

5th International Conference on Mechanical and Aeronautical Engineering (ICMAE 2019)

IOP Conference Series: Materials Science and Engineering
Volume 751

Sanya, China
12 - 15 December 2019

ISBN: 978-1-7138-4700-7
ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

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
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Preface	
Committees	
Peer review statement	
Numerical Study on Aerodynamic Characteristics of Variable-sweep Morphing Aircraft at Transonic Speeds.....	1
<i>Yuchang Lei, Dengcheng Zhang, Yanhua Zhang, Guangxu Su</i>	
A Simple Modification of HLLEM Approximate Riemann Solver Applied to the Compressible Euler System at Low Mach Number	8
<i>Hang Yu, Hua Li, Jianqi Lai, Ye Zhang</i>	
Effectiveness of Variable Rotor Blades Technique&Variable Stator Vanes Technique in AdjustingAxial-flow Compressor.....	18
<i>Long Bingxiang, Chen Qin, Ren Zebin, Liao Daxiong</i>	
Modeling and Numerical Simulation of Stratospheric Aircraft Propulsion System.....	28
<i>Xingjun Yuan, Jiming Wang, Xuan Tong, Fengmei Wei</i>	
Study on Rotor Eddy Current Losses in High-speed Permanent Magnet Brushless Machines for Aircraft Applications	34
<i>Yaohua Hu, Shushu Zhu</i>	
Study on Magnet Eddy Current Losses in Interior Permanent Magnet Machines for Aircraft Electric Green Taxiing Systems	40
<i>Yaohua Hu, Pengfei Zhang</i>	
Study on Lumped Magnetic Circuit in Interior PM Machines for Aircraft Electric Green Taxiing Systems.....	46
<i>Pengfei Zhang, Yaohua Hu</i>	
Experimental Study on the Performance of One Micro Pulsed Plasma Thruster	52
<i>Xinru Du, Jianjun Wu, Sheng Tan, Yu Zhang, Yang Ou, Zhaofu He</i>	
Theoretical Analysis of Supersonic Low Reynolds Number Flow Control Technique Based on Flow Mixing	58
<i>Xu Dachuan, Ren Zebin, Chen Zhiqiang, Wang Haifeng, Guo Longde</i>	
Fluid-structure Interactions on Steerable Cruciform Parachute Inflation Dynamics.....	65
<i>Xinglong Gao, Qingbin Zhang, Qin Chen, Wenkai Wang</i>	
Rapid Aerodynamic Calculation Method for Hypersonic Gliding Vehicle.....	71
<i>Bin Zhang, Zhiwei Feng, Boting Xu, Tao Yang, Wuyu Peng</i>	
Study on LabVIEW-based Aviation BLDCM Control System.....	77
<i>Linhai Zhang, Yeming Yao, Lilin Xu</i>	
Investigation of the Influence of Blocking Effect on the Aerodynamic and Hydrodynamic Characteristics of a Powered Aircraft Model	83
<i>Zhijian Xiao, Bin Wu, Mingzhen Wang, Qi Hu, Wenjing Yang</i>	

Research and Design of the Control Law of Passive Side-Stick System with Human Factor Fault.....	90
<i>Yao Ziyu, Yang Xizhong, Qiu Xuyi</i>	
Experimental Analysis on Combined Vibration and Acoustics Test of a Satellite.....	99
<i>Yan Tingfei, Gao Haiyang, Xiang Shuhong</i>	
Spacecraft's Partially Invariant Stabilization System.....	105
<i>Nickolay Zosimovych</i>	
A Method of On-line Monitoring for Vibration Table Bearings Based on VMD	116
<i>Du Xiaozhou, Xin Qi, Gao Haiyang, Zhu Zihong</i>	
Comparative Research on Early Warning Determination Methods of Spacecraft Collision.....	122
<i>Sun Hongqiang, Zhang Zhanyue, Hu Ewen</i>	
Research on FMEA Application in Assembly Process of Complex Space Probes	129
<i>Chenxing Wang, Wei Feng, Linzheng Wang, Song Song</i>	
Assembly Method for Satellite Device Installation based on HoloLens	135
<i>Wei Zhang, Qiang Zhang, Zhe Liu, Chengli Zhang, Wei Wang, Chengshuang Yin</i>	
Application and Research of Air Cushion Transportation in Flexible Assembly for Spacecraft	141
<i>Zhu Yahong, Zhang Chengli, Xing Shuai, Li Xiaohuan</i>	
Simulation of Space Flexible webs on Capture Process Based on Nonlinear Finite Element Method.....	147
<i>Boting Xu, Yueneng Yang, Bin Zhang, Ye Yan</i>	
Numerical Simulation of Air Resistance on the Mars Probe Cabin Separation	155
<i>Qiwei Chen, Wei Feng, Laiying Tang, Linzheng Wang, Shengyu Zheng, Wei Sun, Wei Wang</i>	
Quick Trajectory Optimization Method for Mars Airplane Based on Adaptive Gauss Pseudospectral Method.....	161
<i>Z Y Sun, Z Y Liu, P Zhang</i>	
VISHKIRA, A Gallinaceous Aircraft.....	169
<i>K Taneja, R Jaiswal, S K Kalwala</i>	
Research on Model Correction of Turbofan Engine Based on Quantum-behaved Particle Swarm Optimization.....	176
<i>Renjun Qian, Benwei Li, Siqi Yan, Shufan Zhao, Huailiang Teng</i>	
Certification Techniques for the Deformation Compliance of Civil Aviation Passenger Seat.....	182
<i>Zhou Jianbin, Zhang Xinyuan, Wang Xiaozheng</i>	
Requirements Management Applied in Airworthiness Certification in the Civil Aircraft	188
<i>Yi Wang, Xinai Zhang</i>	
Research on Civil Aircraft Emergency Evacuation Time for Ditching	195
<i>Wu Yang</i>	
Accuracy Control of Big-scale Space 3D Measurement System in Aircraft Digital Assembly	202
<i>Yan Cheng, Yuan-heng Xu, Xue-liang Huang, Lei Wang</i>	
The Comfort Design for Civil Aircraft Cabin Using Ergonomics Theory	209
<i>Wu Yang, Mu Tengfei, Wang Haiqiang</i>	

The Application of Overset Grid in the Analysis of Impact Loads of Amphibious Aircraft during Landing on the Water	216
<i>Qi Hu, Ming-Zhen Wang, Bin Wu, Jia-Xu Zhang, ZhiJian Xiao</i>	
Interior Inspection for Equipment and Furnishings System of Civil Aircraft	222
<i>Zhou Jianbin, Zhang Xinyuan, Wang Xiaozheng</i>	
Integrated Requirements Management of Civil Aircraft	228
<i>Xinyu Zhang, Xinai Zhang</i>	
Experimental Study on the Attitude of Civil Aircraft Ditching with High Horizontal Tail Configuration.....	235
<i>Xu Nanbo, Wang Yuping, Fu Lin, Zhou Qing</i>	
Comparison of Three Compensation Methods for the Touch-trigger Probe Pretravel Errors	240
<i>Simi Li, Long Zeng, Pingfa Feng, Dingwen Yu</i>	
Research on Risk Assessment with Uncontrollable High Thrust for Civil Airplane.....	246
<i>Zou Candong, Xu Nanbo</i>	
Flight Path Planning Surrogate Model Based on Stacking Ensemble Learning.....	254
<i>X Z Yang, Z X Cui, X Y Qiu</i>	
Research on Service-oriented UAV Route Planning Component Design	262
<i>Yuanyuan Qi, MinYang Kang, Bing Xue, Shuo Wang</i>	
Research on the Construction Technology of Knowledge Graph in Aviation.....	268
<i>Xue Wang, Xizhong Yang, Jiapan Fu, Xuyi Qiu</i>	
The Influence of Angle Parameters on Pulsation Characteristics of Elastomer Rotor Pump	274
<i>Jiadi Lian, Yan Bai, Zefei Zhu, Jing Xu, Jingxuan Ma</i>	
Experimental Study of Hybrid Deicing System	280
<i>Shu Jun, Xu Dongguang, Ye Lin, Zhu dongyu</i>	
Investigation on Steady State Unbalance Response of Rotor with Elastic Ring Squeeze Film Damper	286
<i>Lu Zhao, Mingfu Liao, Jihui Niu</i>	
Measurement and Analysis of the Key Metrics of Information System Resilience	297
<i>Wei Jinyi, Li Ning, Shi Jing, Xu Luo</i>	
Modal Analysis of Variable Structure of Gate Rotor of CP-type Single-screw Structure.....	305
<i>Xiaofeng Song, Wei Wang, Yuting Wu, Chongfang Ma</i>	
Model-based Balancing Method of Rotors using Differential Evolution Algorithm.....	314
<i>Yun Zhang, Meng Li, Yang Hu</i>	
Tiltrotors Position Tracking Controller Design Using Deep Reinforcement Learning	320
<i>Yujia Huo, Yiping Li, Xisheng Feng</i>	
Analysis of the Influence of On-Board Temperature and Pressure Control System on Inert Gas Generating Performance of Hollow Fiber Membrane	329
<i>Jing-yang Zhang, Bi-tai Luo, Wen-chao Hu, Ping Shen</i>	
Vibration signal Processing of Cutting Gearbox Based on Haar-Wavelet Denoise	340
<i>X F Zhang, F W Ma, N N Wang, Z F Guo</i>	

Dynamic Optimization Design of Transverse Axis Cutting Reducer	348
<i>Minghu Yin, Hao Liu, Yahui Cui, Feifei Sun, Daixiang Zhang</i>	
Application of Kalman Filter in Satellite Propellant Remaining Prediction Technology	354
<i>Wenjuan Yin, Zhiwei Cao, Mengjie Wang</i>	
Simulation Analysis of Influence of the Blade Elasticity on Propeller Performance	360
<i>Yuhang Tan, Weicai Peng, Lijiao Shen</i>	
Electrochemical Kinetic Property Determination of MIECs by Comprehensive Multi-physical Coupling Model	367
<i>Jianhua Wang, Salman Khalid, Fei He, Wanfan Wu</i>	
Aircraft Inflight Icing Detection Based on Statistical Decision Theory	374
<i>D Ding, W Q Qian, Q Wang</i>	
Feasibility and Uncertainty Analysis of Constitutive Parameters Identification for Composite Materials Using Displacement Field Data	383
<i>Zhaoyang Liu, Liu Liu, Tiren He</i>	
Characterization and Uncertainty Analysis of the Interlaminar Inelastic Properties of Unidirectional Fibre-reinforced Composites	390
<i>Tiren He, Liu Liu, Jifeng Xu</i>	
Stress Analysis and Strength Test of 2500 Fracturing Truck Frame	396
<i>Lei Li, Bin Zhang, Chunming Fan</i>	
Copula-based Estimation Method of the Expected Value Function for Robust Design Optimization	403
<i>Xinyao Li, Weihong Zhang, Liangli He</i>	
Analysis of Geometric Characteristics of Cycloidal Transmissio	411
<i>Xiangmao Huang, Jing Zhang</i>	
Static and Dynamic Analysis of a 2T3R Five-degree-of-freedom Parallel Mechanism	417
<i>Bofan Lu, Guohua Cui, Qiang Guo</i>	
Numerical Simulation Method for Wave Surface Landing of Seaplane	423
<i>Sun Feng, Wang Mingzhen, Zhang Jiaxu, Hu Qi</i>	
Design and Experimental Research of Rope Missile	429
<i>Haoting Wu, Lei Zhao, Pingjun Wu, Feng Xiao, Yongxiu Guo, Ming Jiang, Junlei Geng, Lei Yang</i>	
Study on the Rate of Elastic-plastic Crack Propagation of Heterogeneous Metal Welded Joints in Nuclear Power	436
<i>G B Li, H Xue, Y Q Bi, L Zhang</i>	
Energy and Exergy Analysis of Steam Source Optimization for Boiler Soot Blowing System	442
<i>Wanfan Wu, Fangyuan Ran, Fei He, Jianhua Wang</i>	
The Calculation of Friction Heat and Thermal Analysis of Spur Gears Based on Thermal Elastohydrodynamic Lubrication Theory	449
<i>Shuyi Liu, Chen Qi</i>	
Thermodynamic Modeling and Simulation Analysis of Double-tube Damper	460
<i>Yijie Chen, Xiaodong Gao, Yiqiang Wan, Xiaoling Han, Jianjian Dai</i>	

Numerical Simulation of Liquid-vapor Phase Transition Induced by a Heated Surface in a Shear Flow.....	466
<i>Xiaopeng Shan, Deming Nie</i>	
Molecular Dynamics Simulation of Rarefaction Effect on Shear-driven Gas Flow in Nanochannels	472
<i>Ye Zhang, Ran Zhang, Wenjia Xie, Hua Li</i>	
Investigation on Application of Closed Cavity Inductively Coupled Plasma in Inlet Stealth	478
<i>Han Xinmin, Zhang Wenyuan, Wei Xiaolong, Xu Haojun, Chen Junlin</i>	
Method of Probe Radius Compensation for Optical Complex Surface Measurement	484
<i>L J Chen, Y D Kang</i>	
Analysis of Failure Effect of Cage Thickness on Spherical Roller Bearings	492
<i>Fang Li, Wang Biao Qiu, Jia Bin Cai, Kai Wang, Zheng Pan</i>	
Research on Construction Method, Risk Identification and Evaluation Technology of UHV AC Composite Cross Arm Pole and Tower	498
<i>Chunhua Hu, Jiancheng Wan, Ming Jiang, Yujing Hao</i>	
Application of Weak Signal Denoising Based on Improved Wavelet Threshold.....	507
<i>Ning Zhang, Pengfei Lin, Lei Xu</i>	
Design of Swinging Somatosensory Game Rehabilitation System	513
<i>Lili Kou, Chaoyu Xia, Zhihua Hu, Xiaojun Jiang</i>	
Intelligent Sequencing of Working Steps Using Genetic Algorithm.....	519
<i>Y P Zhu, H G Zhou, J F Liu, G Z Tian</i>	
Availability Assessment of Avionics Display System based on MBSA using Fault Dependent Matrix	525
<i>Haiyong Dong, Zhiyuan Cao, Zhengjun Zhai, Qingfan Gu, Yanhong Lu, Guoqing Wang, Miao Wang</i>	
Design of Image Recognition Algorithm for Critical Flight Parameters in Civil Aircraft Display System	531
<i>Maodi Zhang, Yuanhui Zhou, Qingfan Gu</i>	
Performance Simulation Analysis of Composite Thermal Management System for Hypersonic Vehicle	537
<i>Yang Changbao, Zhou Hui, Zhang Jingyang</i>	
Research on Post-processing Microstructure and Property of Titanium Components with Selective Laser Melting (SLM).....	548
<i>Ming Qiang Chu, Shu Yan Zhang, Guan Qiao Su, Ren Gen Ding, Lei Wang, Sanjooram Padde</i>	
Improving Clamping Accuracy of Thin-walled Workpiece in Turning Operation	558
<i>Ammar H. Elsheikh, Jiajie Guo, Kun Bai, Kok-Meng Lee</i>	
The Numerical Simulation of Temperature Field in Friction Stir Welding of 7075 Aluminium Alloy.....	564
<i>F J Ma, D Y Fu, Y Liu, D P Yang, S F Zhang, Z H Sha</i>	
Study of Different Micro Milling Blades on Milling Titanium Alloy TC4.....	570
<i>ZiChuan Zou, XianFeng Zhao, Lin He, XueTing Jiang</i>	

Experimental Evaluation for the Interference-fit Electromagnetic Riveting Joint with Headless Rivet.....	579
<i>Danlong Song, Xiangyang Zhang, Kai Liu, Yanchao Zhang, Zhenchao Yang</i>	
Research on Hull Assembly Process Planning Based on Rule Reasoning	587
<i>Li Lei, Liu Di, Wang Pengyu, Zhou Honggen</i>	
Construction Process of Continuous Unreeling and Setting of Leading String Based on Trajectory Theory	594
<i>Haoting Wu, Yong Zhu, Qinghao Wang, Haichao Wang, Lei Zhao, Pingjun Wu, Ming Jiang, Lei Yang</i>	
Fatigue Behavior of Friction Stir Welded Lap Joints for Dissimilar AA7150-AA2524 Aluminum Alloy.....	604
<i>A Chen, W F Zang, D K Dong, Y Z Gong</i>	
Effect of Load Ratio on the Mechanical Field around Crack Front of Dissimilar Metal Weld Joints.....	610
<i>Jia Wenna, Zhao Lingyan, He Jinxuan, Rehmat Bashir</i>	
Improvement of Microstructural and Mechanical Characteristics of Friction Stir Welded AA6061 Aluminium Alloy Joint.....	616
<i>Taher A. Shehabeldeen, T. S. Mahmoud, Mahmoud Nemat-Alla, E.Y. Elkady, Yajun Yin, Xiaoyuan Ji, Xu Shen, Jianxin Zhou</i>	

Author Index