Editorial

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Biographical notes: Hui Zhang received his BSc in Mechanical Design Manufacturing and Automation from the Harbin Institute of Technology at Weihai, Weihai, China, in 2006, an MSc in Automotive Engineering from Jilin University, Changchun, China, in 2008, and PhD in Mechanical Engineering from University of Victoria, Victoria, BC, Canada, in 2012. He has worked as a post-doctoral researcher (2012–2013) and research associate (2014–2015) at the Department of Mechanical and Aerospace Engineering of The Ohio State University, Columbus, Ohio, USA. He is now a professor at Shanghai Maritime University.

Xinjie Zhang is an Associate Professor in the ASCL at Jilin University. His research focuses on vehicle system dynamics and control, tyre mechanics, and active and semi-active suspension. He got his PhD in 2011 from Jilin University and has been a visiting scholar at CVeSS of Virginia Tech from 2009 to 2011. He has authored more than 20 technical publications and holds 15 Chinese patents. He serves on the editorial board of Shock and Vibration and the Commercial Vehicle's Chassis and Suspension Committee of SAE. He was awarded Manuel Junoy Award by the FISITA in 2012.

Mehdi Ahmadian, Professor of Mechanical Engineering in the College of Engineering at Virginia Tech, was named the Dan Pletta Professor by the Virginia Tech Board of Visitors. He currently serves as Editor for the *International Journal of Vehicle System Dynamics*, and Editor-in-Chief of *Shock and Vibration* and *Journal of Vibration and Control*. He is a Fellow of the ASME, a Fellow of the SAE, and an Associate Fellow of the AIAA. He is the recipient of the 2008 SAE Forest R. McFarland Award and the 2014 SAE International L. Ray Buckendale Award.

Nong Zhang received his BE in 1982 from Northeastern University, ME in 1984 from Shanghai Jiao Tong University, China, and PhD in 1989 from the University of Tokyo, Japan. He worked at several universities in China, Japan, USA and Australia, before joining the Faculty of Engineering of the University of Technology, Sydney, in 1995. Since 2009, he has been Professor of Mechanical Engineering, at School of Electrical, Mechanical and Mechatronic Systems, University of Technology, Sydney.

Junmin Wang received his BE in Automotive Engineering and MS in Power Machinery and Engineering from the Tsinghua University, Beijing, China, in 1997 and 2000, respectively, the second and third MS in Electrical Engineering and Mechanical Engineering from the University of Minnesota, Twin Cities, in 2003, and PhD in Mechanical Engineering from the University of Texas at Austin in 2007. He has five years of full-time industrial research experience (May 2003–August 2008) at Southwest Research Institute. In September 2008, he joined Ohio State University and founded the Vehicle Systems and Control Laboratory.

Suspension systems are of great importance to ride comfort, handing and safety of road vehicles. Unsurprisingly, the design of suspension systems has attracted considerable attentions during the past few decades. Compared with passive suspensions, active and semi-active suspension systems have the capacity to improve the compromise between ride, stability and handling by adjusting suspension damping in real time. Active and semi-active suspensions are expected to become an integral part of future vehicles, beyond the production vehicles that have already adopted them. The proliferation of such advanced systems is aided by the customer demand for improved vehicles, the broad availability of electronics and controllers in most automobiles, and the emergence of electric vehicles with novel propulsions such as in-wheel independent electric drives.

The overall aim of this special issue is to document some of the recent advances in active and semi-active suspension research and development. Of particular interest are papers that are devoted to the most innovative design and control of advanced suspension systems with vehicular applications. Topics in this special issue include, but are not limited to:

- active and semi-active suspensions modelling and/or experimental analysis
- novel control strategies
- suspension system integration and cost control
- system reliability and life-testing analysis
- integration of advanced suspensions with other controllable systems, such as ESC, ABC, PTC, etc.
- off-roading application of active and semi-active system.

We solicited a lot of submissions to this special issue worldwide from industry and academia. After a stringent peer-review process, 11 submissions have been accepted, which cover advanced control, system optimisation and observer design for active/semi-active suspension systems.

In the paper entitled 'Constrained robust adaptive control for vehicle active suspension systems', by Pan et al., a constrained robust adaptive control strategy is proposed for active suspension systems. The non-symmetric input saturations were considered and an auxiliary system was constructed to reduce the negative effects caused by possible saturation.

Jing et al. propose a fault-tolerant control strategy for active suspension systems of in-wheel motor-driven electric vehicles in the paper 'Fault-tolerant control of active suspensions in in-wheel motor driven electric vehicles'. A dynamic vibration absorber is installed on the in-wheel motor axle to attenuate the vibration.

In the paper entitled 'Full-car active suspension based on $\mathcal{H}_2$/generalised $\mathcal{H}_2$ output feedback control', by Yu et al., a 15 degree-of-freedom full-car simulation model is established. The H_2 norm of the transfer function from the disturbance on the road to the vertical acceleration and the pitch acceleration was considered and optimised.

In another work, entitled 'Fuzzy logic torque control system in four-wheel-drive electric vehicles for active damping vibration control', by Song et al., the non-linear relaxation length-based model and the magic formula pragmatic model were used to describe the dynamic interaction on the tyre/road interface. A fuzzy logic torque control strategy was developed to suppress the oscillation in the driveline of a four-wheel-drive electric vehicle.

Yao et al. have studied a novel dual-mode interconnected suspension system in the paper 'Study on a novel dual-mode interconnected suspension'. The main purpose of the work was to optimise the conflicting vehicle performance indices, including the handling stability and ride comfort.

In the paper entitled 'Horizontal vibration reduction of a seat suspension using negative changing stiffness magnetorheological elastomer isolators', by Du et al., the performance of magnetorheological elastomer (MRE) isolators was experimentally verified. It infers from experimental results that the MRE isolators have a controllable negative changing stiffness characteristic.

Esmaeili et al. designed a load-dependent LPV/H_2 controller in the paper 'Load-dependent LPV/H_2 output-feedback control of semi-active suspension systems equipped with MR damper'. Both impulse and real road inputs were used to illustrate the effectiveness of the designed controller.

In the paper entitled 'Study of semi-active suspension control strategy based on driving behaviour characteristics', by Wang et al., the driving behaviour characteristics were employed to improve the suspension performance.

At the optimisation and estimation sides, a load-dependent observer was designed in 'Load-dependent observer design for active suspension systems', by Zhang et al. Fewer sensors were used get the state information.

In the paper entitled 'The optimisation of a proportional solenoid valve design for heavy vehicle active suspension system', by Meng et al., a proportional solenoid valve was optimised for the active suspension system. The optimisation method is Non-Dominated Sorting Algorithm-II.

Liang et al. investigated the shock absorber in the paper 'Research on recycling vibration energy of shock absorber'. The results in the paper showed that the heat energy was generated during the jounce and rebound of the wheel.