Contents

Part I Introduction to Flow Control Technology

1 Introduction and Literature Survey .............................................. 3
Vasileios Pastrikakis and George Barakos

Part II Design of Modern Gurney Flap

2 CFD Method for Modelling Gurney Flaps.............................. 23
Vasileios Pastrikakis, Mark Woodgate, and George Barakos

3 Performance Enhancement of Rotors in Hover Using Fixed Gurney Flaps................................................................. 51
Vasileios Pastrikakis, René Steijl, and George Barakos

4 Alleviation of Retreating Side Stall Using Active Gurney Flaps ...... 69
Vasileios Pastrikakis, René Steijl, and George Barakos

5 Effect of Gurney Flaps on Overall Helicopter Flight Envelope ...... 87
Vasileios Pastrikakis and George Barakos

6 Active Gurney Flap Unit............................................................. 105
Ihor Berezin and R. Raczynski

7 Gurney Flap Force Calculations ............................................. 121
Prasanta Sarkar and Radoslaw Raczynski

Part III Design of Rod Vortex Generator

8 Investigation of Vortex Generators on Channels and Airfoils ........ 137
Fernando Tejero, Piotr Doerffer, Pawel Flaszynski, and Oskar Szulc
9 Implementation of Rod Vortex Generators on Helicopter Rotor Blades in Hover and Forward Flight Conditions .......... 155
Fernando Tejero, Piotr Doerffer, Paweł Flaszyński, and Oskar Szulc

10 Retractable Rod Vortex Generator ........................................ 175
Tomasz Lewandowski

Part IV Important Issues in Synthetic Jet Design

11 Numerical Simulation of a Synthetic Jet Actuator for Active Flow Control ......................................................... 203
Marcin Kurowski

12 Introduction to the Synthetic Jet Flow Control and Drag Reduction Techniques ..................................................... 223
Milan Matejka

13 Experimental Results of Synthetic Jet Wind Tunnel Tests ......... 233
Milan Matejka

Part V Multi Physics Co-simulation Methods

14 Fluid –Structure Interaction Simulation ....................................... 263
Ihor Berezin, Prasanta Sarkar, and Jacek Malecki

15 Analysis and Optimization of Flow Around Flexible Wings and Blades Using the Standard Co-simulation Interface MpCCI .......... 283
Nadja Wirth, Pascal Bayrasy, Bettina Landvogt, Klaus Wolf, Francesco Cecutti, and Tomasz Lewandowski

16 Numerical Simulation of Airflow and Acoustic Field Around a Passenger Car Model Using Euler Approach and Hybrid Meshing 323
Oskar Szulc and Piotr Doerffer

17 Computation of Rotorcraft Stability Derivatives Using the Discrete Adjoint Method ...................................................... 337
M. Biava and G. Barakos

Part VI Structural Dynamics of Blades and Components

18 Dynamics of the Synthetic Jet Actuator Investigation by the Numerical and Experimental Approach ....................... 359
Rūta Rimašauskienė

19 Thermal Synthetic Jet Actuator Investigation by Experimental Approach ................................................................. 375
Rūta Rimašauskienė

20 Modal Analysis of PZL-W-3/W-3A Sokol Main Rotor ............. 395
Ihor Berezin
21 Strain Modal Analysis ..................................................... 405
   Fabio L.M. dos Santos and Bart Peeters

22 Uncertainty Quantification of the Main Rotor Blades
   Measurements............................................................... 429
   Marcin M. Luczak

23 Temperature Compensation Methods for Elastic Wave Based SHM . 483
   Codruț Alexandru Dan and Paweł Kudela

Index ................................................................. 499
Recent Progress in Flow Control for Practical Flows
Results of the STADYWICO and IMESCON Projects
Doerffer, P.; Barakos, G.N.; Luczak, M. (Eds.)
2017, XI, 511 p. 455 illus., 402 illus. in color., Hardcover
ISBN: 978-3-319-50567-1