

# Contents

## Part I Vehicle Performance Development

<b>A New Approach to Improve the Design Quality of Chinese National Brand Vehicle</b> . . . . .	3
F2012-E01-004	
Du Cao, Jing Deng and Fengfei Fu	
<b>The Process of Vehicle Dynamics Development</b> . . . . .	13
F2012-E01-011	
Zhanglin Cai, Stephen Chan, Xiaofeng Tang and Jiang Xin	
<b>Development of Methodologies for Evaluation, Simulation and Improvement of Cross-Wind Sensitivity.</b> . . . .	23
F2012-E01-014	
Guido Tosolin, Jonathan Webb, Alex Català, Alfonso Escuer and Young Jin Hyun	
<b>Maneuvering Experiment of Personal Mobility Vehicle with CVT-Type Steering Mechanism</b> . . . . .	35
F2012-E01-016	
Yoshihiro Suda, Hirayama Yuki, Masahiko Aki and Takafumi Takagi	
<b>Vehicle Performance Objective Management in Automotive R&amp;D</b> . . .	45
F2012-E01-018	
Xuezhen Wu, Haiqiang Han, Liqiang Dai, Linghua Zou and Fuquan Zhao	
<b>Improving Energy Efficiency of Heavy-Duty Vehicles: A Systemic Perspective and Some Case Studies</b> . . . . .	51
F2012-E01-024	
Juhani Laurikko, Kimmo Erkkilä, Petri Laine and Nils-Olof Nylund	

<b>Study on the Active Front Steering System with Steady Gain . . . . .</b>	<b>65</b>
F2012-E01-025	
Youkun Zhang and Baohui Liu	
 <b>Design Optimization of Full Vehicle Suspension Based on Ride and Handling Performance . . . . .</b>	 <b>75</b>
F2012-E01-026	
Tey Jing Yuen, Ramli Rahizar, Zainul Abidin Mohd Azman, Alias Anuar and Dzakaria Afandi	
 <b>Improve Fuel Economy of Commercial Vehicles Through the Correct Driving . . . . .</b>	 <b>87</b>
F2012-E01-029	
Ping Guo, Zhenlei Li, Zhiwu Zhang, Jun Chi, Shuai Lu, Ye Lin, Zhengfa Shi and Jingcai Shi	
 <b>Research on Test Method of Off-road Vehicle Trafficability . . . . .</b>	 <b>97</b>
F2012-E01-031	
Wenhu Qin, Zhanjun Guo and Weigong Zhang	
 <b>Part II Vehicle Integration Platformized and Universal Design</b>	
 <b>A Design Method for Future Automobiles . . . . .</b>	 <b>109</b>
F2012-E02-003	
Zhifeng Wang, Wu Yang, Zhiguo Le and Fuquan Zhao	
 <b>Effect of Engineering Materials for Vehicle Collision Simulation. . . . .</b>	 <b>123</b>
F2012-E02-005	
Yanling Huang, Gaoji Yin, Zhitao Wang, Juanli Ni, Li Li, Qiang Liu, Anzhi Yang and Fuquan Zhao	
 <b>Part III Development of CAD/CAE/CAM and CF Methods in Automotive Practice</b>	
 <b>Simulation of Leaf Spring Balanced Suspension Based on Virtual Test-Rig . . . . .</b>	 <b>135</b>
F2012-E03-002	
Xinpeng Tang and Kun Liu	
 <b>A Simulation Analysis and Optimization of Mode and Stiffness of BIW . . . . .</b>	 <b>145</b>
F2012-E03-004	
Qiuxia Zhang, Leyi Zhang and Mingtao Guo	

<b>Vehicle Wading Simulation with STRA-CCM+ . . . . .</b>	<b>157</b>
F2012-E03-005	
Xin Zheng, Xin Qiao and Fanhua Kong	
<b>Developing Low-Noise Low Back Pressure Intake System by CAE Technology . . . . .</b>	<b>167</b>
F2012-E03-006	
Yue Chang Chen, Haotian Shi and Yang Guang	
<b>Study on Vehicle Modeling and Steering Performance . . . . .</b>	<b>177</b>
F2012-E03-009	
Minglun Cao and Cai Yang	
<b>Surrogate Model for Aerodynamic and Handling Stability Optimization of a Tractor-Trailer in Crosswinds . . . . .</b>	<b>189</b>
F2012-E03-010	
Xu Gong, Zhengqi Gu, Jian Ye, Xu Yan and Zhiming Zhao	
<b>Calculation of Drum Brake Temperatures in Ten-Cycle Braking . . . .</b>	<b>201</b>
F2012-E03-013	
Kun Zhang and Cai Yang	
<b>Solution of the Glare Risk in Vehicle Inner Trim Designing . . . . .</b>	<b>209</b>
F2012-E03-014	
Mengdong Mi, Yongqing Liu, Congwen Yu, Sujuan Peng, Bin Feng, Jian Shi and Pin Wang	
<b>Topology Optimization Design of a Heavy Truck Frame. . . . .</b>	<b>219</b>
F2012-E03-015	
Jingxin Wang, Tie Wang, Yanchao Yang, Zhaohui Peng, Zhi Li and Na Wang	
<b>Bridging the Gap Between CAD and CAE in Composite Structures Development Process for the Automotive Industry. . . . .</b>	<b>229</b>
F2012-E03-016	
Samouil Saltiel, Michalis Giannakidis and Nikos Toulas	
<b>Ensuring Reliability of Automotive Electronics by Using Thermal Analysis . . . . .</b>	<b>241</b>
F2012-E03-019	
Boris Marovic and Alexandra Francois-Saint-Cyr	

**Effects of Frequency Response Spacing on Vibration Fatigue Analysis** . . . . . 253  
F2012-E03-020  
Jasuk Koo

**CAE Supported ESC Development/Release Process** . . . . . 267  
F2012-E03-021  
Yiqin Mao, Johannes Wiessalla, Jan Meier, Wolfgang Risse,  
Guy Mathot and Manfred Blum

**Application of Optimization Algorithm to HVAC Configuration Design** . . . . . 277  
F2012-E03-023  
Tatsuro Kyuto, Motohiro Kitada and Hideo Asano

**Research of Flow Field Simulation for Lubrication System and Effect Evaluation on a 7-Speed Dual Clutch Transmission** . . . . . 285  
F2012-E03-033  
Yinhui Lin, Zhihua Hu, Chaoqiang Xiong, Mengyan Zang, Yuan Jia,  
Yong Chen, Daguo Luo and Fuquan Zhao

**Application of Stiffness Estimation and Structure Optimization in Rubber Component Development.** . . . . . 299  
F2012-E03-036  
Min Sun, Yuan Qu, Youfeng Qiu and Shenrong Wu

**Brake Cooling Simulation: A Combined Procedure of CFD, Thermal and 1D Software** . . . . . 309  
F2012-E03-037  
Enric Aramburu and Roger Calvo

**BIW Optimization by Means of an Automated CAE Process for the Reduction of Welding Points** . . . . . 321  
F2012-E03-038  
Pérez Mario, Calvo Roger and Hirschbeck Bernhard

**Establishing a Carbon Fiber Material Database for Crashworthiness Structural Development** . . . . . 329  
F2012-E03-039  
Pablo Cruz and Raúl Ureña

**Full Vehicle Durability Analysis by Means of the IDIADA Virtual Proving Ground** . . . . . 337  
F2012-E03-040  
Jordi Arbiol, José Antonio Muñoz, Xavierl Armengo and Enric Aramburu

**The Parametrical Design and Optimization of Body Frame Based on Crashworthiness and Lightweight** . . . . . 349  
F2012-E03-042  
Yongxin Men, Guojun Zheng, Huicai Zelong Lu and Zelong Wang

**Development of Concept Analysis and Multi-Objective Optimization Platform for Body-In-White Structure** . . . . . 361  
F2012-E03-046  
Yiwen Li, Hongjian Li, Zuofeng Pan and Tao Xu

**Fatigue Life Prediction of Spot-Weld for Auto Body Based on Multiple Load Cases** . . . . . 373  
F2012-E03-049  
Liling Zhang, Qing Jiang, Xuefeng Chen and Xu Wang

**Acoustic Isolation Analysis of Weatherstrip Considering Door Opening Condition** . . . . . 383  
F2012-E03-050  
Tae Hyung Kim, Hak Jin Kim, Heon Young Kim, Joon Chul Park, Byung-Kwon Min and Chang-Kuk Yim

**Assessment of Modeling Individual Physiological Differences when Predicting Thermal Comfort** . . . . . 393  
F2012-E03-053  
Curran Allen and Hepokoski Mark

**The Multi-Physics Coupling Analysis Based on Electro-Magnetic, Structural and Acoustic Characters for a Drive Motor in EV** . . . . . 399  
F2012-E03-057  
Jinling Zeng, Yingzi Piao, Bingwu Lu, Fuxiang Huo and Qun Zhang

**Modular Car Body Design and Optimization by an Implicit Parameterization Technique via SFE CONCEPT** . . . . . 413  
F2012-E03-058  
Fabian Duddeck and Hans Zimmer

**A New Approach for Vibro-Acoustic Optimization Using Discrete and Continuous Shape Variables Applied to a Car Body** . . . . . 425  
F2012-E03-059  
Hans Zimmer, Arnold Gross-Thebing, Manohar Prabhu and Fabian Duddeck

**Part IV    Advanced Chassis, Body Structure and Design**

<b>Integrated Architectures for Third Generation Electric Vehicles: Technical Challenges Meeting Customer Requirements . . . . .</b>	<b>437</b>
F2012-E04-001	
Micha Lesemann, Leif Ickert, Lutz Eckstein, Sven Faßbender, Michael Funcke and Jac Wismans	
<b>The Ring-Shaped Route Body Structure Design and Evaluation Method . . . . .</b>	<b>447</b>
F2012-E04-002	
Feng Xiao and XinHua Gao	
<b>The Study of Wheeled Semi-trailer Design and Development Based on Scale Model . . . . .</b>	<b>463</b>
F2012-E04-003	
Xiong Xin, Xuexun Guo and Libo Wang	
<b>The Concept and Methodology of Creating the Universal Life-Saver with Rotary-Screw Mover . . . . .</b>	<b>477</b>
F2012-E04-004	
Maxim Krashennnikov, Anatoly Kulashov, Viktor Shapkin and Alla Koshurina	
<b>Research on the Development Procedure of Light-Weight New Body Architecture . . . . .</b>	<b>491</b>
F2012-E04-005	
Xiangyang Fu, Guohong Shi, Xin Jiang, Yunhui Duan and Zhengchao Song	
<b>Control and Simulation of Regenerative Suspension Using Permanent Magnetic Synchronous Motor . . . . .</b>	<b>505</b>
F2012-E04-007	
Weihua Wang and Songshan Liu	
<b>The Application of Tolerance Analysis During Engineering Process. . .</b>	<b>515</b>
F2012-E04-009	
Wei Wang and ZhiHan Zhou	
<b>Synchronized Design Optimization Method of Body Joints and Major Cross Sectional Members . . . . .</b>	<b>531</b>
F2012-E04-010	
Jie Xiang, Yong Chen and Youmin Guo	

<b>Design and Development of Contractive Suspension in Hill-Climb Races</b> . . . . .	539
F2012-E04-014	
Antonini Pierluigi and Cibrario Valerio	
<b>Modularized Design of the Engine Compartment Design Based on the Theory of CBR</b> . . . . .	553
F2012-E04-016	
Honghua Li, Wei Li and Fuquan Zhao	
<b>Development of First Order Analysis for Torsion Beam Suspension (FOA/TB) Corresponding to Modular Design</b> . . . . .	561
F2012-E04-017	
Kazuaki Chiku, Hideki Sugiura, Takaaki Uno and Toshiji Hirotani	
<b>A Pillar Structure Optimization Design of Driving Safety</b> . . . . .	571
F2012-E04-018	
Guolin Li, Jun Sui, Xiang Zheng, Honghua Li and Fuquan Zhao	
<b>A New Body Concept for Electric Vehicle: PBC-EV</b> . . . . .	579
F2012-E04-020	
Jaehyun Kim, Hongwoo Lee, Kyunghwan Chung, Hyounyoung Lee, Yeonsik Kang and Jaebok Nam	
<b>The Study on Development of High Security and High Comfort Commercial Vehicle Cab</b> . . . . .	593
F2012-E04-021	
Yuhai Chang and Xiaojun Yang	
<b>The Design and Simulation Analysis of Electromagnetic Energy Regenerative Suspension System</b> . . . . .	601
F2012-E04-023	
Hongbin Ren, Sizhong Chen and Zhanzong Feng	
<b>Optimization of the Magnetic Property of a Magnetorheological Squeeze Mount</b> . . . . .	611
F2012-E04-024	
Xinjie Zhang, Fangwu Ma, Fuquan Zhao, Konghui Guo and Mehdi Ahmadian	
<b>Semi-Active Suspension Adaptive Control Strategy Based on Hybrid Control</b> . . . . .	625
F2012-E04-025	
Xinjie Zhang, Wuhui Yu, Fangwu Ma, Fuquan Zhao and Konghui Guo	

<b>Optibody Project: Optimizing Vehicle Structures for Electric Light Trucks and Vans</b> . . . . .	633
F2012-E04-026	
Eduardo del Pozo de Dios, Arturo Dávila, Juan José Alba and Massimiliano Avalor	
<b>Linear Quadratic Gaussian Optimal Control Strategy for Four-Wheel Steering Vehicle</b> . . . . .	641
F2012-E04-028	
Yan Chen, Wenqiang Chen, Xingmin Wei and Fuquan Zhao	
<b>Design and Validation of a Race Car with Respect to Aerodynamics and Body Styling</b> . . . . .	651
F2012-E04-029	
Abdul Vaseem Akram, M. Ajay Kumar, K.C. Vora and Mohammad Rafiq	
 <b>Part V Automotive Ergonomic, Interior and Exterior Trim Design</b>	
<b>Driver Accommodation Assessment Using Physics-Based Posture Prediction Model</b> . . . . .	665
F2012-E05-001	
Ozsoy Burak and Jingzhou (James) Yang	
<b>Design of the Adjustable Vehicle Seating Buck for Ergonomics Verification</b> . . . . .	677
F2012-E05-002	
Hongfang Ling, Li Wu and Gang Li	
<b>Study on Preventing Dazzle of Meter</b> . . . . .	691
F2012- E05-006	
Luo Pan, Xiaolin Liao, Guozheng Luo, Jing Wang, Dejian Cheng and Li Yu	
<b>A Study and Application of Optimization on Console Development</b> . . .	701
F2012-E05-009	
Ruiyan Zhang, Ni Cao and Miao Luo	
<b>Enhancing Vehicle Ingress/Egress Ergonomics with Digital Human Models</b> . . . . .	713
F2012-E05-010	
Nanxin Wang, Ksenia Kozak, Jian Wan, Gianna Gomez-Levi and Gary Strumolo	



<b>Preliminary Research on Muscle Activity in Driver’s Steering Maneuver for Driver’s Assistance System Evaluation . . . . .</b>	<b>723</b>
F2012-E05-011	
Ryouhei Hayama, Yahui Liu, Xuewu Ji, Takahiro Mizuno, Tomoyasu Kada and Liming Lou	
<b>Color TFT Instrument Clusters in the Chinese Market. . . . .</b>	<b>737</b>
F2012-E05-012	
Huibin Li, Gerhard Mueller, Karl Reich and Leo Glasenhardt	
<b>Color and Texture Design of Chinese Automobile Brand . . . . .</b>	<b>747</b>
F2012-E05-014	
Yanhong Hao and Fuquan Zhao	
<b>Development of Shock-Absorbing Grip-Handle Structures on the Headliner . . . . .</b>	<b>761</b>
F2012-E05-015	
Hee Sang Park, Yongsu Chang and Jun Ho Jung	
<b>SEMG Based Recognition for Lumbar Muscle Fatigue During Prolonged Driving . . . . .</b>	<b>773</b>
F2012-E05-017	
Xin Tao, Bo Cheng, Bo Wang, Feiruo Zhang, Guofa Li and Chaoyang Chen	
 <b>Part VI Vehicle Style and Aerodynamic Design</b>	
<b>Aerodynamic Investigations in Conceptual Vehicle Development Supported by Integrated Design and Simulation Methods . . . . .</b>	<b>787</b>
F2012-E06-004	
Mario Hirz, Severin Stadler, Martin Prenner and Johannes Mayr	
<b>Research on Drag Reduction of Commercial Vehicle Based on Aerodynamics. . . . .</b>	<b>801</b>
F2012-E06-007	
Shijie Fan, Qiang Fu, Jialin Zhang, Jinying Ma, Jing Zhao and Kelong Lu	
<b>The State of Equilibrium in Car Body Design: The Application of Asymmetry for Enhanced Harmony. . . . .</b>	<b>811</b>
F2012-E06-009	
Liming Fu, Mingyang Sun and Alvin Chan	

**Part VII New Materials and Structures**

**The Analysis of Composite Leaf Spring by Finite Element Method and Experimental Measurements** . . . . . 823  
F2012-E07-004  
Jiashi Wang, Zaike Li and Qibin Jiang

**Finite Element Analysis of Two Kinds of Dump Trunk** . . . . . 831  
F2012-E07-005  
Zhi Li, Tie Wang, Jingxin Wang, Zhaohui Peng and Na Wang

**Advanced Solid Lubricant Technology Improve Engine Performance** . . . . . 839  
F2012-E07-006  
Yupeng An, Kejin Zhang, Dan Wang, Junyan Zhang and Bin Zhang

**Wrought Magnesium Alloy AZ31 Grain Refinement by Predeformation** . . . . . 851  
F2012-E07-007  
Fei Xiong, Lichun Cui and Ping Wang

**Consideration of Biomimetics in Structural Design of Vehicle Side Intrusion Bars** . . . . . 859  
F2012-E07-009  
Yan Rui, Aleksandar Subic and Chunhui Wang

**Development of High Performance FRP Crush Box: A Report of JSAE FRP Working Group Activity. Numerical Analysis of Fracture Behavior of FRP Crush Box with Tapered Trigger** . . . . . 869  
F2012-E07-012  
Reika Akita, Atsushi Yokoyama, Asao Koike, Kouji Kawamura, Yoshihiro Sukegawa and Hiromichi Oohira

**Development of the High Performance FRP Crush Box: A Report of JSAE FRP Working Group Activity. Analysis of Collapse Mechanism of the Trigger Part of FRP Crush Box** . . . . . 879  
F2012-E07-013  
Asao Koike, Atsushi Yokoyama, Reika Akita, Yoshiro Sukegawa, Koji Kawamura and Hiromichi Oohira

**Research of Application of Crash Durable Adhesive  
on a Chinese Domestic Car Body** . . . . . 889  
F2012-E07-020  
Zhongying Yue, Xiukui Yuan, Chaoqian Gao, Liantai Yuan, Qiang Liu,  
Fuquan Zhao, Yufei Wang, Xiaojun Yang and Jie Xu

**The Study of Aluminum Alloy Application  
on Automotive Control Arm** . . . . . 901  
F2012-E07-021  
Juanli Ni, Li Li, Qiang Liu, Fuquan Zhao, Yi Xu, Shijie Guo  
and Bowen Changhai

**Using Shape Memory Alloys in Automotive Safety Systems** . . . . . 909  
F2012-E07-023  
Viorel Gheorghita, Paul Gümpel, Joachim Strittmatter, Chiru Anghel,  
Thomas Heitz and Mathias Senn

**Study on Electro Rheological Fluid Shock Damper  
and Adjustable Damping Performance** . . . . . 919  
F2012-E07-024  
Jianhua Wang, Fei Xie, Yuncheng Wang and Chunbao Guo

**Cyclic Tension–Compression Test of Mg Alloy Sheet  
at the Elevated Temperature** . . . . . 927  
F2012-E07-029  
Oh Suk Seo, Heon Young Kim, Myoung-Gyu Lee,  
Ji Hoon Kim and Dae Yong Kim

**The Third Generation Auto Sheet Steel: Theory and Practice** . . . . . 933  
F2012-E07-030  
Shanqiang Ying and Han Dong

**Part VIII Automotive Reliability Technology**

**Vehicle Usage Measurement and Analysis Based  
on the Random Retail Customer** . . . . . 951  
F2012-E08-001  
Yaozeng Pan, Feng Yang and Chenyang Li

**Part IX    Lightweight Design Technology**

<b>Design, Evaluation Methods and Parameters of Automotive Lightweight . . . . .</b>	<b>965</b>
F2012-E09-001	
Mingtu Ma and Hongzhou Lu	
<b>Body Light Weight and Cost Control . . . . .</b>	<b>977</b>
F2012-E09-006	
Dazhou Guo	
<b>Lightweight Design and Formability Analysis of Auto Body Aluminum Trunk Lid . . . . .</b>	<b>987</b>
F2012-E09-007	
Zhao Liu, Ping Zhu and Xiaojing Zhu	
<b>Geometric Parameters Optimal Design of Variable Cross-Section Rim . . . . .</b>	<b>1003</b>
F2012-E09-009	
Hongyu Wang	
<b>Lightweight Design for a FSC Car Based on Modal and Stiffness Analysis . . . . .</b>	<b>1009</b>
F2012-E09-012	
Liman Jiang, Guoquan Wang, Guoqing Gong and Ruiqian Zhang	
<b>Application of Comprehensive Optimization into Bus Structure Lightweight Improvement in 3-Section Chassis Frame . . . . .</b>	<b>1023</b>
F2012-E09-014	
Congcheng Ma and Fengchong Lan	
<b>Applying Agile Software Principles and Practices for Fast Automotive Development . . . . .</b>	<b>1033</b>
F2012-E09-015	
David Socha, Tyler C Folsom and Joe Justice	
<b>Multi-Objective Evaluation Regulation Study of Automotive Lightweight . . . . .</b>	<b>1047</b>
F2012-E09-016	
Hongzhou Lu, Zhiwen Wang, Ma Mingtu, Yilong Cheng and Guimin Lu	
<b>Future Mobility Requires Advanced Car Concepts and Power Train . . . . .</b>	<b>1057</b>
F2012-E09-025	
Sven Augustin	

<b>A Lightweight Optimization Method of Vehicle Body Structure Design. . . . .</b>	<b>1063</b>
F2012-E09-026	
Zhixiang Li and Jifa Mei	
<b>Analysis of the Transient Thermomechanical Behaviour of a Lightweight Brake Disc for a Regenerative Braking System. . . .</b>	<b>1075</b>
F2012-E09-028	
S. Sarip, A. J. Day, P. Olley and H. S. Qi	
<b>Concept Analysis of Automotive Aluminium Alloy Bumper . . . . .</b>	<b>1089</b>
F2012-E09-030	
Xinming Wan, Xiao Zhi, Qingjiang Zhao, Guangyao Wang and Xiaofei Xu	
<b>Study on Lightweight of Vehicle Body Structure Based on Implicit Parametric Model . . . . .</b>	<b>1101</b>
F2012-E09-031	
Jiyou Zhang, Shudan Liu, Hong Peng, Yongxin Men and Fuquan Zhao	
<b>Lightweight Design and Evaluation for Cab-in-White of Heavy-Duty Truck . . . . .</b>	<b>1109</b>
F2012-E09-034	
Xinyu Wang, Dengfeng Wang, Wanlai Sun and Peiwu Liu	
<b>Research on Parameterized Structural Modeling for Carbody Lightweighting. . . . .</b>	<b>1119</b>
F2012-E09-038	
Xin Chen, Fangwu Ma, Dengfeng Wang, Yongxin Men, Qiang Liu, Zaiqi Yao, Junlong Zhou and Chen Xie	
<b>Reliability-Based Topology Optimization of Control Arm of Suspension for Lightweight Design. . . . .</b>	<b>1129</b>
F2012-E09-039	
Qinghai Zhao, Xiaokai Chen and Yi Lin	
<b>Structural Lightweight Design of Engine Connecting Rod. . . . .</b>	<b>1139</b>
F2012-E09-042	
Fuxiang Huo, Jun Li, Yu Xu, Bing Wu, Yepeng Han, Peng Li and Qun Zhang	
<b>Part X Design for Recycling</b>	
<b>Development of Environmental Assessment System of Vehicle . . . . .</b>	<b>1151</b>
F2012-E10-001	
Moosang Yu and Yunjong Kim	

**Research on Hydraulic Regenerative Braking System  
for Pure Electric Vehicle Based on AMESim . . . . . 1161**  
F2012-E10-002  
Junping Jiang, Xiaobin Ning, Yaoting Xu, Qiucheng Wang,  
Wei Liu, Zhijie Pan and Fuquan Zhao

**Part XI Dynamic Modeling**

**Main Problems of Creating Surface Traction-Transport  
Vehicles with Mechatronic Systems . . . . . 1173**  
F2012-E11-001  
Belousov Boris and Ksenevich Tatiana

**Wheelbase Filtering Effect on Vehicle Ride Dynamics. . . . . 1183**  
F2012-E11-007  
Kang Song, Xiaokai Chen and Yi Lin

**Part XII Simulation and Experimental Validation**

**Modeling and Experimental Research About a New Type  
of Vehicle Active Suspension Electromagnetic Actuator . . . . . 1199**  
F2012-E12-001  
Lai Fei and Huang Chaoqun

**Research on Nonlinear Characteristics of Hydro-Pneumatic  
Spring and Impact to Ride Performance of Vehicles. . . . . 1211**  
F2012-E12-002  
Junwei Zhang, Sizhong Chen, Zhicheng Wu, Lin Yang and Bin Zhang

**Simulation Research on Car Suspension Durability Enhancement  
Test Based on Virtual Proving Ground . . . . . 1223**  
F2012-E12-003  
Zhenglin Cao, Jun Li and Konghui Guo

**Simulation Research on Strong Fluid-Solid Interaction  
of Hydraulic Engine Mount. . . . . 1235**  
F2012-E12-004  
Zhenglin Cao, Jun Li, Konghui Guo and Qun Zhang

**A Study on Battery Model Verification Using Battery HILS . . . . . 1249**  
F2012-E12-008  
Hyun-Sik Song, Tae-Hoon Kim, Jin-Beom Jeong, Byoung-Hoon Kim,  
Dong-Hyun Shin, Baek-Haeng Lee and Hoon Heo

**Extended Flexible Environment and Vehicle Simulation  
for an Automated Validation . . . . .** 1263  
F2012-E12-010  
Albert Albers, Rolf Hettel, Matthias Behrendt,  
Tobias Düser and Alexander Schwarz

**Application of Energy Distribution Analysis During  
the Vehicle Development . . . . .** 1275  
F2012-E12-012  
Yongsheng Long, Jianpeng Shi, Li Xin, Xueen Zhang,  
Jun Wang and Shaoju Qu

**Simulation and Correlation of Commercial Axle Banjo Housing  
Fracture Under Braking Fatigue Test . . . . .** 1287  
F2012-E12-013  
Ajay Guddeti and Abhijit Nilangekar

**Development of a Vehicle Simulator Based on a Real Car  
for Research and Education Purposes . . . . .** 1301  
F2012-E12-015  
Zsolt Szalay, Péter Gáspár, Zoltán Kánya and Dávid Nagy

**Early Verification of Complex Distributed Systems Using  
Model Driven Development and Virtual Engineering . . . . .** 1313  
F2012-E12-020  
Lance Brooks, Jun Wu and Darrell Teegarden

**Research in the Impact of Curtain Airbag  
Deployment on Interior . . . . .** 1327  
F2012-E12-021  
Shuyuan Zhou, Liangming Xiang, Jie Lou, Wenwei Zhang and Min Xu

**Multi-Domain Modeling and Simulation of Automotive  
Air Conditioning System Based On Modelica . . . . .** 1337  
F2012-E12-024  
Jing Li, Yunqing Zhang and Wei Chen

**Predictive Energy Management Strategies in Virtual Driving Tests:  
Early Evaluation of Networked Controller Functions  
in Realistic Use Cases . . . . .** 1351  
F2012-E12-027  
Andreas Kunz, Bernhard Schick and Steffen Lange

**Evaluation of Video-Based Driver Assistance Systems  
with Sensor Data Fusion by Using Virtual Test Driving . . . . .** 1363  
F2012-E12-028  
Bernhard Schick and Steffen Schmidt

**Vehicle Warm-Up Analysis with Experimental  
and Co-Simulation Methods. . . . .** 1377  
F2012-E12-029  
Daniel Ghebru, Christian Donn, Wolfgang Zulehner, Heiko Kubach,  
Uwe Wagner, Ulrich Spicher, Wolfgang Puntigam and Klaus Strasser

**Modelling and Simulation of AMT Truck Clutch  
Actuating Mechanism . . . . .** 1391  
F2012-E12-030  
Yanying Guo, Xintian Lu, Tao Yan and Zhonghui Sun

**Vibration Fatigue Analysis of Adaptive Front Lighting System . . . . .** 1401  
F2012-E12-031  
Yeon Gyoo Lee, Seungryul Choi and Tae Ryong Jeon

**Application of Two-Chamber Muffler to Reduce Car Noise  
in Engine Intake System . . . . .** 1411  
F2012-E12-040  
Zhihong Tang, Zhenying Zhu, Yongxin Men and Fuquan Zhao

**Ergonomic Simulation and Optimization During  
the Body Assembly . . . . .** 1419  
F2012-E12-041  
Yanjun Gao, Xianbo Wei, Beifang Ma, Yang Yu,  
Xingmin Wei and Fuquan Zhao

**Test and Analysis of the Mechanical Properties for Laser-Welding  
Seams and Spot-Welding Joints . . . . .** 1429  
F2012-E12-046  
Liling Zhang, Xuefeng Chen, Qing Jiang and Xu Wang

**Aerodynamic Design and Numerical Simulation Analysis  
of a Passenger Car’s Defrosting Duct. . . . .** 1441  
F2012-E12-048  
Bo Yang, Li-na Huang and Fengtao Ren



**An Operating System for the Optimization of Technical Systems  
Using the Example of Transmission Calibration . . . . . 1449**  
F2012-E12-051

Albert Albers, Alexander Schwarz, Matthias Behrendt and Rolf Hettel

**Model Structure, Realization and Learning Process For a Driver  
Model Being Capable to Improve Performance  
with Learning by Itself . . . . . 1461**  
F2012-E12-052

Kazuhide Togai and Hisashi Tamaki

**Part XIII Virtual Design, Testing and Validation**

**The Suspension Optimization of FSAE Racing Car Based  
on Virtual Prototyping Technology . . . . . 1481**  
F2012-E13-002

Jun Ni, Sizhong Chen and Zhicheng Wu

**The Study of the Impact of Aluminum Formability Parameters  
on its Stamping Formability . . . . . 1491**  
F2012-E13-003

Jian Zhang, Mingtu Ma and Hongzhou Lu

**Calculation of Shrinkage Rate for Injection Molding Based  
on Moldflow . . . . . 1501**  
F2012-E13-007

Fangcheng Xiao, Lei Chen and Xiao Wang

**A Study of Contact Condition in Vehicle Transmission  
Virtual Assembly System . . . . . 1511**  
F2012-E13-010

Yan Chen, Shouwen Yao and Fei Liu

**The Multi-Properties Modeling Technologies of Virtual Assembly  
for Vehicle Transmission Based on the Design . . . . . 1521**  
F2012-E13-011

Fei Liu, Qingdong Yan, Shouwen Yao and Xin Zheng

**New Technologies in Driving Dynamics Performance Simulation . . . 1531**  
F2012-E13-012

Cibrario Valerio and Cugnon Frederic

**Transmission System Design and Manufacture  
in FSC Racing Vehicle. . . . .** 1551  
F2012-E13-014  
Zhenpo Wang, Changfu Zou, Lei Yue and Lei Zhang

**Parallel Design Optimization of Articulated Heavy Vehicles  
with Active Safety Systems . . . . .** 1563  
F2012-E13-015  
Manjurul Md. Islam, Steve Mikaric, Yuping He and Thomas Hu

**The Application of Dual Limit Analysis Method in Physical  
Performance Characteristics Defining and Structural Designing . . . .** 1577  
F2012-E13-016  
Chi Luo

**Predicting Battery Pack Thermal and Electrical Performance  
in a Vehicle Using Realistic Drive Cycle Power Profiles . . . . .** 1587  
F2012-E13-017  
Allen Curran and Scott Peck

**Virtual Test Drive in the Application Process  
of ESP®-Systems to Ensure Performance and Robustness. . . . .** 1595  
F2012-E13-019  
Albert Lutz, Fabien Macaire and Walter My

**The Test and Analysis of Car’s Brake Noise. . . . .** 1611  
F2012-E13-020  
Qinghai Sui

**Thermal Management Simulation of Passenger Car with Naturally  
Aspirated and Turbocharged Gasoline Engine . . . . .** 1621  
F2012-E13-021  
Haie Chen, Hongzhou Li, Xinxin Dai, Qun Chen and Kang Li

**Part XIV Testing of Components, Systems and Full Vehicle**

**Research on User Vehicle Operation Regularity. . . . .** 1643  
F2012-E14-008  
Zhonggao Yu, Yutan Zhang, Yonghong Xu, Gan Chen,  
Jianguang Zhou, Jianxian Chen and Jie Bai

<b>Acoustic Mode and Structure Mode Analysis of Heavy Duty Truck Muffler</b> . . . . .	1655
F2012-E14-011	
Guoquan Wang, Cheng Zhao, Liangcheng Zhang and Yong Chen	
<b>Transient Thermal Measurement of Electronic Components and Radiometric Characterization of LEDs</b> . . . . .	1669
F2012-E14-013	
Boris Marovic and Alexandra Francois-Saint-Cyr	
<b>Maneuver-Based Testing of Integrated, Highly Interconnected Safety Systems</b> . . . . .	1677
F2012-E14-019	
Kathrin Sattler, Andreas Raith, Thomas Brandmeier, Christian Schyr and Daouda Sadou	
<b>Studying of Instantaneous Emissions Character for Hybrid Electric Vehicle</b> . . . . .	1691
F2012-E14-024	
Yanxin Nie, Baocheng Du, Peng Wan and Jingsi Xie	
<b>Effect of Cryogenic Treatment on Retained Austenite and Fatigue Life of Gcr15 Wheel-Hub Bearing</b> . . . . .	1701
F2012-E14-025	
Qiucheng Wang, Xiaobin Ning, Qi Chen and Bintao Mao	
<b>A Study on Analysis Method of Motion Characteristics in the Crash Test Based on Computer Vision</b> . . . . .	1709
F2012-E14-029	
Guohua Cao, Gang Han, Weiguo Liu and Fuquan Zhao	
<b>Study of Optimized Tuning in Full AFLS Head Lamps</b> . . . . .	1719
F2012-E14-031	
Doohyun Kim	
<b>Improvements in Test Protocols for Electric Vehicles to Determine Range and Total Energy Consumption</b> . . . . .	1733
F2012-E14-032	
Juhani Laurikko, Jukka Nuottimäki and Nils-Olof Nylund	
<b>New AMFM Test Method with Android Operation System</b> . . . . .	1745
F2012-E14-038	
Yongqing Zhu, Kerun Xu, Lubing Zeng, Minjie Tian and Chendong Wang	

**Part XV Subjective and Objective Evaluation of Performances**

**Ergonomic Evaluation System for Vehicle Package. . . . .** 1755  
F2012-E15-001  
Shihai Li, Yongqing Liu, Zhongxian Chen, Mengdong Mi, Hao Chen,  
Weiwei Du, Tingchuan Song and Huang Jian

**Subjective and Objective Vehicle Tests, Two Parallel  
Vehicle Handling Evaluations . . . . .** 1767  
F2012-E15-004  
Eric Chabrier and Michel Grima

**Subjective Evaluation and Modeling of Human Ride Comfort of  
Electric Vehicle Using Tools Based on Artificial Neural Networks. . .** 1777  
F2012-E15-005  
Lerspalungsanti Sarawut, Albers Albert and Ott Sascha

**Torque Vectoring Control Design Based on Objective  
Driving Dynamic Parameters. . . . .** 1787  
F2012-E15-006  
Michael Graf and Markus Lienkamp

**Integrated State Estimation with Driving Dynamic Sensors  
and GPS Data to Evaluate Driving Dynamics Control Functions. . .** 1797  
F2012-E15-013  
Markus Bauer, Carlo Ackermann and Rolf Isermann

**Evaluation Tool for Current and Future Powertrains. . . . .** 1807  
F2012-E15-016  
Barak Adam

**Part XVI Other**

**Wet Handling Track: Utilities, Water System, Coefficient  
of Adherence. . . . .** 1825  
F2012-E16-005  
Pinilla Marc, Carbonell Abel and Arango Luz A

**The Development of an Auxiliary Unloading Device  
for Dump Trucks . . . . .** 1837  
F2012-E16-006  
Guoxing Li and Tie Wang