

2017 5th International Conference on Mechanical, Automotive and Materials Engineering (CMAME 2017)

**Guangzhou, China
1-3 August 2017**



**IEEE Catalog Number: CFP17L90-POD
ISBN: 978-1-5386-0433-5**

**Copyright © 2017 by the Institute of Electrical and Electronics 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP17L90-POD
ISBN (Print-On-Demand):	978-1-5386-0433-5
ISBN (Online):	978-1-5386-0432-8

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2017 5th International Conference on Mechanical, Automotive and Materials Engineering (CMAME 2017)

Table of Contents

Preface	ix
Committees	x

Materials Science and Engineering

Vibration and Mode Shape Analysis of Functionally Graded Nanocomposite Plates Reinforced by Aggregated Carbon Nanotube.....	1
<i>Vahid Tahouneh</i>	
Hybrid Frequency-dependent Hysteresis Model of Magnetostrictive Actuator	6
<i>Yikun Yang, Bintang Yang and Muqing Niu</i>	
Complex Permittivity and Permeability Measurement Method of Multiple Free-Space Incident for Structured Absorbing Materials	11
<i>Li Liangtao, Liu Jun, Qu Liyong, Ma Yao</i>	
Mechanical Properties of C _f /SiC Composites with Ameliorated Interface Employing a New Precursor	15
<i>Yunliang Shi, Ke Jian</i>	
Study on the Compressive Mechanical Properties of HTPB Propellant at Low Temperature	19
<i>Xiangdong Chen, Xinlong Chang, Youhong Zhang, Bin Wang</i>	
Structural and Properties Study of Li ₃ PO ₄ Thin Film Electrolyte for Potentiometric Nox Sensing	23
<i>Hairong Wang, Mi Zhang, Zhen Liu, Di Chen, Hanqing Gu</i>	
Research on Surface Topography Characteristics of Laser Micro-hole Drilling	28
<i>Haijuan Ding, Xiaohai Li and Dong Wang</i>	
Study on Oxidation Resistance of TiAlN Films Deposited by Magnetron Sputtering	32
<i>Hongying Huo, Min Zou</i>	
Effect of Cr Element on Performance of Ni-based Alloy Laser Cladding Layer	37
<i>Y. Yang, Z. P. Jiang, H. Z. Li, L. Chen</i>	

Engine System Design and Power Machinery

The Remaining Life Prediction of the Fan Bearing Based on Genetic Algorithm and Multi-parameter Support Vector Machine	42
<i>Shuangshuang Jin, Zhenhuan Wu, Yudong Fu and Guoan Yang</i>	
The Design of the Four-star Single-acting Piston Cylinder Offset Type of Radial Motor	48
<i>Li Huan, Li Chao</i>	
In-plane Equivalent Elastic Modulus of U-type Honeycomb with Zero Poisson's Ratio	53
<i>Liu Weidong, Xi Hui, Zhang Mengzhe, Liu Jingying, Hu Rui, Yan Jie</i>	

A Study on the Power Characteristics and Control Strategies of a New Type of ECHPS	58
<i>Wang Yuanzhe, Yang Lin, Hu Wen, Bai Fuming</i>	
Analysis of the Kinematics Characteristics of the Power Transmission Mechanism of a New Wobble Plate Engine.....	63
<i>Simin Hu, Xiaojun Xu, Lei Zhang, Kun Yin</i>	
Mean Stress Correction in Plastic Strain Energy Fatigue Life Prediction Model for Turbine Disk of Aero-Engine	67
<i>Shan Lu, Yun-Lai Su</i>	
Engine Assembly Precision Analysis based on the Working Temperature and Finite Element Analysis	73
<i>Zhang Yu, Sha Hui</i>	
Study on a Semi-physical Simulation Experimental Platform for the Signal Wheel Sensor in the Engine	77
<i>Sui meili, Lv jiangyi</i>	
Mechanical Design-Manufacture and Automation	
The Application of GA-BP Algorithm in Prediction of Tool Wear State	81
<i>Tang Jun, Li Wenxing, Zhao Bo</i>	
Electrical-Magnetic-Mechanical Modeling of a Novel Vibration Shaker Based on a Rotary Permanent Magnet	86
<i>Fengyu Cao, Muqing Niu, Baoying Xie, Wei Hu and Bintang Yang</i>	
Evaluation of Softening Zone in X80 Pipeline Steels under Tension-bending Load	92
<i>Liu Ligang, Zhang Chaofan, Liu Yu, Sun Shumao, Yu Hui</i>	
Dynamic Performance Analysis and Design for a Fluidlastic Isolator	98
<i>Cheng Qi-you, Deng Jing-hui, Qian Feng, Feng Zhi-zhuang, Zhu Yan</i>	
Design of the Tobacco Seedling Transplanting Machine.....	102
<i>Zhang Fei, YanYaMin</i>	
Research on Structural Strength of 7800 PCTC under Flexible Design.....	106
<i>Xu Meng-Na, Wang Wei, Chen Di-Yi, Xie Yong-He, Li Guo-Qiang</i>	
Investigation on Sound Absorbing Performance of the Polyester Fiber for Noise Reduction in Large-scale Equipment.....	110
<i>Panfeng Bai, Xiaocui Yang, Xinmin Shen, Xiaonan Zhang, Zhizhong Li, Qin Yin</i>	
Dynamic Characteristics Analysis of Spiral Groove Liquid Lubricated Seal Considering Centrifugal Inertia ...	114
<i>Yang Wenjing, Hao Muming, Li Zhentao, Cao Hengchao</i>	
Transient Thermal Solid-fluid Coupled Simulation on the Compression Progress of the Multistage Air Compressor Based on Ansys Workbench	119
<i>Yongguang Liu, Yunlong Li</i>	
A Dynamic Relation Model Analysis of High-speed Impact and Sabot Strength.....	123
<i>Huaying Wu, Lizhong Wang, Jinfeng Shang, Meng Zhao</i>	
A Fuzzy Satisfactory Optimization Method Based on Stress Analysis for a Hybrid Composite Flywheel	128
<i>Liping Yang, Zhengyi Ren, Curran Crawford</i>	
A Novel Measurement for Monitoring Mechanical Impedance Applied to Breakthrough Detection of Bone-Drill System	133
<i>Po-Jen Koa, Mi-Ching Tsai</i>	

Vibration Response of the Launcher under Impact Load.....	138
<i>Huazheng Wang, Yi Jiang, Miao Chen, Wei Liu</i>	
Design and Analysis of Robot Systems	
Laser Sensor Weld Beads Recognition and Reconstruction for Rail Weld Beads Grinding Robot.....	143
<i>Wenqiang Wu, Lingqian Kong, Wei Liu, Chunliang Zhang</i>	
Rigid-Flexible Coupling Simulation and Vibration Analysis of Flexible Robot	149
<i>Zhao Liu, Li-Bin Song, Ye Li, Bo-Zhao Pan</i>	
Analysis and Simulation of Quadruped Walking Robot with Hydraulic Driving.....	154
<i>Xin Li, Jingfeng He, and Zenghua Bian</i>	
Trajectory Planning Method of Redundant Robot for Spraying the Inner Surface	158
<i>Zhao Liu, Li-Bin Song, Bo-Zhao Pan, Ye Li</i>	
Automobile Design and Manufacturing Engineering	
Design and Analysis of a Novel Tensioning Stage Driven by a Giant Magnetostrictive Actuator.....	164
<i>Xiaoqing Sun, Bintang Yang, Shufeng Guo, Wenqiang Zhao and Jietan Zhang</i>	
Kinematical Analysis of a Novel Retractable Suspension	170
<i>Kun Yin, XiaoJun Xu, FaLiang Zhou, SiMin Hu</i>	
Design of a Novel Active Joint Mechanism for Solar Panels.....	174
<i>Wei Hu, Quan He, Bintang Yang, Shufeng Guo, Wenqiang Zhao, Jietan Zhang</i>	
State Recognition of Egg Embryo in Vaccines Production Based on SVM	178
<i>Yanwei Xu, Menghui Chen, Tancheng Xie</i>	
Vehicle Dual-Redundancy Electronic Steering Wheel System.....	183
<i>Tong Wang, Junnan Mi, Zhikai Cai, Xi Chen, Xiaomin Lian</i>	
A New Self-Adaption Control Strategy based on Vehicle-and-Road Incorporation for Plug-in Hybrid Electric Vehicle.....	188
<i>Jianan Zhang, Liang Chu, Chong Guo, Yuanjian Zhang, Zicheng Fu, Yadan Liu</i>	
Research on Measurement Method of Brake Cylinder Compensation Hole of Automobile	195
<i>Junpeng Gao, Tao Jiang and Shuyuan Xing</i>	
Numerical Simulation of the Stress, Temperature & Wear Behaviors of the Drum Brake.....	199
<i>Ehtisham Shahid, Xiaoying Wang, Zijie Fan, Liangjin Gui</i>	
Study on Optimization Target of Camber of Independent Suspension	205
<i>Zhicheng Wu, Yishan Sun</i>	
Thermal and Fluid Mechanics Analysis	
Wear State Recognition of NC Tool Based on Multi Sensor	209
<i>Yanwei Xu, Junda Ma, Tancheng Xie</i>	
Surface Temperature Measurement with Unknown Emissivity Using a Two-color Pyrometer Placed with a Reflector	214
<i>Xunjian Che, Zhi Xie</i>	
Simulation Analysis of Gas-solid Two-phase Flow for Heating Catalyst in Rotary Multi-cavity Kiln.....	218
<i>Yu-ping Ma, Jing-jing Xu</i>	

Thermo-electric Model of The Power Battery and Module Based on AMESim	223
<i>Jianpeng Wang, Cunyun Pan, Haijun Xu, Xiaojun Xu</i>	
The Swimming Characteristics of Bionic Frogs Based on Multi – Linkage Mechanism	229
<i>Zheng Sun, Jiajian Lin, Yihui Xia</i>	
Aircraft Structural Design and System Control	
Dynamic Modeling and Simulation of Powered Parafoil Airdrop Process	234
<i>Rui Guo, Qingbin Zhang, Zhiwei Feng</i>	
Airfoil Aerodynamic Optimization Based on Proper Orthogonal Decomposition.....	240
<i>Su Hua, Li Bo, Gong Chunlin, Gu Liangxian, Li Xu</i>	
Dynamic Analysis for Rotor/ Fuselage Coupling Stability of a Bearingless Rotor Helicopter.....	245
<i>Zhu Yan, Lu Yu-hui Ling Ai-min</i>	
Research on Adaptive Cruise Control Systems and Performance Analysis Using Matlab and Carsim.....	249
<i>Yang Ying, Ogunleye Odunayo Solomon</i>	
Precise Robot Assembly for Large-scale Spacecraft Components with a Multisensor System.....	254
<i>Meng Shaohua, Hu Ruiqin, Zhang Lijian, Zhao Jun</i>	
L1 Fault Tolerant Control with Sliding-mode Based Adaptive Law for Aircraft Actuator Fault	259
<i>Wang Chao, Xie Wujie, Dong Wenhan, Jiao Jinyan</i>	
Interference Detection of Spacecraft before Deck Docking Based on 3D Scanner	265
<i>Wei Zhang, Zaihua Yang, Kai Xu, Rongxu Xiao, Lei Sun, Pan Hao</i>	
Study on Small UAVs’ Deep Stall Landing Procedure.....	269
<i>Bochao Cheng, Zheng Guo</i>	
The Conceptual Design and Aerodynamic Characteristics Analysis of the Diamond Joined-Wing Configuration UAV	275
<i>Sun Junlei, Wang Heping, Zhou Zhou, Lei Shan</i>	
Control Theory and Engineering Applications	
Power Quality Disturbances Classification Based on Waveform Feature	280
<i>Rixing huang, Feng he, Guan chun, Bo jiang</i>	
Design and Implementation of Fuzzy-PI Controllers for PMSM Based on Multi- Objective Optimization Algorithms.....	285
<i>I-Hsi Kao, Kuna-Chung Lu, Jau-Woei Perng</i>	
System Identification in Adaptive Inverse Control for Electrohydraulic Shaking Table Using Variable Tap-length NLMS Algorithm.....	290
<i>Man Wang, Dacheng Cong, Zhidong Yang, Changhong Gao</i>	
Realization of Fiber Optic Gyro Modulation and Demodulation Control System Based on FPGA	296
<i>Chao Liao, Jinbin Luo, Li Liu, Chengxiang Liu</i>	
Research on the Robustness of Digital Hydraulic Position Tracking System Based on Sliding Mode Adaptive Control.....	301
<i>Pan Wei, Zhu Shi-Jian</i>	
The Design of Surveillance System based on Hi3520D.....	305
<i>Qingming Yi, Min Shi and Yujia Chen</i>	

Micropositioning Control for an Amplified Magnetostrictive-Actuated Device	310
<i>Sicheng Yi, Bintang Yang, Muqing Niu, Guang Meng, Shufeng Guo and Wenqiang Zhao</i>	
Study on Dynamic Alarm Curve of Condition Monitoring Parameters of Hydropower Unit.....	315
<i>GE XinFeng, Chen Huinan, Ding Yongsheng, Du Jinqi, Zhao Ming, Zhang Yizhong</i>	
Vibration Data Acquisition and Fault Diagnosis System of Hydro Turbine Based on CompactRIO	319
<i>Gong Weiming, Zhao Ming, Ge Xinfeng, Ding Yongsheng, Du Jinqi, Zhang Yizhong</i>	
Localization of Moving Object under the Interference of Ferromagnetic Platform with the Alternating Magnetic Field.....	324
<i>Gao Xiang, Yan Sheng-gang, Li Bin</i>	
Decoupling for Redundant Multi-axis Shaking Table Based on Combination of Degree of Freedom and Modal Control.....	328
<i>Qiang Fan, Shutao Zheng, Yu Xia</i>	
Power Electronics and Energy Engineering	
Research on Multi-objective Optimization Linear Programming Problem of Power Generation under Carbon Emission Trading.....	335
<i>Wu Guoying, Xu Erfeng, Liu Dunnan, He Yingjing</i>	
Technical System of Energy Big Data Analyzing in the Context of Energy Internet	340
<i>Liu Dunnan, Xu Erfeng</i>	
Dynamic Mechanical Analysis of a Power Electronic Gate Driver Board.....	345
<i>Thomas Schriefer, Maximilian Hofmann</i>	
Stitching of Semi-Infinite Cracks with Band Width.....	350
<i>Bian Li, Xiaochun Yang, Lingli kang</i>	
Modeling and Application of Output Current of the Solar Array for Satellite in Sun Synchronous Orbit	355
<i>Yanshan Bian, Chuan Xu, Jianfeng Li, and Xijing Wang</i>	
Analysis for Axial Force of Slotted-type Axial-flux Magnetic Coupler	359
<i>Yang Chaojun, Wu Yingzhi, Liu Kang, Li Zhibao, Zhang Weifeng, and Liu Ming</i>	
Electronic Information Technology	
Design and Implementation of GPS Baseband Correlator	365
<i>Qing-Ming Yi, Min Shi, ZhiJi Lin, Chong Luo</i>	
Design of Automatic Storage System Monitoring Software Based on OPC Communication	370
<i>Zhang Peng, Zhang Teng, Zhou Guangcheng</i>	
Research on the Method of Flexible Data Bus Technology of the Monitoring of the Hidden Engineering Audit	375
<i>Chen Rong, Yu Luqian</i>	
Intelligent Predictive Food Traceability Cyber Physical System in Agriculture Food Supply Chain.....	380
<i>Rui-Yang Chen</i>	
Jinliang a Novel Method for Mechanical Constitutive Parameters Estimation of Human Left Ventricle	385
<i>YiQiang Li, Li Cai, Zhiqiang Huang</i>	

Image Processing

An Improved Face Recognition Fusion Algorithm Based on the Features Extracted from Gabor, PCA and KPCA	390
<i>Shenshen Liu, Shunfang Wang</i>	
Research on Image Segmentation of Digital Rubbings Based on OTSU Threshold and Genetic Algorithm	395
<i>Ma Yongli, Huang Zhikai, Lu Li, Rao Fanxing, Zhang Liling</i>	
Effects of Y_2O_3 on the Properties of Ni-Based Alloy Laser Cladding Coatings	400
<i>Y. Yang, S. Peng</i>	
Image Processing Methods Based on Key Temperature Features for State Analysis and Process Monitoring of Selective Laser Melting (SLM)	405
<i>Zhehan Chen, Xiaohua Zhang, Ketai He, Haiyue Wang</i>	