguo Wang</i>	<b>928</b>
Nonlinear Analysis of Oscillations in Aero-hydraulic Actuation System Considering Load Effect <i>Yawen Li, Zongxia Jiao, Yanzhi Xu</i>	<b>934</b>
Simulation of Wet-Clutch Short-time Load end Speed Control System on Amesim <i>Di Wang, Bing Xu, Junhui Zhang, Song Zhang</i>	<b>939</b>
Position Control Research Based on Wire Rope Connected Twin Direct Drive Motor System <i>Quan Guo, Zongxia Jiao</i>	<b>944</b>
Theoretical Study and Optimization of a CNG Fueling Sub-station Compressor Driven by Linear Motor <i>Xufeng Zhao, Xiaohui Li, Chao Li, Weicai Quan, Yinshui Liu</i>	<b>950</b>
Modeling and Unbalance Force Control of Four-cylinders Synchronization Electro-hydraulic Loading System in Superplastic Forming Equipment <i>Zenghui Shi, Zongxia Jiao, Shuai Wu, Hong Xiao</i>	<b>956</b>
The CFD-PBM Coupling Calculation of Salt-out Flow in the Centrifugal Pump <i>Yayun Wang, Cheng Tang, Dong Liu</i>	<b>962</b>
On Orientation Control of Suspended Blade During Installation in Wind Turbines <i>Lasse Schmidt, Daniel B. Roemer, Henrik C. Pedersen, Torben O. Andersen</i>	<b>966</b>
Active Disturbance Rejection Trajectory Tracking Control for Two-Joint Driven by Pneumatic Artificial Muscles <i>Ling Zhao, Linlin Ge, Yafei Yang</i>	<b>972</b>
Modeling of Movement-Induced and Flow-Induced Fluid Forces in Fast Switching Valves <i>Roemer Daniel Beck, Johansen Per, Schmidt Lasse, Andersen Torben Ole</i>	<b>978</b>
Dynamic analysis and Co-simulation ADAMS-SIMULINK for a Space Manipulator Joint <i>Yanbo Wang, Ke Li, Haiping Zhou, Songbo Deng, Jian Xu, Jiayu Liu</i>	<b>984</b>
Optimal Design of a Small High Temperature and High Pressure Spool Valve for Oil Exploration <i>Mingxing Han, Yinshui Liu, Donglin Li, Yipan Deng, Jun Li</i>	<b>990</b>
Power Flow Analysis Using PowerWorld: a Comprehensive Testing Report <i>Chao Zuo, Bowen Wang, Min Zhang, Mustafa A. Khanwala, Shuping Dang</i>	<b>997</b>
Design of Collaborative Training Simulation System for Engine-room Resource Management <i>Zunlei Duan, Hui Cao</i>	<b>N/A</b>

Dynamic Properties of LEG Tilting Pad Fluid Film Bearing <i>Qijiang Yang, Wei Zhao, Weiguang Li, Jiexing Luo, Kai Wang, Xiangli Zheng, Jiaojiao Wang</i>	<b>1006</b>
Optimal approach for the eradication of Ebola <i>Xiaorong Huang, Wangyong Lv, Ju Liu, Wanli Liu</i>	<b>1011</b>
Research on the Ebola Virus's Drug Delivery System <i>Feng Chen, Wangyong Lv, Chuan Luo, Yiping Huang</i>	<b>1015</b>
Motion Control for A Redundantly Actuated Parallel Electrohydraulic Mechanism <i>Changhong Gao, Zhidong Yang, Dacheng Cong, Chifu Yang</i>	<b>1019</b>
Low-Speed Performance Analysis of Variable Frequency Hydraulic Systems in Parallel Valve Control <i>Jinhai Sun, Haigang Ding, Jiyun Zhao</i>	<b>1024</b>
Simulation Research of Hydraulic Turbine Generator Under Fuzzy PID Control with Load Disturbance and 100% Load Rejection <i>Xiaoming Yuan, Chao Wang, Junbo Wang, Lei Ma, Lijie Zhang</i>	<b>1028</b>
Impedance Analysis and Clamp Locations Optimization of Hydraulic Pipeline System in Aircraft <i>Xin Li, Lijian Zhang, Shaoping Wang, Chao Zhang</i>	<b>1034</b>
Decoupling Control of PMA-driven Serial Link Mechanism <i>Hao Liu, Lijian Zhang, Yituo Li, Xin Li, Chao Zhang</i>	<b>1040</b>
Study on Generation Mechanism and Source of Aerodynamic Noise of High-Speed Train <i>Zhaojin Li, Jian Yang, Ruigang Song, Tianchen Yuan</i>	<b>1045</b>
Modeling and Simulation of Hydraulic System for The Multi-DOF Hydraulic Arm <i>Yishan Zeng, Shengtao Geng, Lingqing Feng, Baogen Zhou</i>	<b>1050</b>
Improved Degraded Ceiling Algorithm for the Expected Optimal Value <i>Beibei Guo, Wangyong Lv, Ruyi Fu, qingzhi zhong</i>	<b>1055</b>
Residual Stress Distributions Based on Solder Joint Shape with Free Boundaries <i>Guoliang Zhang, Wei Zhong, Jiagen Peng</i>	<b>1059</b>
Simulation of Hydraulic Excavators Slewing System Based on Hydraulic Accumulator <i>Ting Zheng, Yuancheng He</i>	<b>1063</b>
Calculation of the Flow Characteristics of a Pipeline with an Intermittent Air Source While Considering the Dynamic Change of Flow Area of a Ball Valve <i>Liangbin Guo, Yunxiang Zhao</i>	<b>1067</b>
Test and Analysis of the Fundamental Functions of Digital Signal Processing Using Signal Wizard 2.55 <i>Guo Sheng, Li Huang, Nigel Chan, Maciel Gabriela, Shuping Dang</i>	<b>1072</b>
Analysis of Ni-coating's Influence on Wetting of Ag Solder <i>Wei Zhong, Guoliang Zhang</i>	<b>1077</b>
The Component-method Model of Variable Cycle Engine <i>Lihua Zhang, Kun Xu, Hui Xue, Chunxia Wang, Wu Jiechun</i>	<b>N/A</b>

The Simulation and Emulation of Orbit Parameters of Spacecraft Based on Passive Detection <i>Lihua Zhang, Chunxia Wang, Jiechun Wu, Kun Xu, Ri Xu</i>	N/A
The Choosing of College Excellent Coaches Based on the Weighted Sum Model <i>Lihua Zhang, Xue Hui, Kun Xu, Chunxia Wang, Jiechun Wu</i>	N/A
Forward Kinematic Modeling and Analysis of 6-DOF Underwater Manipulator <i>Asghar Khan, Liquan Wang</i>	1093
Thermal-Hydraulic Modeling and Simulation of Piston Pump in Electro-hydrostatic Actuator System <i>Kai Li, Zhong Lv, Kun Lu, Ping Yu</i>	1097
Improved Robust Control for Multi-link Flexible Manipulator with Mismatched Uncertainties <i>Fangfang Dong, Jiang Han, Ye-Hwa Chen</i>	1102
Simulation of the Seepage Properties of Grease Containing Nano-C <sub>60</sub> in the Albronze Powder Metallurgy <i>Hanyang Liu, Xiaohui Luo, Weijie Shi, Jun Guo</i>	1108
Analysis of Magnetic Force of Electromagnet Ball Valve During Pipeline Hydraulic Transients <i>Wenzhi Cao, Tianyang Zhao, Dan Jiang, Ping Yang</i>	1113
Co-simulation of Cylinder Impact Process Based on Simulink and ANSYS <i>Wang Qi, Gangyan Li, Fan Yang, Qian Lu, Fei Li, Dawei Hu</i>	1118
Dynamics Modeling and Postural Stability Control of a Unicycle Robot <i>Long Zhao, Xiaobin Zhang, Qiang Xu, Junhong Ji</i>	1123
Dynamics Modeling and Load Analysis of Linear Motor for LEHA System <i>Tianyi Wang, Huisheng Liang, Zongxia Jiao, Ping He, Liang Yan</i>	1128
Driving Solution Study of a Turbine Flowmeter Dynamic Calibration System <i>Xin Jin, Bin Wang, Zhifeng Ye</i>	1134
Dynamics of Hydraulic Transformer Controlled Motor System <i>Chongfeng Di, Wei Wu, Jibin Hu, Shihua Yuan</i>	1140
Two Directional Transform based Sparse Representation: a Novel Idea and Method for Sparse Representation <i>Yong Du, Shupeng Zheng, Junqian Wang, Yu Wang, Deyi Ran</i>	1145
A Low Order Adaptive Control Scheme For Hydraulic Servo Systems <i>Torben Andersen, Henrik Pedersen, Michael Bech, Lasse Schmidt</i>	1148
Study on Factors of Control Characteristics of Forging Manipulator Continuous Complex Movement Based on Virtual Prototyping <i>Fugang Zhai, Xiangdong Kong, Qilei Wu, Hanyin Zhu</i>	1153
Research on Modeling and Simulation of a Hydraulic Cylinder with Special Buffer Structure <i>An He, Jian Shi, Shaoping Wang</i>	1158
Modeling and Analysis of the Electro-hydraulic Proportional Valve Controlled Motor System Supplied by Variable Pressure Accumulator <i>Bingbing Wang, Guanglin Shi, Licheng Yu</i>	1165



Closed Form Inverse Kinematics Solution for 6-DOF Underwater Manipulator <i>Asghar Khan, Xiangming Cheng, Xingxing Zhang, Liquan Wang</i>	<b>1171</b>
Hydrodynamic Interactions between a Cylinder and an Attached Elastic Plate <i>Dibo Dong, Weishan Chen, Shengjun Shi, Zhenbo Han, Zhenxiu Hou</i>	<b>1177</b>
The Simulation and Analysis on the Roll Influence Factors and Safety Speed of Vehicle under the Extreme Turning <i>Li Fan, Gangyan Li, Ran Chen, Linwei Cao, Lihang Meng, Jian Yang, Zhanghua Luo</i>	<b>1183</b>
Computational Fluid Dynamics Analysis of Hydrodynamic Bearing Clearances on Hemolysis in a Centrifugal Blood Pump <i>Qing Han, Hongwei Li, Xiuhua Men, Xiaohui Wang, Honghua Zhao</i>	<b>1190</b>
Research on PID Controller for Hydraulic Servo System Based on LabVIEW <i>Junpeng Zhao, Xinfu Liu</i>	<b>1195</b>
Cutting Plate Front Surface for an Effective Chip Formation in Recovery Turning of Railway Wheels <i>V.V. Altukhova, B.Ya Mokritskii</i>	<b>1199</b>
Investigation of Two-phase Flow in Axial-centrifugal Impeller by Hydrodynamic Modeling Methods <i>Vladimir Lomakin</i>	<b>1204</b>
Usge of Module-Element Method in Problems of Hydroelasticity for Composite Systems “Ship-Liquid” <i>N.A. Taranukha</i>	<b>1207</b>
Design and Simulation of PWM DC Motor Speed Regulator Based on Proteus <i>Jie Sun, Qinfang Sun</i>	<b>1210</b>
Comparative Vibration Analysis Of A Slender Beam In Gravity Compensation Test And Zero-Gravity Environment <i>Lidong Mo, Zhen Liu, Guanxin Chi, Vitalii Morkovin, Haibo Gao</i>	<b>1214</b>
Experimental Study on the Multi-dimensional Microgravity Simulation System for Manipulators <i>Lidong Mo, Zheyao Xu, Yukun Chen, Naiming Qi, GuanXin Chi</i>	<b>1222</b>
A Practical Compound Control Strategy for Electro-hydraulic Load Simulator <i>Chenghu Jing, Hongguang Xu, Dake Zheng</i>	<b>1228</b>
The Study of Trajectory Automatic Control Based on RBF Neural Network PID Control <i>Zhenmian Du, Zhengmao Ye, Hui Zhang, Hua Bai, Yuanli Xu, Xianguo Jiang</i>	<b>1234</b>
Random Wave Replication Control Method Research on Variable Stiffness Loading System <i>Hui Zhang, Zhengmao Ye, Guang feng Guan, Chen Siyuan</i>	<b>1239</b>
The Application of Direct Drive Volume Control in the Bucket Wheel Machine Control <i>Hui Zhang, Zhengmao Ye, Chong Wang</i>	<b>1243</b>
Variable Structure Force Control of Suspension Loading System <i>Hui Zhang, Zhengmao Ye, Jiang Liu</i>	<b>1247</b>
Performance Investigation of Aerostatic Thrusting Gas Bearing with Discontinuous Slot-restricted <i>Ang Sun, Huizhen Liu, Wenqi Ma, Jie Yu</i>	<b>1252</b>

Dynamics Modeling and Analysis for Tilting-Pad fluid film Bearing Considering Perturbation Frequency <i>Qijiang Yang, Weiguang Li, Jiexing Luo, Wei Zhao, Xiangli Zheng, Kai Wang, Jiaojiao Wang</i>	1257
Numerical Simulation on Flow Characteristics of PM2.5 in the Indoor Environment <i>Dong Xiang, Qingjun Yang, Qitao Huang, Changhai Liu, Yuxin Ding</i>	1263
Optimizing Pipe Network of Lubrication System for Accurate Oil Distribution <i>Qingjun Yang, Kaitao Liu, dong Zhu, Qingjun Lv, Qinghui Xiong, Xiaomei Luo</i>	1268
Dynamics Analysis of Hybrid Parallel Robot <i>Wu You, Fu Zhuang, Xu Jiannan, Yan Weixin, W.H. Liu, Y.Z. Zhao</i>	1272
<b>Topic: Condition Monitoring and Fault Diagnosis, Reliability, Health Management, Fault Prognostics</b>	
<b>Paper Title / Author(s)</b>	<b>Page</b>
Fault Diagnosis Method for Hydraulic Pump Based on Order Tracking <i>Wanlu Jiang, Yong Zhu, Meng Wang</i>	1276
Research on Multi-fault Identification Method of Axial Piston Pump Based on Correlation Dimension <i>Siyuan Liu, Mengxue Yang, Wenwen Zhang</i>	1281
Multiple Damage Detection using Sparse Blind Source Separation in Composite Structures <i>Shaopeng Dong, Mei Yuan, Fukai Shang, Yuxuan Liang, Zongxia Jiao</i>	1285
Two-Stage Force Particle Swarm Optimization Algorithm and Application in Hydraulic System Reliability Optimization <i>Chengyu Yao, Xueyun Tan, Dongning Chen, Shijun Lv</i>	1291
Hydraulic System Reliability Modelling and Analysis Based on Convex Model Bayesian Network <i>Dongning Chen, Yuliang Zhang, Chengyu Yao, Shijun Lv</i>	1297
Testing Report of Power Flow and Fault Analysis Using IPSA+ <i>Li Huang, Xu Zhang, Min Zhang, Zehua Zhang, Bowen Wang</i>	1302
Capacitive Sensing System for Car Washer Tank Liquid Level Measurement <i>Bowen Wang, Li Huang, Min Zhang, Yathurshen Muralitharan, Xu Zhang, Shuping Dang</i>	1306
Task Allocation Strategy of Utility Management System Based on Heuristic Constrained Optimal Tree Algorithm <i>Min Luo, Shaoping Wang, Jian Shi, Zongxia Jiao</i>	1311
State Recognition Based on Wavelet Packet Norm Entropy for Aircraft Hydraulic Pump <i>Shaoping Wang, Qianxia Ma, Chuanqi Lu</i>	1318
CFD Investigation on the Influence of Jet Velocity of Oil-jet Lubricated Ball Bearing on the Characteristics of Lubrication Flow Field <i>Ran Zhang, Chao Wei, Wei Wu, Shihua Yuan</i>	1324
Research on Parallel Energy-saving Reliability Test Method for Hydraulic Components <i>Liwang Wei, Yi Zhang, Rui Guo, Jingyi Zhao</i>	1329
<b>Topic: Energy-saving Technology in Fluid Power System, Fluid Power Control in New Energy Resource</b>	

<b>Paper Title / Author(s)</b>	<b>Page</b>
Analysis and Test of No-load Pressure Drop in an Integrated Hydrostatic-driven Electric Generator <i>Tao Wang, Zhixiong Zhou, Ximing Xiang</i>	<b>1333</b>
Experimental Research on Cooling Performance of a Type of Microcomputer Chassis <i>Jianhua Zhao, Dianrong Gao</i>	<b>1338</b>
Numerical Study of Turbulent Drag Reduction over Non-smooth Surfaces of Rotating-stationary Disk System <i>Zhao Xiong, Shihua Yuan, Wei Wu, Jibin Hu</i>	<b>1343</b>
Study on Energy Regeneration System for Hybrid Hydraulic Excavator <i>Kyoung Kwan Ahn, Ngoc Minh Truong Bui, Quang Truong Dinh, Quoc Thanh Truong, Se Young Lee, So Young Lee</i>	<b>1349</b>
A+D Combined Pump-controlled System for the Regular Forging Process of the Forging Press <i>Jing Yao, Bin Li, Xiaoming Cao, Yang Zhang</i>	<b>1355</b>
Research on Mechanism of Drag Reduction and Efficiency Improvement of Hydrodynamic Torque Converter with Bionic Non-smooth Surfaces <i>Chunbao Liu, Bosen Chai, Changsuo Liu, Wenxing Ma</i>	<b>1361</b>
A Research Proposal of the Optimization Strategy of Distribution Network <i>Rinat Kakimzhanov, Li Huang, Xu Zhang, Bowen Wang</i>	<b>1368</b>
Segmented Power Demand Forecasting Using Stochastic Model <i>Xue Feng, Bowen Wang, Rentao Wu, Mustafa A. Khanwala, Shuping Dang</i>	<b>1374</b>
Hydraulic Power Assist Vehicle's Energy Control Strategy Based on Fuel Consumption Characteristics <i>Wei Xiao</i>	<b>1378</b>
Simulation and Experiment of Front Located Parallel Hydraulic Hybrid System <i>Boyuan Zheng, Xin Wang, Weiquan Liang, Xinhui Liu</i>	<b>1383</b>
A Study on Motion and Energy Absorption Characteristics of Raft-type Wave Energy Converter <i>Qingjun Yang, Changhai Liu, Wei Feng, Gang Bao</i>	<b>1388</b>
Pressure Control of Rotary Accumulator <i>Changhong Wang, Yunwu Han, Shurui Wang, Lianghua Bi</i>	<b>1395</b>
Rectangular Tabs for Elliptic Jet Control <i>S. M. Aravindh Kumar, Ethirajan Rathakrishnan</i>	<b>1399</b>
A Research on Theory and Practice of the Innovative Talent Training Mode in Mechanical Specialties <i>Bing Zhao, Ji Su</i>	<b>1408</b>
Exploration and Practice of Engineering Graduate Entrepreneurial Ability Training System <i>Fang Wang, Bing Zhao</i>	<b>1412</b>