# TABLE OF CONTENTS

**DIESEL ENGINE EMISSION MODEL TRANSIENT CYCLE VALIDATION** ............................................................ 1  
Dhinesh V Velmurugan, Markus Grahn, Tomas McKelvey

**ESTIMATING TAILPIPE NOX CONCENTRATION USING A DYNAMIC NOX/AMMONIA CROSS SENSITIVITY MODEL COUPLED TO A THREE STATE CONTROL ORIENTED SCR MODEL** ............................................................ 8  
M. Aliramezani, C. R. Koch, R. E. Hayes

**TEMPERATURE CONTROL OF ELECTRICALLY HEATED CATALYST FOR COLD-START EMISSION IMPROVEMENT** ............................................................ 14  
Jinbiao Ning, Fengjun Yan

**COMPOSITE CONTROL OF DOC-OUT TEMPERATURE FOR DPF REGENERATION** ............................................................ 20  
Jinbiao Ning, Fengjun Yan

**BLACK BOX SCR MODELING AND CONTROL FOR SMALL CI ENGINES** ............................................................ 28  
Stephan Stadlbauer, Harald Waschl, Luigi Del Re

**MILD HEV WITH MULTIMODE COMBUSTION: BENEFITS OF A SMALL OXYGEN STORAGE** ............................................................ 34  
S. Nüesch, A. G. Stefanopoulou

**CROSSTALK INTERFERENCES ON IMPEDANCE MEASUREMENTS IN BATTERY PACKS*** ............................................................ 42  

**A STUDY ON BATTERY MODEL PARAMETRISATION PROBLEM - APPLICATION-ORIENTED TRADE-OFFS BETWEEN ACCURACY AND SIMPLICITY** ............................................................ 48  
Abbas Fotouhi, Daniel J. Auger, Karsten Propp, Stefano Longo

**ESTIMATING THE STATE OF CHARGE OF LITHIUM-ION BATTERY BASED ON SLIDING MODE OBSERVER** ............................................................ 54  
Yan Ma, Bingsi Li, Yongqiang Xie, Hong Chen

**GAIN-SCHEDULED CONTROL OF MODULAR BATTERY FOR THERMAL AND STATE-OF-CHARGE BALANCING*** ............................................................ 62  
Faisal Altaf, Bo Egardt

**BATTERY LIFE EXTENDING CHARGING STRATEGY FOR PLUG-IN HYBRID ELECTRIC VEHICLES AND BATTERY ELECTRIC VEHICLES*** ............................................................ 70  
L. Tang, G. Rizzoni, A. Cordoba-Arenas

**BATTERY PEAK POWER SHAVING STRATEGY TO PROLONG BATTERY LIFE FOR ELECTRIC BUSES** ............................................................ 77  
T. H. Pham, B. Rosea, S. Wilkins

**CHARACTERIZING THE INFLUENCE OF MUSCLE ACTIVITY IN FNIRS BRAIN ACTIVATION MEASUREMENTS** ............................................................ 84  
Nils Volkening, Anirudh Unni, Birte Sofie Löffler, Sebastian Fudickar, Jochem W. Rieger, Andreas Hein

**DRIVER BEHAVIOR ASSESSMENT BASED ON THE G-G DIAGRAM IN THE DVE SYSTEM** ............................................................ 89  
Oussama Derbel, René Landry

**DRIVER RATING BASED ON INTERVAL TYPE-2 FUZZY LOGIC SYSTEM** ............................................................ 95  
Ayse Cisel Aras, Ismail Gocer

**ADVANCED TRAFFIC SIMULATION FRAMEWORK FOR NETWORKED DRIVING SIMULATORS** ............................................................ 101  
K. Abdelgawad, S. Henning, P. Biemelt, S. Gausemeier, A. Trächtler

**AUTOMATIC RECOGNITION OF DRIVING SCENARIOS FOR ADAS DESIGN** ............................................................ 109  
Alberto Lucchetti, Carlo Ongini, Simone Formentin, Sergio M. Savaresi, Luigi Del Re

**DESIGN AND EVALUATION OF A DRIVING MODE DECISION ALGORITHM FOR AUTOMATED DRIVING VEHICLE ON A MOTORWAY** ............................................................ 115  
Jongsang Suh, Boemjun Kim, Kyongyu Yi

**THE AAC2016 BENCHMARK - LOOK-AHEAD CONTROL OF HEAVY DUTY TRUCKS ON OPEN ROADS** ............................................................ 121  
Lars Eriksson, Anders Larsson, Andreas Thomsson

**FUEL SAVING POTENTIAL OF OPTIMAL ROUTE-BASED CONTROL FOR PLUG-IN HYBRID ELECTRIC VEHICLE** ............................................................ 128  
Dominik Karbowksi, Vadim Sokolov, Jeong Jongyeoul

**FLATNESS-BASED TRAJECTORY PLANNING FOR THE BATTERY STATE OF CHARGE IN HYBRID ELECTRIC VEHICLES** ............................................................ 134  
Martina Jokovski, Dirk Abel
LPV/H. SUSPENSION ROBUST CONTROL ADAPTATION OF THE DYNAMICAL LATERAL LOAD TRANSFERS BASED ON A DIFFERENTIAL ALGEBRAIC ESTIMATION APPROACH ........................................ 440
S. Fergani, L. Menhour, O. Sename, L. Dugard, B. D’Andrea Novel

FAST DETERMINATION OF VEHICLE SUSPENSION PARAMETERS VIA CONTINUOUS TIME SYSTEM IDENTIFICATION* .......................................................... N/A
Sandra Thaller, Florian Reitner, Roman Schmed, Harald Waschl, Helmut Kokal, Luigi Del Re

DETERMINING THE INITIAL IN-CYLINDER GAS STATE BASED ON SEMI-PHYSICAL MODELS .................................................................................................................. 454
S. Zysdek, D. Casper, R. Isermann, A. Weber

SIMULTANEOUS ESTIMATION OF INTAKE AND RESIDUAL MASS USING IN-CYLINDER PRESSURE IN AN ENGINE WITH NEGATIVE VALVE OVERLAP ........................................ 461
C. Guardiola, V. Triantopoulos, P. Bares, S. Bohac, A. Stefanopoulos

A COMBUSTION CYCLE MODEL FOR STATIONARY AND TRANSIENT ENGINE OPERATION .......................................................................................................................... 469
T. Makowicki, M. Itzerer, P. Kotman, K. Graichen

ENHANCED COMBUSTION MODEL WITH FUEL-WALL IMPINGEMENT ORIENTED TO INJECTION PATTERN TUNING IN AUTOMOTIVE DIESEL ENGINES ........................................ 476
Ivan Ariste, Rocco Di Leo, Cesare Pianese, Matteo De Cesare

MODEL OPTIMIZATION AND FLOW RATE PREDICTION IN ELECTRO-INJECTORS OF DIESEL INJECTION SYSTEMS .......................................................... 484
Roberto Giaroppa, Paolo Lino, Guido Maione, Fabrizio Saponaro

ACCURATE DYNAMIC MODELING OF AN ELECTRONICALLY CONTROLLED CNG INJECTION SYSTEM ........................................................................................................ 490
Paolo Lino, Guido Maione

DEVELOPMENT OF A REGENERATIVE BRAKING CONTROL STRATEGY FOR HYBRIDIZED SOLAR VEHICLE ............................................................................................... 497
M. Grandone, M. Naddeo, D. Marra, G. Rizzo

IMPLEMENTATION OF A ROBUST CRUISE CONTROL USING LOOK-AHEAD METHOD .............................................................. 505
Péter Gáspár, Balázs Németh, Michel Basset, Rodolfo Orjuela

OPTIMAL MODEL PREDICTIVE ACCELERATION CONTROLLER FOR A COMBUSTION ENGINE AND FRICION BRAKE ACTUATED VEHICLE ........................................ 511
Mathias Mattsson, Rasmus Mehler, Mats Jonasson, Andreas Thomasson

COMPUTE OPTIMAL TRAVEL DURATION IN ECO-DRIVING APPLICATIONS .................................................................................................................. 519
Valentina Ciarla, Alexandre Chasse, Philippe Moulin, Luis Leon Ojeda

MODEL-BASED TORQUE SHAPING FOR SMOOTH ACCELERATION RESPONSE IN HYBRID ELECTRIC VEHICLES ........................................................... 525
Katherine Bovee, Giorgio Rizzoni

DYNAMIC MODELING PLATFORM FOR SERIES HYBRID ELECTRIC VEHICLES ........................................................................................................ 533
Simos A Evangelou, Wassif Shabbir

DESIGN OF RAPID FIRST-AID ALERT SYSTEMS FOR 2-WHEELED VEHICLES VIA SMARTPHONES* INERTIAL SENSORS ............................................................................. 541
Alberto Lucchetti, Mara Tanelli, Sergio M. Savarese, Mario Santucci

A COMPREHENSIVE OBSERVER-BASED FAULT ISOLATION METHOD WITH APPLICATION TO A HYDRAULIC POWER TRAIN ........................................................................ 547
Sebastian Pröll, Fabian Jarmolowitz, Jan Lunze

COMBINING MULTIPLE DIAGNOSTIC TROUBLE CODES INTO A SINGLE DECISION TREE .......................................................... 555
Markos F. B. G. Oliveira, Ricardo Lüders

HEAVY-DUTY TRUCK BATTERY FAILURE PROGNOSTICS USING RANDOM SURVIVAL FORESTS .......................................................... 562
Sergii Voronov, Daniel Jung, Erik Frisk

MODELING WITH FAULT INTEGRATION OF THE COOLING AND THE LUBRICATING SYSTEMS IN MARINE DIESEL ENGINE: EXPERIMENTAL VALIDATION .................................................. 570
Hassan Moussa Nahim, Rafic Younes, Hassan Shraim, Mustapha Ouladsine

ON FUNCTIONAL SAFETY OF VEHICLE ACTUATION SYSTEMS IN THE CONTEXT OF AUTOMATED DRIVING ...................................................................................................... 576
Torben Sölte, Réné S. Hosse, Uwe Becker, Markus Maurer

AN APPLICATION OF REFERENCE GOVERNOR TO A DIESEL ENGINE AIR PATH SYSTEM: IMPLEMENTATION OF A MULTI-VARIABLE REFERENCE MODIFICATION ALGORITHM .......................................................... 582
Hayato Nakada, Peter Martin, Anuradha Wijesinghe, Hayato Shirai, Akio Matsunaga, Hiroyuki Tominaga

AIR-PATH CONTROL OF A HEAVY-DUTY EGR-VGT DIESEL ENGINE ........................................................................................................ 589
Esteban R. Gelbo, Johan Dahl
FEEDFORWARD CONTROLLER DESIGN FOR EGR AND VGT SYSTEMS BASED ON CYLINDER PRESSURE INFORMATION AND AIR PATH MODEL ................................................................. 596
Donghyuk Jung, Kyungnam Min, Yeongsweop Park, Soochan Pyo, Myoungho Sunwoo
THREE-INPUT-THREE-OUTPUT AIR PATH CONTROL SYSTEM OF A HEAVY-DUTY DIESEL ENGINE .................................................................................................................. 604
Z. Yang, E. Winward, D. Zhao, R. Stobart
ADVANCED MODEL BASED AIR PATH MANAGEMENT USING A DISCRETE-ANGULAR CONTROLLER IN IDLE-SPEED CONTEXT ................................................................. 611
Thomas Laurain, Jimmy Lauber, Reinaldo Palhares
DECOPLED, DISTURBANCE REJECTION CONTROL FOR A TURBOCHARGED DIESEL ENGINE WITH DUAL-LOOP EGR SYSTEM ............................................................. 619
Song Chen, Fengjun Yan
DESIGN OF A NONLINEAR, DYNAMIC FEEDFORWARD PART FOR THE EVAPORATOR CONTROL OF AN ORGANIC RANKINE CYCLE IN HEAVY DUTY VEHICLES .......... 625
D. Seitz, O. Gehring, C. Bung, M. Brunschier, O. Sawodny
MODEL-BASED DEVELOPMENT OF COMBUSTION-ENGINE CONTROL AND OPTIMAL CALIBRATION FOR DRIVING CYCLES: GENERAL PROCEDURE AND APPLICATION .......................................................... 633
Rolf Isermann, Heiko Seuquenz
ENERGY BASED METHOD TO ANALYSE FUEL SAVING POTENTIAL OF HYBRID VEHICLES FOR DIFFERENT DRIVING CYCLES .................................................. 641
Anders Grauers, Karthik Upendra
EU6 C-SEGMENT DIESEL VEHICLES, A CHALLENGING SEGMENT TO MEET RDE AND WLTP REQUIREMENTS .................................................................................. 649
D. Bianco-Rodriguez, G. Vagnoni, B. Holderbaum
CYCLE BEATING - AN ANALYSIS OF THE BOUNDARIES DURING VEHICLE TESTING .................................................................................................................. 657
Kristoffer Ekberg, Lars Eriksson, Martin Sivertsson
A DISTURBANCE REJECTION-BASED CONTROL FRAMEWORK FOR SI-CAI HYBRID COMBUSTION IN GASOLINE ENGINES ......................................................... 665
Kang Song, Hui Xue, Tianyuang Hao, Tielong Shen
AUTOMOTIVE ENGINE CONTROL WITH RATIONAL FUNCTION SATISFYING INEQUALITY CONSTRAINT ........................................................................ 673
Akira Oohata
MODEL BASED COMBUSTION PHASE OPTIMIZATION IN SI ENGINES: VARIATIONAL ANALYSIS AND SPARK ADVANCE DETERMINATION* ........................................ 679
Yahai Zhang, Tielong Shen
A PARALLELIZED METHOD FOR CONTINUOUS-TIME MODELS WITH DEPENDENCE ON CALCULATION ORDER ........................................................................ 685
Kota Sata, Shun-Ichi Azuma, Akira Oohata
1. KNOCK LIMIT CONTROLLER BASED ON EXPONENTIAL MOVING AVERAGE OF KNOCK INTENSITY ................................................................. 691
Xun Shen, Tielong Shen
GRADIENT ESTIMATION BASED MULTI-FUNCTIONAL OPTIMIZATION OF DYNAMICAL SYSTEMS .......................................................................................... 696
Mitsuru Toyoda, Tielong Shen
CHARACTERIZING AND DETECTING SURGE AND CO-SURGE IN AUTOMOTIVE COMPRESSORS ........................................................................ 702
Erik Hellström, Hamid Ossareh, Baitao Xiao, Mario Santillo
MODELING FOR ESTIMATION OF WAVE ACTION IN MULTI-CYLINDER TURBOCHARGED SI ENGINES ........................................................................ 708
Stephanie Stockar, Marcello Canova, Baitao Xiao, Julia Buckland, Wen Dai
INTRINSIC PERFORMANCE LIMITATIONS OF TORQUE GENERATION IN A TURBOCHARGED GASOLINE ENGINE .......................................................... 714
Andreas Daasch, Erik Schulz, Matthias Schulhalbers
EFFECTS OF DIFFERENTIAL PRESSURE MEASUREMENT CHARACTERISTICS ON LOW PRESSURE-EGR ESTIMATION ERROR IN SI-ENGINES* ................................................................. 722
Rani Kiwan, Anna G. Stefanopoulou, Jason Martz, Gopichandra Sururilla, Immiaz Ali, Daniel Joseph Styles
ENGINE MODEL CALIBRATION USING EXTREMEUM SEEKING ........................................................................ 730
Qingyuan Tan, Prasad Divekar, Ying Tan, Xiang Chen, Ming Zheng
SENSORS INSTALLATION GUIDE TO MONITOR AUTOMATIC TRANSMISSION PERFORMANCE ........................................................................ 736
Qadeer Ahmed, Mukilan Arasu, Jiya Zhang, Giorgio Rizzoni
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTIMATION OF THE CLUTCH CHARACTERISTIC MAP FOR WET CLUTCH TRANSMISSIONS CONSIDERING ACTUATOR SIGNAL AND CLUTCH SLIP</td>
<td>742</td>
</tr>
<tr>
<td>T. Arndt, A. Tarasow, C. Bohn, G. Wachsmuth, R. Serway</td>
<td></td>
</tr>
<tr>
<td>NONLINEAR FLATNESS-BASED CONTROL OF DRIVELINE OSCILLATIONS FOR A POWERTRAIN WITH BACKLASH TRAVERSING</td>
<td>749</td>
</tr>
<tr>
<td>True Pham, Robert Seifried, Andreas Hock, Christian Scholz</td>
<td></td>
</tr>
<tr>
<td>MPC FOR ACTIVE TORSIONAL VIBRATION REDUCTION OF HYBRID ELECTRIC POWERTRAIN</td>
<td>756</td>
</tr>
<tr>
<td>Raja Sangili Vadamala, Christian Beidl</td>
<td></td>
</tr>
<tr>
<td>OPTIMAL CONTROL OF ENGINE CONTROLLED GEARSHIFT FOR A DIESEL-ELECTRIC POWERTRAIN WITH BACKLASH</td>
<td>762</td>
</tr>
<tr>
<td>V. Nezhadali, L. Eriksson</td>
<td></td>
</tr>
<tr>
<td>AN APPLICATION OF IN-CYLINDER PRESSURE FOR COMPRESSION HEAT TRANSFER ESTIMATION*</td>
<td>769</td>
</tr>
<tr>
<td>Chanyut Khajorntraidet, Kazuhisa Ito</td>
<td></td>
</tr>
<tr>
<td>FLATNESS-BASED FEEDFORWARD AND FEEDBACK CONTROL FOR FUEL RAIL SYSTEM OF GASOLINE DIRECT INJECTION ENGINE</td>
<td>775</td>
</tr>
<tr>
<td>Q.-F. Liu, C.-Y. Wang, Y.-F. Hu, H. Chen</td>
<td></td>
</tr>
<tr>
<td>A NEW D-OPTIMAL INPUT SEQUENCE DESIGN USING PI2 ALGORITHM</td>
<td>781</td>
</tr>
<tr>
<td>Hiroaki Ishiyama, Masaki Yamakita</td>
<td></td>
</tr>
<tr>
<td>IDENTIFICATION OF STATIC BOUNDARY MODEL BASED ON GAUSSIAN PROCESS CLASSIFICATION</td>
<td>787</td>
</tr>
<tr>
<td>H. Oyama, M. Yamakita, K. Sata, A. Ohata</td>
<td></td>
</tr>
<tr>
<td>ENGINE SPEED CONTROL DURING GEAR SHIFTING OF AMT HEVS WITH IDENTIFIED INTAKE-TO-POWER DELAY</td>
<td>793</td>
</tr>
<tr>
<td>Jinlong Hong, Bingzhao Gao, Liang Lv, Yunfeng Hu, Hong Chen</td>
<td></td>
</tr>
</tbody>
</table>

Author Index