

Table of Contents

Preface, Editorial, Organizing and Sponsors

Chapter 1: Aerodynamics

| | |
|---|-----|
| Wake Frequency Analysis of a Plunging Airfoil with Trailing-Edge Strips F. Ajalli, M. Mani and M. Gharakhanlou | 3 |
| Numerical Sensitivity Analysis of Axial Flow Fan 3D Aerodynamics under Off Design Conditions P.K. Akula, B. Singh and V.G. Nair | 8 |
| A Study on the Effect of Upstream Square Blockage of a Rotating Cylinder X.H. Cheong, A.S.M. Rafie, F.I. Romli, M.T.H. Sultan and N. Yidris | 13 |
| Generic Modeling and Parametric Study of Flapping Wing Micro-Air-Vehicle H. Djojodihardjo, A.S.S. Ramli and S. Wiriadidjaja | 18 |
| Ventilated Brake Disk Air Streamlining Using Curved Vane K.M. Munisamy, M.Z. Yusoff and S.K. Thangaraju | 26 |
| An Experimental Investigation on the Effect of Various Swirl Atomizer Orifice Geometries on the Air Core Diameter M.S.F.M. Rashid, A.H.A. Hamid, C.S. Ow and Z.A. Ghaffar | 32 |
| The Effect of Canard to the Aerodynamic Behavior of Blended Wing Body Aircraft Z.M. Ali, W. Kuntjoro and W. Wirachman | 38 |
| The Aerodynamics Investigation of Vortex Trap on Helicopter Blade M.F. Yaakub, A.A. Wahab, M.F. Abdul Ghafir, S.N.M. Mohd Yunos, S.J.M.M. Salleh, Q.E. Kamarudin and M.F.M. Masrom | 43 |
| Effects of Blowing Ratio on Multiple Shallow Angle Film Cooling Holes K. Abdullah and K.I. Funazaki | 49 |
| Assessment on Effects of Under-Relaxation Factors on 2D Incompressible Laminar Flow over a Backward-Facing Step (BFS) Y. Sinnasamy, N.A. Yahaya, S. Basri, A.A. Jaafar and A.S.M. Rafie | 55 |
| Aerodynamic Interference Correction Methods Case: Subsonic Closed Wind Tunnels S. Wiriadidjaja, A.S.M. Rafie, F.I. Romli and O.K. Ariff | 60 |
| Coupled Analytical-Numerical Procedure to Solve the Double Wedge Spiked Supersonic Intake Flow Field H.H. Al-Kaiyiem, T.W. Salih and D. Govindasamy | 67 |
| Rotor-Stator Distance Effect onto Axial Fan Performance Improvement K.M. Munisamy, R. Govindasamy and S.K. Thangaraju | 73 |
| Comparative Study of Vortex Generator Orientation on Wing Surface Considering Delta Vortex Generators S.M.A. Aftab and P.S. Murthy | 79 |
| Cavity Effect of Synthetic Jet Actuators Based on Piezoelectric Diaphragm M.N. Dahalan, S. Mansor and A. Ali | 85 |
| Experimental and Numerical Investigation onto 1250mm Axial Fan K.M. Munisamy, R. Govindasamy and S.K. Thangaraju | 91 |
| Numerical Investigation of Flow-Induced Vibration of a Cantilever Beam for a Piezoelectric Energy Harvester M.R. Rasani, J.Y. Tu and N.A.N. Mohamed | 97 |
| Experimental Study of Free Stream Turbulent Effects on Dynamic Stall of Pitching Airfoil by Using Particle Image Velocimetry T.S. Leu, J.M. Yu, C.C. Hu, J.J. Miau, S.Y. Liang, J.Y. Li, J.C. Cheng and S.J. Chen | 103 |
| The Effects of Spatial Resolution in Turbulent Boundary Layers with Pressure Gradients Z. Harun, M.D. Isa, M.R. Rasani and S. Abdullah | 109 |

Chapter 2: Aerospace Structures and Material

| | |
|--|-----|
| Effect of Laser Pulse Fatigue on the Mechanical Characteristics of a CFRP Plate S.C. Hong, J.R. Lee, S.Y. Chong and C.Y. Park | 121 |
| The Effect of Laser Cutting Parameters on the Aerospace Structure Panel of CFRP Composite Material W. Saidin, E.A. Rahim, M.S. Mustafa and N.A. Rahman | 127 |
| Modal Properties of a Cantilevered Laminated Woven Composite Plate as Affected by Stacking Sequence and Fiber Orientation: An Experimental Study D.L. Majid, M.N.A. Sani, F. Mustapha, H. Hanafi and M.T.H. Sultan | 132 |
| Damage Identification and Classification in CFRP Laminates – A SEM Based Study M.T.H. Sultan, N. Yidris, F. Mustapha, A.S.M. Rafie and D.L. Majid | 138 |
| Optimization of the Composite Truncated Cone Structure Layers under Buckling Load H.S.S. Pour, M. Sadighi and A. Kami | 144 |
| Computational Simulation for Static and Dynamic Load of Rectangular Plate in Elastic Region for Analysis of Impact Resilient Structure H. Djojodihardjo, H. Jamali, A. Shokrani, F. Mustapha, R. Zahari and S. Wiriaidjaja | 150 |
| Beneficial Patch Repair Effect on Fatigue Crack Growth of Al-Alloy 7050 M. Benachour, F.Z. Seriari, N. Benachour and M. Benguediab | 158 |
| Geometric Non-Linear Analysis of Composite Laminated Plates Using Higher Order Finite Strip Element R. Zahari, F. Mustapha, D.L.A. Majid, A.S.M. Rafie and T.H. Sultan | 165 |
| Failure Mechanics of Uniformly Compressed Thin-Walled Box-Section Struts N. Yidris, J. Loughlan, M.T.H. Sultan and A.S.M. Rafie | 172 |
| Prediction of Energy Absorption Capability of Curved Panel Structure; For Wing Leading Edge Study N. Omar, N.A.M. Khalid, N.F. Shamsudin and Y. Aminanda | 178 |
| Computational Analysis of a Truss Type Fuselage I.A. Yousif, M.A.M. Zein and M.E.A. Elsayed | 183 |
| Damage Classification in CFRP Laminates Using Principal Component Analysis (PCA) Approach M.T.H. Sultan, A.S.M. Rafie, N. Yidris, F. Mustapha and D.L. Majid | 189 |
| Multiple Delaminations Growth in Composite Laminates under Compressive Cyclic Loading in Post-Buckling H. Hosseini-Toudeshky, M.S. Goodarzi and B. Mohammadi | 195 |
| Structural Analysis of Light Aircraft Wing Components A. Bushra, M. Mahdi and M.A. Elhadi | 201 |
| Buckling Analysis of Ring-Stiffened Laminated Composite Cylindrical Shells by Fourier-Expansion Based Differential Quadrature Method S. Barani, D. Poorveis and S. Moradi | 207 |
| The Behaviour of Fibre-Metal Laminates under High Velocity Impact Loading with Different Stacking Sequences of Al Alloy A.A. Ramadhan, A.R.A. Talib, A.S.M. Rafie and R. Zahari | 213 |
| Composite Repair of Curved Stiffened Aluminum Panels under Combined Tension and Shear Cyclic Loadings H. Hosseini-Toudeshky, M.A. Ghaffari and B. Mohammadi | 219 |
| Fatigue Damage Mechanism of Titanium in Inert Environments N.I. Zahari, H. Yussof and M. Sugano | 225 |

Chapter 3: Propulsion

| | |
|--|-----|
| Effect of Rotor Tip Gap Variation at the Rear Stages of an Axial Flow Compressor A.M. Pradeep, R.N. Chiranthan, D. Dutta and B. Roy | 233 |
| Impact of Operating and Health Conditions on a Helicopter Turbo-Shaft Hot Section Component Using Creep Factor M.F. Abdul Ghafir, Y.G. Li, A.A. Wahab, S.N.M. Mohd Yunos, M.F. Yaakub, S.J.M.M. Salleh, Q.E. Kamarudin and M.F.M. Masrom | 239 |
| An Investigation on the Effect of Variable Valve Timing on Piston Engine for Lightweight Aircraft A.A. Sabaruddin, S. Wiriaidjaja, D.L.A.A. Majid, H. Djojodihardjo and M.T. Ahmad | 245 |

| | |
|---|-----|
| Preliminary Development of Electric Motorcycle Engine for Sport Aviation Vehicles M.K. Jamil, M.E. Kadir, M.Z. Zainol, A.H. Abdullah and A.Z. Bakar | 250 |
| Investigation into the Temperature Impact on O-Ring's Sealing Performance Using Advanced Stress Relaxation Test Y. Liu and C.W. Wilson | 255 |
| Thermodynamic Analysis of Flow Field at the End of Combustor Simulator K. Ehsan, N.A.C. Sidik and M.A.S.M. Bozorg | 261 |
| Mathematical Model Development of TMM25-Single Shaft Turbojet Engine K.I. Azzabi and A. Elmahmodi | 267 |

Chapter 4: Aerospace Design

| | |
|---|-----|
| A Novel Design of Landing Gear Oleo Strut Damper Using MR Fluid for Aircraft and UAV's C.B. Asthana and R.B. Bhat | 275 |
| Design of Optimum Torsionally Flexible PropRotors for Tilt-Body MAVs F. Zawawi, J. Morlier, G. Grondin and J.M. Moschetta | 281 |
| A Preliminary Study of Baseline Design Architecture Effects on Aircraft Redesign Risks F.I. Romli, S. Wiriadidjaja and A.S.M. Rafie | 287 |
| A New Concurrent Engineering – Multi Criteria Decision Making Technique for Conceptual Design Selection N. Fatchurrohman, S. Sulaiman, S.M. Sapuan, M.K.A. Ariffin and B.T.H.T. Baharudin | 293 |
| Conceptual Design of Solar Powered Unmanned Arial Vehicle N.H. Abu-Hamdeh, K.A. Alnefaie and M.K. Al-Hajjaj | 299 |
| Design and Analysis of UAV Fuselage T. Singhanart, C. Srimontok, N. Pisispan, S. Chitimaworaphan and W. Mongkhonchaiwiwat | 305 |
| Computer Aided Design, Analysis and Prototype Development of 2-Axis Stabilized Aerial Image Capturing M.M. Zihad, K.A. Ahmad and A.H. Kadarmen | 310 |
| Preliminary Design of Solar Powered Unmanned Aerial Vehicle S. Jashnani, P. Shaholia, A. Khamker, M. Ishfaq and T. Nada | 315 |
| Aircraft Dynamically Similar Model Design Using Simulated Annealing A. Shakoori, M. Mortazavi and H. Nobahari | 323 |

Chapter 5: Aerospace System Performance

| | |
|---|-----|
| Model Reference Adaptive Control Design for a Ducted Fan Air Vehicle in Vertical Plane E. Fadaeian and A. Banazadeh | 331 |
| Design and Test of a Vertical-Axis Wind Turbine with Pitch Control J.J. Miau, S.Y. Liang, R.M. Yu, C.C. Hu, T.S. Leu, J.C. Cheng and S.J. Chen | 338 |
| Implementation of Extreme Low Power Micro-Controller for a Wireless Structural Health Monitoring (SHM) System M.Z. Zainol, F. Mustapha, M.T.H. Sultan and N. Yidris | 344 |
| Development of Simple-Structure Magnetic Membrane Actuator for Synthetic Jet Application A. Pimpin, K. Intarasuksanti, E. Wongweerayoot and W. Srituravanich | 350 |
| Automatic Monitoring of Photovoltaic Cells Performance on Solar Aircraft Z. Sahwee, H. Husain, M.K.A. Kadir, M.F. Razali, M.Z. Zainol and S.A. Sarmin | 356 |
| Performance Analysis of Smart Composite Structure Using Shape Memory Alloy Actuators E.J. Abdullah, D.L.A. Abdul Majid, L.G. Yuan and N.F. Harun | 361 |
| Two-Step Electroplating Process in Fabrication of Thermal Bimorph Cantilever Actuator for Flow Control Application A. Pimpin, E. Wongweerayoot and W. Srituravanich | 367 |

Chapter 6: Flight Performance

| | |
|--|-----|
| Investigation on the Effect of Airspeed and Altitude to Phugoid Mode of a Small Unmanned Blended Wing-Body Aircraft with Canard as a Longitudinal Control Surface | 375 |
| R.E.M. Nasir, W. Kuntjoro and W. Wisnöe | |
| Emissions Performance Study for Conventional Aircraft Designs | 385 |
| F.I. Romli and M.S. Kamaruddin | |
| Stability Analysis of a Light Aircraft Configuration Using Computational Fluid Dynamics | 391 |
| M. Mahdi and Y.A. Elhassan | |
| On the Evaluation of Negative Altitude Requirement for Flutter Speed Boundary of Transport Aircraft and UAV | 397 |
| E. Sulaeman | |
| Three Dimensional Path Planning Algorithm for Small UAVs Incorporating Existing Dynamic Soaring Heuristics | 403 |
| O.K. Ariff, T.H. Go, S. Wiriadidjaja and A. Zahir | |

Chapter 7: Space Systems

| | |
|--|-----|
| Investigation on a Flexible Tether Slackness Based on In- and Out-of Plane Libration Angles | 411 |
| A.A.T. Hong and R. Varatharajoo | |
| Spacecraft Attitude and System Identification Using Marginal Reduced UKF Utilizing the Sun and Calibrated TAM Sensors | 417 |
| M. Kiani and S.H. Pourtakdoust | |
| Spray Characteristics of Swirl Effervescent Injector in Rocket Application: A Review | 423 |
| Z.A. Ghaffar, A.H.A. Hamid and M.S.F.M. Rashid | |
| Parametric Study of Ground-Track Based Performance Measure Requirements for the Optimization of Near Earth Twin-Spacecrafts Trajectory | 429 |
| H. Djojodihardjo, A.A.A. Gunter and R. Varatharajoo | |
| Load Cell Application in Rocket Thrust Measurement System | 437 |
| N.H. Abdullah, T.F. Wahida Ku Chik, F.A. Zaraini and A. Ammar | |
| Application of Airborne LiDAR-Derived Parameters and Probabilistic-Based Frequency Ratio Model in Landslide Susceptibility Mapping | 442 |
| B. Pradhan, Z.A. Latif and S.N.A. Aman | |
| Diurnal and Seasonal Variation of Critical Frequency in Malaysia from 2005 to 2007 | 448 |
| S. Abdullah and A.F. Mohd Zain | |
| S.H.E.E.P. for Sleeping in Zero-G | 453 |
| M. Khamdevi and F. Bachtiar | |
| Passive Attitude Control Torque Generation Performances of a Gravity Gradient Stabilized Satellite | 458 |
| N.M. Suhadis and R. Varatharajoo | |
| Comparison between H_2 and H_∞ Optimal Control Solutions for a Combined Energy and Attitude Control System | 464 |
| B.Y. Siang and R. Varatharajoo | |
| Soret Measurement for Multi-Component Hydrocarbon Mixtures from Space Experiment Conducted Onboard FOTON M3 Unmanned Satellite | 470 |
| M.Z. Saghir, S. Srinivasan and S. Van Vaerenbergh | |
| Designing and Developing a Ground Operation Software for Picosatellite Operation and Data Processing | 475 |
| S. Fadlie Sabri, N. Salleh and E.W.L. Leng | |
| Single Parameter-Based Neural Networks Prediction of TEC | 481 |
| V. Jayapal and M.Z. Ahmad Faizal | |
| Remote Sensing Data Derived Parameters and its Use in Landslide Susceptibility Assessment Using Shannon's Entropy and GIS | 486 |
| H.R. Pourghasemi, B. Pradhan and C. Gokceoglu | |
| Preliminary Hardware Design and Development of On-Board Data Handling for Pico-Satellite in National Space Agency | 492 |
| S.A. bin Ibrahim, S.F. Sabri and N. Salleh | |
| Thermal Analysis of CUBESAT in Worse Case Hot and Cold Environment Using FEA Method | 497 |
| K. Thanarasi | |

Chapter 8: Aerospace Management and Operation

| | |
|--|-----|
| Application of Back Propagation Neural Network Algorithms on Modeling Failure of B-737 Bleed Air System Valves in Desert Conditions | 505 |
| W.G. Abdelrahman, A.Z. Al-Garni and W. Al-Wadiee | |
| Reliability Analysis for the Power and Propulsion System of Stratospheric Airship | 511 |
| J. Liu, Q.B. Wang, J. Chen, D.P. Duan and S. Wang | |
| A Study of Flight Pad Time for Scheduling Process | 517 |
| F.I. Romli and M.B. Seng | |
| RVSM Implementation in Malaysia | 522 |
| I.F. Nusyirwan and K. Perumah | |
| Maintainability Prediction for Aircraft Mechanical Components Utilizing Aircraft Feedback Information | 528 |
| W.M.S. Wan Husain | |
| Investigating Imperfect Inspection of Avionics System and its Relationship with Availability Percentage | 534 |
| A.R. Mahayudin, M.T. Ahmad, F.I. Romli and A. Zahir | |
| Loosening Monitoring of Bolted Joints Using Optical Fiber Bending Sensor for Aircraft Lug Assembly | 540 |
| H.J. Shin, J.R. Lee and C.Y. Park | |

Chapter 9: Aerospace Reviews

| | |
|---|-----|
| Comparative Study on Aircraft Landing Instruments: Accuracies and Limitations | 549 |
| A.A.A. Salih, A. Zahir and O.K. Ariff | |
| Unmanned Aerial Systems Platform Research Prognosis | 555 |
| J. Chahl | |
| Suggestions for a Roadmap towards Becoming a Launch Capable Nation | 561 |
| F.A. Zaraini, T.F. Wahida Ku Chik, N.H. Abdullah and A. Ammar | |
| Subsonic Wind Tunnels in Malaysia: A Review | 566 |
| S. Wiriaidjaja, F. Hasim, S. Mansor, W. Asrar, A.S.M. Rafie and E.J. Abdullah | |
| Short-Term and Long-Term Feedstock Bio Jet Fuel for Green Environment of Air Transport in Climate Change Awareness | 572 |
| H. Mohd Noh and N.A. Md Zulkifly | |