

Xinguo Zhang *Editor*

The Proceedings of the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018)

Set 1



 Springer

Lecture Notes in Electrical Engineering

Volume 459

Series Editors

- Leopoldo Angrisani, Department of Electrical and Information Technologies Engineering, University of Napoli Federico II, Naples, Italy
- Marco Arteaga, Departament de Control y Robótica, Universidad Nacional Autónoma de México, Coyoacán, Mexico
- Bijaya Ketan Panigrahi, Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, Delhi, India
- Samarjit Chakraborty, Fakultät für Elektrotechnik und Informationstechnik, TU München, Munich, Germany
- Jiming Chen, Zhejiang University, Hangzhou, Zhejiang, China
- Shanben Chen, Materials Science & Engineering, Shanghai Jiao Tong University, Shanghai, China
- Tan Kay Chen, Department of Electrical and Computer Engineering, National University of Singapore, Singapore, Singapore
- Rüdiger Dillmann, Humanoids and Intelligent Systems Lab, Karlsruhe Institute for Technology, Karlsruhe, Baden-Württemberg, Germany
- Haibin Duan, Beijing University of Aeronautics and Astronautics, Beijing, China
- Gianluigi Ferrari, Università di Parma, Parma, Italy
- Manuel Ferre, Centre for Automation and Robotics CAR (UPM-CSIC), Universidad Politécnica de Madrid, Madrid, Spain
- Sandra Hirche, Department of Electrical Engineering and Information Science, Technische Universität München, Munich, Germany
- Faryar Jabbari, Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA, USA
- Limin Jia, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China
- Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences, Warsaw, Poland
- Alaa Khamis, German University in Egypt El Tagamoa El Khames, New Cairo City, Egypt
- Torsten Kroeger, Stanford University, Stanford, CA, USA
- Qilian Liang, Department of Electrical Engineering, University of Texas at Arlington, Arlington, TX, USA
- Ferran Martin, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain
- Tan Cher Ming, College of Engineering, Nanyang Technological University, Singapore, Singapore
- Wolfgang Minker, Institute of Information Technology, University of Ulm, Ulm, Germany
- Pradeep Misra, Department of Electrical Engineering, Wright State University, Dayton, OH, USA
- Sebastian Möller, Quality and Usability Lab, TU Berlin, Berlin, Germany
- Subhas Mukhopadhyay, School of Engineering & Advanced Technology, Massey University, Palmerston North, Manawatu-Wanganui, New Zealand
- Cun-Zheng Ning, Electrical Engineering, Arizona State University, Tempe, AZ, USA
- Toyoaki Nishida, Graduate School of Informatics, Kyoto University, Kyoto, Japan
- Federica Pascucci, Dipartimento di Ingegneria, Università degli Studi "Roma Tre", Rome, Italy
- Yong Qin, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China
- Gan Woon Seng, School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore, Singapore
- Joachim Speidel, Institute of Telecommunications, Universität Stuttgart, Stuttgart, Baden-Württemberg, Germany
- Germano Veiga, Campus da FEUP, INESC Porto, Porto, Portugal
- Haitao Wu, Academy of Opto-electronics, Chinese Academy of Sciences, Beijing, China
- Junjie James Zhang, Charlotte, NC, USA

The book series *Lecture Notes in Electrical Engineering* (LNEE) publishes the latest developments in Electrical Engineering - quickly, informally and in high quality. While original research reported in proceedings and monographs has traditionally formed the core of LNEE, we also encourage authors to submit books devoted to supporting student education and professional training in the various fields and applications areas of electrical engineering. The series cover classical and emerging topics concerning:

- Communication Engineering, Information Theory and Networks
- Electronics Engineering and Microelectronics
- Signal, Image and Speech Processing
- Wireless and Mobile Communication
- Circuits and Systems
- Energy Systems, Power Electronics and Electrical Machines
- Electro-optical Engineering
- Instrumentation Engineering
- Avionics Engineering
- Control Systems
- Internet-of-Things and Cybersecurity
- Biomedical Devices, MEMS and NEMS

For general information about this book series, comments or suggestions, please contact leontina.dicecco@springer.com.

To submit a proposal or request further information, please contact the Publishing Editor in your country:

China

Jasmine Dou, Associate Editor (jasmine.dou@springer.com)

India

Swati Meherishi, Executive Editor (swati.meherishi@springer.com)

Aninda Bose, Senior Editor (aninda.bose@springer.com)

Japan

Takeyuki Yonezawa, Editorial Director (takeyuki.yonezawa@springer.com)

South Korea

Smith (Ahram) Chae, Editor (smith.chae@springer.com)

Southeast Asia

Ramesh Nath Premnath, Editor (ramesh.premnath@springer.com)

USA, Canada:

Michael Luby, Senior Editor (michael.luby@springer.com)

All other Countries:

Leontina Di Cecco, Senior Editor (leontina.dicecco@springer.com)

Christoph Baumann, Executive Editor (christoph.baumann@springer.com)

**** Indexing: The books of this series are submitted to ISI Proceedings, EI-Compendex, SCOPUS, MetaPress, Web of Science and Springerlink ****

More information about this series at <http://www.springer.com/series/7818>

Xinguo Zhang
Editor

The Proceedings of the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018)

Volume 1

 Springer



Asia-Pacific International Symposium
on Aerospace Technology

Editor
Xinguo Zhang
Chinese Society of Aeronautics
and Astronautics
Beijing, Beijing, China

ISSN 1876-1100 ISSN 1876-1119 (electronic)
Lecture Notes in Electrical Engineering
ISBN 978-981-13-3304-0 ISBN 978-981-13-3305-7 (eBook)
<https://doi.org/10.1007/978-981-13-3305-7>

Library of Congress Control Number: 2019935810

© Springer Nature Singapore Pte Ltd. 2019

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface

The 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018) was held in Chengdu City, Sichuan Province, China, during October 16 to 18, 2018. Nearly 400 delegates from China, Australia, Korea, Japan, Canada, Vietnam, and India were present.



Dr. Zuoming Lin, Opening Address

Dr. Zuoming Lin, President of Chinese Society of Aeronautics and Astronautics (CSAA), made the opening address, which has been chaired by Dr. Junchen Yao, Secretary General of CSAA. Following the opening ceremony were four plenary lectures. Dr. Xinguo Zhang, Executive Vice President and CIO of Aviation Industry Corporation of China Ltd. (AVIC), talked on Model-Based Systems Engineering Transformation and Innovation. Dr. Joon-Min Choi, Director of Technology R&D

Head Office of Korea Aerospace Research Institute (KARI) shed a light on the Space Development in Korea. Dr. Toshio Nishizawa, Director of propulsion research unit of Japan Aerospace Exploration Agency (JAXA), shared an Overview of JAXA's advanced Fan Jet Research (aFJR) Project. Prof. Pier Marzocca of RMIT University introduced its various research activities.



Dr. Xinguo Zhang, Plenary Lecture

The plenary lectures were followed by 80 technical sessions with more than 300 oral presentations, covering topics of aerodynamics, aircraft /UAV design, navigation, combustion and propulsion, guidance and control, structure and materials, air traffic management, etc. Two hundred and fifty peer-reviewed and orally presented papers were published in this book.

On October 18, delegates went on for the technical visit to the Chengdu Tianfu International Aerotropolis and the China Civil Aviation Flight University in Guanghan City, Sichuan Province.



Plenary Lecture Session

The APISAT is a common endeavor among the four professional aerospace societies in China, Australia, Korea, and Japan, namely the Chinese Society of Aeronautics and Astronautics (CSAA), Royal Aeronautical Society Australian Division (RAeS Australian Division), Japan Society for Aeronautical and Space Sciences (JSASS), and Korean Society for Aeronautical and Space Sciences (KSAS). It is hosted in the four countries in turn annually.

The next event will be held in Gold Coast, Australia, during December 4–6, 2019. More information is available on www.apisat2019.com.

About APISAT

Organization

The Asia-Pacific International Symposium on Aerospace Technology (APISAT) is a common endeavor among the four national aerospace societies in China, Australia, Korea, and Japan, namely Chinese Society of Aeronautics and Astronautics (CSAA), Royal Aeronautical Society Australian Division (RAeS Australian Division), Korean Society for Aeronautical and Space Sciences (KSAS), and Japan Society for Aeronautical and Space Sciences (JSASS).



中国航空学会
Chinese Society of Aeronautics and Astronautics



**ROYAL
AERONAUTICAL
SOCIETY**
AUSTRALIAN DIVISION

Aim and Scope

APISAT is an annual event initiated in 2009. It aims to provide the opportunity to Asia-Pacific nations for the researchers of universities and academic institutes and for the industry engineers to discuss the current and future advanced topics in aeronautical and space engineering. The official language is English.

Topics

Aerodynamics and Design Computational Fluid Dynamics Wind Tunnel Testing Flow Visualization Unsteady Aerodynamics Acoustics/Aircraft/Helicopter and UAV Design	Structures and Materials Structural Analysis Structural Testing Smart Structures Composite Structures Structural Dynamics Aeroelasticity
Dynamics/Control/Avionics Flight Simulation Navigation Guidance and Control ATM/CNS Sensors and Actuators Satellite Attitude Control	Combustion and Propulsion Combustion Analysis Fuel Injection Turbines Engines Cooling Systems Spacecraft Propulsion

APISAT2018 Organization Committee

Executive Committee

Zuoming Lin (President)	CSAA
Andrew Neely (President)	RAeS Australian Division
Youdan Kim (President)	KSAS
Shigeru Obayashi (President)	JSASS

International Program Committee

Xinguo Zhang (Chairman)	CSAA
Song Fu (Co-chairman)	CSAA
Cees Bil (Co-chairman)	RAeS Australian Division
Jae Woo Lee (Co-chairman)	KSAS
Koji Miyaji (Co-chairman)	JSASS

Song Wu
Sangchul Lee
Tatsunori Yuhara

CSAA
KSAS
JSASS

National Organizing Committee (CSAA)

Junchen Yao (Chairman)
Ce Yu (Vice Chairman)
Xue Zhang (Secretariat)
Zhenghong Gao
Jun Zhou
Yongling Fu
Yahong Chen
Jianping Wang
Pinqi Xia
Jun Hua
Jinsong Leng
Wenbo Du
Changchun Zhou

National Organizing Committee (RAeS Australian Division)

Cees Bil (Chairman)
Douglas Nancarrow
Hideaki Ogawa
Pier Marzocca
Murray Scott
Vincent John

National Organizing Committee (KSAS)

Jae Woo Lee (Chairman)
Shangchul Lee (Vice Chairman)
Sang Joon Shin (Secretariat)
Chang-Kyung Ryoo
Changjeon Hwang

National Organizing Committee (JSASS)

Koji Miyaji (Chairman)

Tatsunori Yuhara (Secretariat)

Naoto Azusawa

Yoshitaka Kondo

Hiroto Kimata

Zhong Lei

Yoshinori Matsuno

Contents

Aerodynamics and Design

A Study of Hybrid Airfoil Design Method	3
Lei Yu, Long Yang, and Dong Yu Zhu	
Numerical Investigation on Arbitrary Polynomial Blade Model for a Transonic Axial-Flow Compressor Rotor with Multi-parameter Optimization	19
Xuning Zhao, Xuhui Zhou, Jinxin Cheng, and Jiang Chen	
Aerodynamic Coefficient Prediction of Airfoils with Convolutional Neural Network	34
Zelong Yuan, Yixing Wang, Yasong Qiu, Junqiang Bai, and Gang Chen	
Application of Aerodynamic Optimization in a Multi-fidelity Distributed Overall Aircraft Design System	47
Xiangyu Gu, Lili Liu, Pier Davide Ciampa, and Yuanzi Fu	
Multipoint and Multi-objective Optimization of Airfoil Considering Boundary Layer Ingestion	61
Rubing Ma and Jianghao Wu	
Flush Air Data Sensing System Design and Test for Supersonic Vehicle	74
Guangqiang Chen, Xiuxin Dou, Guohui Dou, Weijiang Zhou, and Yunjun Yang	
Sting Interference of Dynamic Derivatives for Flying Wing in Transonic	82
Fangjian Wang, Han Qin, Lan Chen, Jing Hu, and Yuhui Song	
Impact of MPF Aeroshell Configuration on Static Instability at Small Angle of Attack	91
Junming Lyu, Wenbo Miao, Fei Huang, and Xiaoli Cheng	

Numerical Investigation of Ice Accretion Effects at Supercooled Large Droplet Conditions	100
Jitong Wang, Weimin Sang, and Tian Lu	
An Engineering Correction Method of Static Aeroelasticity and Reynolds Number Effect on Wind Tunnel Pressure Distribution	114
Kun Mao, Fei Xue, Feng Bai, Dongyun Zhang, and Meihong Zhang	
Effect of Slip Flow on Aerodynamics	135
Fei Huang, Xuhong Jin, Guoxi Han, and Xiao-li Cheng	
Using CFD Solutions as Inputs of Sonic Boom Propagation Calculation	144
Zhiyong Liu, Fengxue Qian, Zhao Zhang, Yang Tao, and Yang Yang	
Two-Dimensional Aerodynamic Loads of Space Shuttle Thermal Protection System Considering Steady Internal Flow	151
Yupeng Feng and Wei Xia	
Separation Characteristics of Embedded Weapons with Flow Control Measures	161
Jia Lian, Jun-qiang Ai, and Lu Xie	
Aerodynamic Loads Analysis for a Maneuvering Aircraft in Transonic Flow	176
Hui Zhang	
The Engine Position Effect on SWB Airplane Aerodynamic Performance	201
Gang Yu, Dong Li, Yue Shu, and Zeyu Zhang	
Numerical Study of the High-Lift Aerodynamic Characteristics of Dropped Hinge Flap Coupled with Drooped Spoiler	211
Wenhu Wang, Cyrille Breard, and Yifeng Sun	
The Swept and Leaned Blade Influence on the Aerodynamic Performance of a Transonic Axial Compressor Rotor	227
N.-Z. Huang, X. Zhao, and Y.-H. Zhang	
Numerical Investigation on Altitude Static Pressure Tapping Location Design of a Reentry Capsule	236
Zhang Zhang, Liwu Wang, Wei Huang, Jiangli Lei, and Rui Zhao	
Radiation Heating Analysis of Hypersonic Re-entry Spacecraft	244
Jingke Hao, Liang Zhang, Junming Lyu, and Bangcheng Ai	
Effects of Distributed Propellers Slipstream on Aerodynamic Characteristics of Wing	255
Shiwei Zhao and Dajun Xu	

Investigation of the Turboramjet Pre-cooler by Using a Controllable Porous Media Structure	268
Xiaozhe Zhang, Duo Lv, Maoguo Cao, Dexin Huang, Yang Yu, Xiao Yu, Yi Shen, and Haibin Ji	
The Simulation of Compressor Performance of Inlet Distortion Using Split Actuator Disk Model	280
Bohan Zhang, Qiang Wang, Haiyang Hu, and Yahua Zhang	
Aerodynamic and Aeroelastic Analysis of Flying Wing with Split Drag-Rudder	294
Wei Xu, Min Xu, and Xiaomin An	
Monte Carlo Simulation for Low-Density Hypersonic Flows Past Two- and Three-Dimensional Cavities	310
Xuhong Jin, Fei Huang, Liang Zhang, and Xiaoli Cheng	
Numerical Simulation of the Effect on External Store Separation in Helicopter Flow Field	319
A. X. Qiu, W. M. Sang, and S. H. Hu	
Uniform Aero-Heating Flux Design for a Hypersonic Blunt Body	335
Jiatong Shi, Ketian Shi, and Liang Zhang	
Support Interference Computations of Forced Oscillation Test for a Flying-Wing Dynamic Model	346
Jiali Wu, Shuai Feng, Yanling Wang, Yanjie Shen, and Chen Bu	
Numerical Study of a Hydrodynamic Benchmark Model for Seaplanes Using OpenFOAM	361
Xu-Peng Duan, Wei-Ping Sun, Cheng Chen, Meng Wei, and Yong Yang	
Drag Reduction on the Fuselage Shape	376
Li Zhang, Zheng-Hong Gao, and Yi-Ming Du	
Numerical Simulation of Ice Ridge and Effects of NSDBD Plasma Actuator on Ice Ridge	386
Junjie Niu, Weimin Sang, and Yunze Jia	
Two-Dimensional Simulation Study on Aerodynamic Drag Reduction Characteristics of Superhydrophobic Structures	402
Run Pang, Weimin Sang, and Yang Cai	
Numerical Study of Görtler Vortices on Hypersonic Boundary-Layer Transition	416
Min Yu, Wu-bing Yang, and Xiang-jiang Yuan	
Shock Bifurcation Phenomenon in the Reflected Shock/Boundary Layer Interaction	423
Yang Zhang, Zhenhai Ma, Jianfeng Zou, and Yao Zheng	

Effect of Active Flow Control Near the Inlet on Performance on S-Duct	431
Jihyeong Lee, Shichao Zhang, Cheolheui Han, and Jinsoo Cho	
Numerical Study of Hypersonic Laminar Interaction Induced by the Swept Blunt Fins	439
Y. L. Liu and J. K. Ma	
Study on Flow Characteristics of Compressible Laminar Flow Boundary Layers	451
Min Chang, XiaoXuan Meng, Ziyuan Fu, and Junqiang Bai	
NSDBD Induced Local Perturbations in Flat Plate Supersonic Laminar Boundary Layers	464
Ke Song	
Parameter Sensitivity Analysis and Rapid Performance Calculation for High Bypass Ratio Separate Flow Exhaust System	475
Huicheng Yang, Qingzhen Yang, Yongqiang Shi, and Canliang Wang	
Numerical Investigation of RCS Jet Interaction on a Hypersonic Vehicle	485
Yuwei Liu, Zheng Chen, and Yaofeng Liu	
Research on Hypersonic Boundary-Layer Stability with High-Temperature Effects	499
Xianliang Chen, Pietro Carlo Boldini, and Song Fu	
Flow Characteristics of Centrifugal Compressor Stage Under Low Reynolds Number	513
Yuxin Ni, Jie Chen, Xin Fu, Guoping Huang, Zhiming Zhang, and Rui Zhu	
Numerical Investigation of Plasma Flow Control Over a Flat Plate	523
Yuqi Qin, Zhengchao Xiang, and Xuanshi Meng	
Numerical Simulation of Flow Field Around an Iced Airfoil Using Lattice Boltzmann Method	534
H. Y. Gu, W. M. Sang, and Y. Cai	
Design and Verification of Thermal Load for Electrothermal Ice Protection System	548
Peng Li, Yuanli Kang, Yupeng Song, Xunan He, and Zuoming Qu	
Ice Accretion Simulation Based on Roughness Extension of Shear Stress Transport $k - \omega$ Turbulence Model	566
Tong Liu, Jinsheng Cai, and Kun Qu	

Research on Numerical Simulation of Glaze Ice for Aircraft and Aero-Engine Entry Components	579
Jing Li, Zhengxia Liu, Lifan Zhang, and Jianping Hu	
A Discontinuous Galerkin Method on Arbitrary Grids with High Order Boundary Discretization	591
Penghui Su and Liang Zhang	
An Improved Tri-linear Interpolation Method for Hybrid Overset Grids and Its Application	601
Pengcheng Cui, Bin Li, Jing Tang, Xiaoquan Gong, and Mingsheng Ma	
Modeling of Turbulence Drag Reduction with Riblets	614
Jian Zhou, Ping Ou, and Wei Wei	
New Multi-dimensional Limiter for Finite Volume Discretizations on Unstructured Meshes	630
Liang Zhang, Bangcheng Ai, and Zhi Chen	
On Numerical Shock Instability of Low Diffusion Shock-Capturing Schemes	643
W. J. Xie, Ye Zhang, Ran Zhang, and Hua Li	
Towards an Accurate and Robust Rotated Riemann Solver for Hypersonic Flow Computations	652
Ye Zhang, Hua Li, W. J. Xie, and Ran Zhang	
Application of an Improved Preconditioning Boundary Condition to Simulation of Tiltrotor Aircraft in Hover	663
Huan Li, Naichun Zhou, Xiaoquan Gong, Jiangtao Chen, and Youq Deng	
A Fully-Local Transition Prediction Model for High-Turbulence Disturbance Environment	682
Min Chang, Lei Qiao, Jiakuan Xu, and Junqiang Bai	
Predictions of Heat Transfer in Hypersonic Viscous Flows by an Improved Third-Order WENO Scheme	703
Chen Li, Qin Li, and Hanxin Zhang	
Numerical Simulation for DLR-F11 Based on PMB3D Solver with Structural Overlapped Grid	711
Yong-gang Yu, Jing Yu, Zhu Zhou, Jiangtao Huang, Gang Liu, and Xiong Jiang	
On the Numerical Simulation of Taylor-Culick Flow with Complex Regressing Wall	723
Juan Duan, Yongliang Xiong, and Ningdong Hu	

Large Eddy Simulation of Laminar Separation Flow Past the SD7003 Airfoil	733
Zhibin Zhu, Peng Bai, and Qing Shang	
ILES, DDES and URANS Simulations of the Separated Flow Around a Circular Cylinder: A Comparative Study	746
He-Yong Xu, Qing-Li Dong, Chen-Liang Qiao, and Zheng-Yin Ye	
Theoretical Analysis of Second Mode in Hypersonic Boundary Layer Above Porous Wall	778
Peng Lv, Yudong Zhang, Jian Gong, and Tiziano Pagliaroli	
Detached Eddy Simulation on the Flow Around NACA0021 Airfoil Beyond Stall Using OpenFOAM	786
Yue Wang, Kang Liu, and Zhonghua Han	
Parallel Dynamic Mode Decomposition for Rayleigh–Taylor Instability Flows	800
Weiwei Tan, Junqiang Bai, Zengdong Tian, and Li Li	
Design and Unsteady Numerical Simulation of Variable Geometry Inlet Using Dynamic Meshes	816
Youcai Xia, Wanwu Xu, Wei Ye, Yicong Jia, and Bangyun Wang	
Research on the Aerodynamic Characteristics of Morphing Supercritical Airfoil	828
Binbin Lv, Pengxuan Lei, Yuanjing Wang, and Wenkui Shi	
Unsteady Flow Mechanism Investigation on Pitching-Blade Rigid Nano Rotor	836
S. Y. Zhao, Z. Liu, C. Bu, P. L. Che, and T. J. Dang	
Numerical Analysis of Transonic Buffet Control Using a Two-Dimensional Bump for a Supercritical Aerofoil	854
Zheng Yang and Hideaki Ogawa	
Mach Number Control for Continuous Mode Tests in Wind Tunnel Using Feed Forward Algorithm	870
Jin Guo, Yang Cao, Ren Zhang, and Xiaochun Cui	
Investigation on Dynamic Derivative Test Technique in Hypersonic Wind Tunnel	883
Jin Liu, Yuhui Song, and Jing Hu	
Data Reduction of the Multistage Compressor Using S2 Stream Surface Solver	892
Chenghua Zhou, Xingmin Gui, and Donghai Jin	

Study on Heat Flux Identification and Measurement Method for the Stagnation Point of Sharp Leading Edge Model in Arc-Heated Wind Tunnel	907
Jinlong Peng, Rushen Yang, Guosheng Lin, and Dongbin Ou	
Calibration of the Versatile Platform and the Supersonic Integrated Section in CAAA	915
JiaLin Jin, GuangLiang Li, ZhongWu Wei, JinGang Dong, and Jiang Zhang	
Research on Aero-Load Calculation of Spoiler for Civil Aircraft	930
Yan Zhongwu	
Experimental Study of Turbulent Separated Flowfield Induced by a Perpendicular Blunt Fin	936
Jikui Ma, Suxun Li, and Yaofeng Liu	
Visualization of Separated Flow Features Induced by Cylindrical Protuberance at Hypersonic Speed by Double-Color Oil Flow	946
Ning Cao, Zhaoyong Ni, and Jikui Ma	
Experimental Study of the Vector Nozzle Performance Using Calibration Tank	956
Runsheng He, Jingcang Liu, and Cong Li	
Plasma Flow Control of Non-bistable Vortex Pair over a Slender Conical Forebody	967
Shiqing Yin, Jia Li, Huaxing Li, and Xuanshi Meng	
Flutter Modeling, Analysis and Test for Blended-Wing-Body Flying Wing	979
Jihai Liu, Yingsong Gu, Ke Xie, and Pengtao Shi	
Experimental Study on Aerodynamic Properties of Circulation Control Airfoil with Plasma Jet	985
Yanhua Zhang, Dengcheng Zhang, Lin Li, Wuji Zheng, and Hao Luo	
Aerodynamic Characteristics and Plasma Flow Control of Static Hysteresis over an Airfoil at Low Reynolds Numbers	996
Haoyu Chen, Long Zhou, and Xuanshi Meng	
Aerodynamic and Thermal Effects of Plasma Actuators on Anti-icing over an Airfoil	1008
Chang Li, Haiyang Hu, Xuanshi Meng, Jinsheng Cai, and Hui Hu	
Acoustics Aircraft Helicopter and UAV Design	
Low Boom Supersonic Aircraft Configuration Optimization Using Inverse Design Method	1023
Yidian Zhang, Jiangtao Huang, and Zhenghong Gao	

Multi-disciplinary Optimization of Large Civil Aircraft Using a Coupled Aero-Structural Adjoint Approach	1042
Jiangtao Huang, Jing Yu, Zhenghong Gao, Zhu Zhou, and Biaosong Chen	
Efficiency Estimation of Formation Flight Types	1055
Yang Tao, Zhiyong Liu, Neng Xiong, Yan Sun, and Jun Lin	
Drag Reduction of Transonic Wings with Surrogate-Based Optimization	1065
Jichao Li, Jinsheng Cai, and Kun Qu	
Aero-Structural Optimization of a Supersonic Wing Model Using Adjoint-Based Optimization Algorithm	1081
Jingrui Guo, Min Xu, and Yi Li	
The Optimization Design of Lift Distribution and Propeller Performance for Rotor/Wing Compound Helicopter	1092
Xiaoxin Liu, Lili Lin, Minghua Peng, and Jianbo Li	
Research on Optimal Design Method of Tilt-Rotor Electric Propulsion System	1108
Dengyan Duan, Hong Zhao, Minghua Peng, and Jianbo Li	
Aerodynamic/Stealthy Integrated Design Optimization of Airfoil for Supersonic Fighter	1120
ZhongYuan Liu, BinQian Zhang, WenTing Gu, MingHui Zhang, and ZhenLi Chen	
Aerodynamic Shape Optimization of the Common Research Model Based on Improved SQP Algorithm	1131
Jing Yu, Jiangtao Huang, Dong Hao, and Zhu Zhou	
Productivity Analysis and Optimization of Aircraft Assembly Line Based on Delmia-Quest	1150
Heng Zhong, Xiaojun Zhang, Jun Hu, Shuntao Liu, and Xinyun Shao	
Experimental Study on Aerodynamic Performance of Flapping Wing with One-Way Holes/Gaps	1160
Wenqing Yang, Bifeng Song, Guanglin Gao, and Kun Zhang	
Measurement of Propeller Characteristics at a Negative Advance Ratio Using a Whirling Arm Facility	1169
Yuto Itoh and Atsushi Satoh	
Evaluating the Combat Effectiveness of Anti-ship Missile in Cooperative Operation	1189
Qijia Yun, Bifeng Song, Huayu Gao, Chaojie Liang, and Yang Pei	

Research on Flight Dynamic Modeling and Interference of Components for Rotor/Wing Compound Helicopter	1202
Lili Lin, Xiaoxin Liu, Minghua Peng, and Jianbo Li	
Research on a Modeling Method of Ducted Propulsion System for Vertical Take-Off and Landing Aircraft	1222
Min Chang, Weixiang Zhou, Bo Peng, and Junqiang Bai	
OrbitPlus Open CubeSat Platform Feasibility Study and Preliminary System Design	1231
Hamed Ahmadloo, Alireza Mazinani, Sara Pourdaraei, MohammadReza Bayat, Mahyar Naderi, and Ehsan Sherkatghanad	
Waveriders Designed for Given Planform Leading Edge Curves	1247
Xiaoyan Wang, Jun Liu, and Shaohua Chen	
On Aircraft Design Under the Consideration of Hybrid-Electric Propulsion Systems	1261
D. Felix Finger, F. Götten, C. Braun, and C. Bil	
Research on Civil Aircraft Design Based on MBSE	1273
Yunong Wang, An Zhang, Delin Li, and Haomin Li	
Design of Wave Rider Based on Shock Fitting Method	1284
Guoliang Li, Anlong Gong, Qiang Liu, Chuqun Ji, Yunjun Yang, and Weijiang Zhou	
A Design Method of Civil Commercial Aircraft Cabin Integration Based on System Engineering Thought	1291
Zhaoliang Zou, Xu Zhang, and Dayong Dong	
Design and Test of Plasma Control Surface on Unmanned Aerial Vehicle	1298
Jiageng Cai, Chang Li, Huaxing Li, and Xuanshi Meng	
Civil Aircraft Fly Test Frequency-Domain Data Method Research	1312
Bin Gao and Zhengqiang Li	
An Aircraft Level System Test Facility Based on Individual System Test Benches	1322
Chen Wu, Guirong Zhou, Guanglei Xu, and Bin Gao	
Design and Experimental Study on a Flapping Wing Micro Air Vehicle	1330
Yi Liu, Yanlai Zhang, and Jianghao Wu	
A New Concept of Compound Helicopter and Flight Tests	1343
Yasutada Tanabe, Masahiko Sugiura, Noboru Kobiki, and Hideaki Sugawara	

Research on Morphing Scheme and Forward-Swept Wing Parameters Based on a Forward-Swept Wing Morphing Aircraft	1353
Xuefei Li, Zhansen Qian, Chunpeng Li, Xianhong Xiang, and Pengbo Xu	
Empirical Correlations for Geometry Build-Up of Fixed Wing Unmanned Air Vehicles	1365
Falk Götten, D. F. Finger, C. Braun, M. Havermann, C. Bil, and F. Gómez	
A Classification and Summary of Degradation Process Model	1382
Long Li, Tianxiang Yu, Bifeng Song, Yijian Chen, and Bolin Shang	
Hybrid Unstructured Mesh Deformation Based on Massive Parallel Processors	1398
Hongyang Liu, Jiangtao Huang, Qing Zhong, and Jing Yu	
Inverse Airfoil Design Algorithm Based on Multi-output Least-Squares Support Vector Regression Machines	1412
Xinqi Zhu and Zhenghong Gao	
Radar Cross Section Gradient Calculation Based on Adjoint Equation of Method of Moment	1427
Lin Zhou, Jiangtao Huang, and Zhenghong Gao	
Large Eddy Simulation of Supersonic Open-Cavity Flows	1446
Feng Feng	
Ranking Method for the Importance of Aircraft Damage Spare Parts	1457
Qian Zhao, Yang Pei, Peng Hou, and Chen Tian	
Heading Load Dynamic Simulation of Landing Gear Test	1469
Zihao Zhang, Xiaohui Wei, and Qi Ye	
Research on Edge Computing Architecture for Intelligent NC Machining Monitoring CPS	1477
Shaochun Sui, Xiaohua Li, and Wenyi Li	
High Subsonic NLF Airfoil Design at Low Reynolds Number	1486
Jing Li and Zhenghong Gao	
The Investigation of the Maximum Possible Drag Reduction of the Winglet Under the Limitation of Wing Root Bending Moment	1499
Yi Liu, Shaoxiu Ouyang, and Xiaoxia Zhao	
Drag Reduction Effect of a Variable Camber Wing of a Transport Aircraft Based on Trailing Edge Flap Deflection of Small Angles	1508
Yi Liu, Shaoxiu Ouyang, and Xiaoxia Zhao	

The Research on the Drag Reduction of Transport Aircraft Using Ventral Fins	1515
Shaoxiu Ouyang, Yi Liu, Xiaoxia Zhao, and Xiao Zhang	
A Study on Aerodynamic Drag Reduction for High Speed Helicopter Airframe	1526
Noboru Kobiki, Yasutada Tanabe, Masahiko Sugiura, and Hideaki Sugawara	
Effects of Distributed Propulsion Crucial Variables on Aerodynamic and Propulsive Performance of Small UAV	1535
Yiyuan Ma, Wei Zhang, Yizhe Zhang, Ke Li, and Yiding Wang	
Wing Selection and Dynamic Derivative Estimation of a Tailless UAV	1551
Tianji Ma, Da Huang, and Lihui Zhang	
Design and Flight Test Validation of a Rotor/Fixed-Wing UAV	1566
Peixing Niu, Yu Zheng, Xu Zeng, and Xiaoguang Li	
Uncertainty-Based Design Optimization of NLF Airfoil Based on Polynomial Chaos Expansion	1576
Huan Zhao and Zhenghong Gao	
Research on Scheme of Maglev-Rotor UAV	1593
Yantao Liu, Qiang Sun, Weigui Zhong, Yongfei Yang, and Wang Xie	
Experimental Investigation on Ground Effect of Ducted Fan System for VTOL UAV	1602
Yangping Deng	
Optimization for Conceptual Design of Reconfigurable UAV Family ...	1610
Haoyu Zhou, Ya Ding, Yalin Dai, and Xiaoqiang Qian	
Combustion and Propulsion	
Laminar Transition over Airfoil: Numerical Simulation of Turbulence Models and Experiment Validation	1623
Shuyue Wang, Gang Sun, Meng Wang, and Xinyu Wang	
Comparison of Electric Ducted Fans for Future Green Aircrafts	1633
Roman Pankov and Jiyong Tang	
Test Research on Operational Deflection Shape and Operational Modal Analysis of Aeroengine Blade	1647
Chao Hang, Qun Yan, Jian Xu, and Xiang Gao	
Application of Ray Tracing Method in Analyzing the Electromagnetic Scattering of Different Nozzles	1666
Xiang Gao, Hong Zhou, Qingzhen Yang, and Wenjian Deng	

Numerical Study of Reverse-Rotating Wave in the Hollow Rotating Detonation Engines	1677
Xiang-Yang Liu, Yan-Liang Chen, Song-Bai Yao, and Jian-Ping Wang	
The Transient Performance of FLADE Variable Cycle Engine During Mode Transition	1685
Hong Zhou, Xiang Gao, Zhanxue Wang, and Wei Zhang	
Numerical Simulation of Bird Strike on a S-Shaped Stealth Inlet	1696
Kun-yang Li, Xiang-hua Jiang, and Da-sheng Wei	
An Experimental Study on Reducing Depositing on Turbine Vanes with Transverse Trenches	1707
Zhengang Liu, Fei Zhang, and Zhenxia Liu	
Numerical Study on the Influence of the Trailing Edge Overflow Holes on the Flow and Heat Transfer of the Inner Cooling Passage on the Trailing Edge of the Turbine Blade	1717
Shun Zhao, Guanghua Zheng, and Chengcheng Hui	
MBSE Approach to Aero-Engine Turbine System Design and Requirements Management	1730
Zhiying Chen, Yufeng Wang, Yuchen Zhang, and Teng Li	
Design and Simulation of Turbofan Engine Digital Electronic Nozzle Control System	1745
Huafeng Yu, Yingqing Guo, and Jiawei Guo	
A Reduction LPV Model Based on the Gas Dynamic Similarity for Turbofan Engine Dynamic Behavior	1757
Zhanyue Zhao and Yingqing Guo	
A Frequency Domain Identification with Maximum Likelihood Method for Aircraft Engine	1767
Nan Liu	
Extended Kalman Filter Infusion Algorithm Design and Application Characteristics Analysis to Stochastic Closed Loop Fan Speed Control of the Nonlinear Turbo-Fan Engine	1775
Xiaowu Lv and Yuansuo Zhang	
The Investigation of Fuel Effects on Industrial Gas Turbine Combustor Using OpenFOAM	1795
Yinli Xiao, Zhibo Cao, Changwu Wang, and Wenyan Song	
Numerical Study on Combustion and Heat Transfer of a GOX/GCH₄ Pintle Injector	1806
Yibing Chang, Jianjun Zou, Qinglian Li, Peng Cheng, and Kang Zhou	

Experimental Research on Air/Ethanol Mono-injector Gas Generator	1826
Fang Zhao, Ze-bin Ren, Xian-feng Li, Long-de Guo, Yu Tao, Yu Shi, and Zhi-feng Luo	
Analysis of Overall Performance of Multi-stage Combustor Scramjet Engine	1835
Jinfeng Du, Chun Guan, Yuchun Chen, Haomin Li, and Zhihua Wang	
An Experimental and Computational Study of Freestream Condition in an Oxygen/Oil Gas-Jet Facility	1847
Ling Zhao, Xin Zhang, Bin Qi, and Yanghui Zou	
Application of the Projective Method in the Numerical Simulation of Combustion	1857
Yang Liu and Zheng Chen	
Experimental Study of High-Efficiency Loop Heat Pipe for High Power Avionics Cooling	1865
Zhihu Xue, Minghui Xie, Jiangfei Duan, and Wei Qu	
Design and Experimental Study of Spherical Calorimeter in Arc-Heated Wind Tunnel	1872
Jinlong Peng, Jianqiang Tu, Guosheng Lin, and Dongbin Ou	
Transient Simulation for the Gas Ingestion Through Turbine's Rim Seal	1880
Jianping Hu, Zhenxia Liu, and Pengfei Zhu	
Numerical Investigation on Intersecting-Grids Composite Cooling Structure with Internal Network Channels	1888
Guanghua Zheng, Yong Chen, Jialin Li, and Chengcheng Hui	
Quantitative Relationship Between Fluorescence Intensity and Equivalence Ratio of Kerosene	1900
Yongsheng Zhao, Junfei Wu, Xiaohu Tian, Yuzhen Lin, and Wei Wei	
Measuring Method of Micro Cone Hole Based on Depth from Focus	1910
Chengxing Bao, JingLiang Liu, Xue Hao, and Dongwei Wang	
Study on Non-contact Measurement Technology for Swirling Slot of Aero Engine Fuel Nozzle	1917
Lei Wang, Chenxing Bao, Wenming Lei, and Chunqun Tang	
Computational Study on Two Dimensional Electrothermal Deicing Problem	1931
Chunhua Xiao, Kunlong Yu, Yubiao Jiang, Ming Li, and Zhangsong Ni	

The Effects of Swirl on Low Power Arcjet Thruster Flowfield and Heat Transfer Characteristics	1948
Xin-ai Zhang and Hai-bin Tang	
Investigation of Influence of Magnet Thickness on Performance of Cusped Field Thruster via Multi-objective Design Optimization	1969
Suk H. Yeo and Hideaki Ogawa	
Performance Evaluation of Magnetic Nozzle by Using Thermal Plasma	1990
Tatsumasa Hagiwara, Yoshihiro Kajimura, Yuya Oshio, Ikkoh Funaki, and Hiroshi Yamakawa	
Dynamics/Control/Avionics	
Calculation and Analysis of Aircraft Pollution Emissions in the Take-off Phase	2001
Zhiqiang Wei, Xiaolan Han, Chung Joon, and Sotto Aaron	
Service Continuity Assessment of Beidou Satellite Navigation System	2023
Shuo Wang, Rui Xue, and Lei Zheng	
Real-Time Traffic Flow Formation of Multiple Aircraft Using Distributed Model Predictive Control.	2036
Kotaro Kakehashi and Nobuhiro Yokoyama	
A Generalization of Jeffrey's Rule in the Interval-Valued Dempster-Shafer Framework	2053
Guojing Xu, Ying Cao, Wen Jiang, and Xinyang Deng	
OWA Aggregation of Multi-criteria on the Framework of Z-Valuation	2064
Guojing Xu, Yue Chang, Xinyang Deng, and Wen Jiang	
Fast Combination Method for Dependent Evidences in the Framework of Hyper-Power Sets	2075
Zhao Jing, Guan Xin, and Liu Haiqiao	
Simulation Platform for New Flight Technology of Civil Aviation	2086
Lisha Ye and Li Cao	
Control Allocation Approach Study for BWB Aircraft	2099
Ning Zhang, Feng Li, and Lixin Wang	
Helicopter Flight Dynamics Simulation with Continues-Time Unsteady Vortex Lattice-Free Wake and Multibody Dynamics	2116
Shuai Deng, Chen Jiang, Yunjie Wang, and Haowen Wang	

Design and Application of Flight Control Actuation System Models Based on Modelica	2132
Wu Shuang and Bao Bingrui	
Symplectic Runge-Kutta Method Based Numerical Solution for the Hamiltonian Model of Spacecraft Relative Motion	2142
Run-de Zhang, Le-ping Yang, and Wei-wei Cai	
The Method and Practices of Aircraft-Level Functional Integration Test in the Lab for Large Jetliner	2154
Junwei Fang, Yong Zhang, Tao Li, Xianzhong Zeng, and Xing Xu	
Interactive Simulation Design for Civil Aircraft Cockpit Assessment and Optimization	2160
Jing Jin Zhang, Zheng Liu, Fei Li, Da Yong Dong, Hong Tao Liu, and Yi Hu	
Flight Risk Quantitative Assessment Based on Extreme Values of Flight Parameters	2169
Zhe Li, Haojun Xu, Yuan Xue, Yang Wei, and Xiaocong Duan	
Employing Model-Based Systems Engineering (MBSE) on a Civil Aircraft Research Project: A Case Study	2178
Jing Jin Zhang, Zheng Liu, Fei Li, Da Yong Dong, Hua Meng, Hong Tao Liu, and Xing Chai	
Towards a Concept of Free Routing in the Northeast Asia/Pacific Region	2187
Mark Brown, Keumjin Lee, and Hiroko Hirabayashi	
A Graph Search-Based Trajectory Optimiser for Practical Wind-Optimal Trajectories	2201
Mark Brown, Hiroko Hirabayshi, and Navinda K. Wickramasinghe	
Optimal Path Planning for UAV Patrolling in Forest Fire Prevention	2209
Junzhong Zhou, Wei Zhang, Yizhe Zhang, Yuqiang Zhao, and Yiyuan Ma	
Research on Closed-loop Guidance Method of Simultaneous Method Based Trajectory Optimization	2219
Feng Qiu, Haoyang Wang, Wei Shang, and Qingfeng Shi	
Aero-optical Effects Simulation Based on Turbulence Vortex Model	2231
Ketian Shi, Jiatong Shi, and Handong Ma	
Air Combat Target Threat Assessment Method on Belief Function Theory	2237
Guojing Xu, Shiyu Wang, Wen Jiang, Xinyang Deng, and Chan Huang	

EM-Based Online Identification Algorithm for Linear Aerodynamic Model Parameters	2249
Hang Zou, Wei Zhang, Junyi Zuo, Xiaodan Chen, and Yawen Cao	
Cooperative Interception of Multiple Missiles for a Highly Manoeuvrable Aircraft Target	2259
Chen Tian, Yang Pei, Peng Hou, and Qian Zhao	
Stochastic Model Predictive Control for Collision Avoidance and Landing of Aircraft	2274
Shimizu Yuji and Tsuchiya Takeshi	
An Analysis of AOA-Maintained APCS in H-Dot Automatic Carrier Landing System	2289
Ran Dong, Na Li, and Xinfei Li	
Dynamic Envelope and Its Characteristics Under Scheduled Control Law	2300
Wuji Zheng, Yinghui Li, Dengcheng Zhang, Chi Zhou, Pengwei Wu, and Zehong Dong	
Optimal Linear-Quadratic Guidance Law Considering Autopilot First-Order Lag with Terminal Acceleration Constraint	2310
Duo Zheng, Xinghua Xu, Ruyi Yan, and Defu Lin	
PIO Engineering Prediction Methods and Verification of Airworthiness Compliance for Civil Aircraft	2331
Jun Liu and Nanbo Xu	
Cooperative Formation Control Technology for Manned/Unmanned Aerial Vehicles	2342
Yu Zheng, Teng Li, Peixing Niu, Mingxi Chen, and Xu Zeng	
Robust Attitude Control System Design for a Distributed Propulsion Tilt-Wing UAV in Flight State Transition	2368
Siqi Wang, Bifeng Song, and Lei He	
Safety Envelope Determination for Impaired Aircraft During Landing Phase Based on Reachability Analysis	2388
Chi Zhou, Yinghui Li, Wuji Zheng, Pengwei Wu, and Zehong Dong	
Study on Integrated Flight/Propulsion Control Method of Compound Adjustable Ducted Rocket	2398
Feichao Cai and Mingyu Shao	
Cooperative Indoor Space Exploration by Multiple Micro Aerial Vehicles with Connectivity Constraints	2410
Kohei Umeki, Daisuke Kubo, and Takeshi Tsuchiya	

Attitude Control Law Design of Experimental Winged Rocket Using Engine Gimbal Control	2425
Tomonori Sugimachi, Koichi Yonemoto, and Takahiro Fujikawa	
Analysis of the Application of Touch Screen in Civil Aircraft Cockpit	2439
Xiaoli Wang, Jiong Zhang, Rui Zeng, and Xin Jiang	
Computational Cost Evaluation of the Flight Controller Using Multi-hierarchy Dynamic Inversion for Winged Rocket	2452
Takahiro Matsukami, Koichi Yonemoto, Takahiro Fujikawa, and Kento Shirakata	
Flight Path Angle Controller Design Based on Adaptive Backstepping Terminal Sliding Mode Control Method	2466
Yang Wei, Haojun Xu, Yuan Xue, Zhe Li, and Hongfeng Tian	
Experimental Study on an Arresting Gear for Heavy UAVs on Slippery Runways	2480
Y. Obikane and Narantsatsralt Norolkhoo	
Calculation of GNSS GBAS Protection Level Based on Four-Parameter Stable Distribution Model	2490
Jinming Song, Rui Xue, and Lei Zheng	
Attitude/Position Estimation of Monocular Vision Based on Multiple Model Kalman Filter	2503
Hao Li, Qiang Tang, and Jia Li	
Tracking GNSS Signals in Low Earth Orbit and High Dynamic Missions	2512
Sara Pourdaraei, Hong Lei Qin, and Adeel Anwar	
Attitude Control Simulator for the Korea Pathfinder Lunar Orbiter . . .	2521
Dawoon Jung, Jae Wook Kwon, Kwangyul Baek, and Han Woong Ahn	
Point-Cloud-Based Relative Attitude Estimation for the Malfunctioned Satellites	2533
Yongsheng Wang, Feng Yu, Na Xu, and Yanhua Zhang	
Design and Simulation Analysis of Electric Drive Emergency Release System for Landing Gear Lock Mechanism	2542
Jun Zhang, Xiaohui Wei, and Yin Yin	
Design and Performance Analysis of a Local Electro-hydraulic Generation System	2555
Mingkang Wang, Yongling Fu, Ziwang Lin, Zhenyu Gou, and Jian Fu	

Control Dynamic Performance Analysis of a Novel Integrated Electro-Mechanical Hydrostatic Actuator	2563
Xudong Yan, Liming Yu, Junlin Pan, Jian Fu, and Yongling Fu	
Sensor Fault Detection and Isolation of Electromechanical Actuator Based on Structural Residual Parity Space	2574
Shimeng Cui and Laixue Sun	
Characteristic Analysis and Simulation of Aero-Engine DC Starting Motor	2586
Sanmai Su, Bowen Yao, Yongqin Chen, and Jun Ma	
Study on Measuring Flange Hole of Aviation Conduit	2596
Ruilin Feng, Changtao Pang, Jingliang Liu, and Zhenyu Yu	
Structures and Materials	
Fast Flutter Uncertainty Calculation Based on Arbitrary Mode Shapes and Reduced - Order Modeling	2607
Guangjing Huang, Yuting Dai, Chao Yang, and Siyan Zhu	
Nonlinear Flutter Test of a Very Flexible Wing	2627
Zhichao Fu and Ziqiang Liu	
Static Aeroelastic Optimization Design and Verification of Composite Wing with Large Sweep Angle	2641
Yuntao Xu and Haibo He	
A Highly Efficient Grid Deformation Strategy Based on Proper Orthogonal Decomposition	2652
Hao Chen, Min Xu, Dan Xie, Yabin Wang, and Xiaomin An	
Geometrical Nonlinear Aeroelastic Wind Tunnel Model Design and Experiment	2675
Jinan Lyu, Xinjiang Wang, Zhichao Fu, Yuntao Xu, and Yi Liu	
Aeroelastic Test of Large Flexible Structure Based on Electromagnetic Dry Wind Tunnel	2684
Yingyu Hou and Ziqiang Liu	
Body Freedom Flutter Investigation Using Different Commercial Softwares	2692
Ke Xie, Yingsong Gu, Jihai Liu, and Pengtao Shi	
Numerical Analysis of Vibration Behaviors of Polymer-Metal Interpenetrating Phase Composites	2699
Fan Xie, Weilin Zheng, Ping Xu, and Weining Zhang	

An Investigation on the Pin-Bearing Behavior of Glass-Reinforced Aluminum Laminate	2706
Yue Zhuo, Riming Tan, Zhidong Guan, and Hu Dan	
Design of Small BLDCM for Aircraft Fuel Pump	2719
Yaru Liu, Yu Zhou, and Jin Cao	
Research on Integrated Displacement Sensing Technology of Aviation Metering Device	2726
Shangwei Xun, Bin Zhang, Xingliang Li, and Meng Guo	
Analysis on Modeling of Constant Pressure Difference Valve of Certain Turboshaft Engine	2735
Yanyan Wei, Chunlei Chang, Hongyu Wang, and Di Kang	
Controlling on the Consistency of Accumulated Assembly Errors Under Digital Manufacturing Environment for Aircraft	2745
Feiyan Guo, Fang Zou, Jianhua Liu, Zhongqi Wang, and Qingdong Xiao	
Empirical Structural Analysis on Chinese Airline Network	2757
Yong Yang, Kaijun Xu, and Jiayi Wu	
A General Solution of Mode I Stress Intensity Factor for Double Cantilever Beam Specimens with Consideration of Deformable Uncracked Segment	2765
Xiangyang An, Zheng Jordan Zhang, and Fei Su	
Simulation and Test Study of the Three-Direction Stiffness and Grounding Characteristics of the Metal Spring Tire	2778
Zhenglong Zhao, Bin Song, Jiangang Lv, Jinhua Liu, Zhongzhi Zhang, and Yu Zhang	
Variational Force/Displacement Method for Analyzing Mode II Crack by Double Cantilever Beam Model	2793
Xiangyang An, J. Z. Zhang, and X. Zhang	
Structure Modelling and Simulation Analysis of Six-Rotor UAV	2811
Zhan-ke Li, Jiao Guo, Fa-ming Li, Yu-dong Yan, Ying Yang, and Yang Liu	
Fatigue Life Prediction Method for the Civil Airplane Actuator Structure Based on the First Principal Stress Correction	2822
Peng Liu, Linyuan Dong, Wei Zhang, Tao Hua, Zidong Yin, and Yixue Hu	
Simulation and Experimental Verification for Composite Material Structure of Helicopter Tail Fin	2830
Haibin Xu, Xin Chen, Kunfa Men, and Heng Sun	

Research on Motion Relationships and Transmission Efficiency of Planetary Roller Screw	2838
Wensen Zhang, Wei Li, Shicheng Zheng, Peng Zhang, and Xiaoye Qi	
Research on the Critical Loads Selecting Methods for the Civil Aircraft	2849
Yi Liu and Zhongwu Yan	
Weight Design Platform of Hybrid Wing Body Based on Vehicle Sketch Pad	2857
Lu Bai, Ming Xia, WeiFeng Shi, and Shuai Zhang	
A Cold-Hot State Conversion Method for Compressor Structure	2866
Shiyu Wu and Yueqian Yin	
Topology Optimization Design of Typical Hinge for Civil Aircraft	2872
Yu Wang, Wei Liu, and Jiazhen Zhang	
A Fast Geometric Modeling Method for Cold Blades	2882
Kaicheng Liu, Jianjun Wang, and Bowen Ni	
Helicopter Lead-Lag Damper Modeling Using Fractional Derivative Methods	2891
Ruirui Li, Jinyu Wang, and Zheng Xu	
Time Varying Mesh Stiffness Calculation of Spur Gear Pair Under Mixed Elastohydrodynamic Lubrication Condition	2898
Zhiying Chen and Pengfei Ji	
Phase Tangent Slope Method for Modal Damping Identification of a Simulation Power Turbine Rotor	2912
Jie Bian, Yanong Chen, Shizhi Wu, Youliang Xu, Qing Mei, and Wangqun Deng	
Automatic Modal Parameters Identification of Control Surface Under Colored Noise Excitation	2921
Tianci Gao, Xudong He, and Huaihai Chen	
Transient Dynamic Response of the Aero-Engine Dual-Rotor System Under the Blades Loss Load	2931
Chi Ma, Lulu Liu, Luo Gang, Chen Wei, and Zhenhua Zhao	
Study on RCS Characteristics of Low Scattering Carriers of Spherical Convergent Nozzle	2944
Yichao Liang, Qingzhen Yang, Yongqiang Shi, Jin Bai, and Qi Lin	
Research on State Monitoring of CNC Machine Tool Based on Dual Dimension Feature	2952
Xuezhen Chen, Chunlei Li, Lianyu Li, and Yuanmeng Xia	

The Use of Strain Measurement Techniques at Elevated Temperatures	2965
Jianguang Bao, Adil Benaarbia, Siyuan Bao, Qingrui Hao, Yonghong Wang, and Wei Sun	
Measuring the Aero-Refueling Hose Model's Sectional-Bending-Stiffness in the RMCFLM Experimental System	2974
Hao Wen, Aiming Shi, Earl H. Dowell, and Xiang Li	
Crack and Shear Band Interaction in Bulk Metallic Glasses	2992
Bingjin Li, Ding Zhou, Bing Hou, Shuangyin Zhang, and Yulong Li	
Planning of Flight Load Validation Test for Civil Transport Aircraft	3002
Zhi Zhang and Yang Liu	
Three-Dimensional Cellular Automata Model of Uniform Corrosion for Aluminium Alloy	3012
Hua Ji, Kelian Ren, Lihong Ding, Ting Wang, Xiaobin Zhang, Jimin Li, Zixiang Zhang, and Dongxu Guo	
Others	
A Functional Requirements Development and Management Approach Applied to a Civil Aircraft Program	3025
Haomin Li, Xinai Zhang, Chao Tang, and Chao Zhan	
Effects of Flight Environment on Pilot Workload in Simulated and Actual Flight	3040
Xueli He, Ling Ding, Chongchong Miao, and Canhui Wu	
Independent Development and Verification of Coordinate Measuring Machine Software	3052
JingLiang Liu, ChenXing Bao, Xue Hao, and RuiLin Feng	
Author Index	3061

Xinguo Zhang *Editor*

The Proceedings of the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018)

Set 1

This book is a compilation of peer-reviewed papers from the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018). The symposium is a common endeavour between the four national aerospace societies in China, Australia, Korea and Japan, namely, the Chinese Society of Aeronautics and Astronautics (CSAA), Royal Aeronautical Society Australian Division (RAeS Australian Division), the Korean Society for Aeronautical and Space Sciences (KSAS) and the Japan Society for Aeronautical and Space Sciences (JSASS). APISAT is an annual event initiated in 2009 to provide an opportunity for researchers and engineers from Asia-Pacific countries to discuss current and future advanced topics in aeronautical and space engineering.

Engineering

ISBN 978-981-13-3304-0



► springer.com