Editorial

Paul D. Walker

School of Electrical, Mechanical and Mechatronic Systems,
University of Technology Sydney,
15 Broadway, Ultimo, NSW, 2007, Australia
Email: paul.walker@uts.edu.au

Yunqing Zhang

School of Mechanical Science and Engineering,
Huazhong University of Science and Technology,
Luoyu Road 1037, Wuhan, 430074, China
Email: zhangyq@hust.edu.cn

Federico Cheli

Department of Mechanical Engineering,
Politecnico di Milano,
Campus Bovisa Sud – via La Masa 1,
Milano, 20156, Italy
Email: federico.cheli@polimi.it

Biographical notes: Paul D. Walker is a Chancellor's Post-Doctoral Fellow at the School of Electrical, Mechanical, and Mechatronic Systems at the Faculty of Engineering and Information Technology in the University of Technology, Sydney (UTS). He received his BE in Mechanical Engineering with First Class Honours from UTS in 2007 and his PhD in 2011, again from UTS. The focus of his PhD was the Dynamics and Control of Dual Clutch Transmission Equipped Powertrains. His current research interests include vehicle powertrain dynamics and control, particularly for hybrid and electric vehicles, with consideration of vehicle noise vibration and harshness. He is currently a member of the American Society of Mechanical Engineers (ASME) and Society of Automotive Engineers (SAE).

Yunqing Zhang is a Professor of School of Mechanical Science and Engineering, Huazhong University of Science and Technology (HUST), Wuhan, Hubei, China. He received the PhD in Mechanical Engineering from HUST. His research interests include vehicle system dynamics and control, multibody system dynamics, mechanical design and theory, uncertainty analysis and robust design. He has contributed to more than 100 publications. He was awarded as Most Cited Chinese Researchers (2014–2017) by Elsevier in Automobile Engineering. He is an Associate Editor for *SAE International Journal of Vehicle Dynamics, Stability, and NVH*. He serves on the SAE Materials Modelling and Testing Committee.

Federico Cheli is Full Professor at the Department of Mechanics at the Politecnico di Milano, Italy. He graduated in Mechanical Engineering in 1981 at the Politecnico of Milano. From 1992 to 2000, he is an Associated Professor

at the Faculty of Industrial Engineering at Politecnico di Milano. He is Co-founder of the E_CO spin-off. He is author of over 380 publications in international journals or presented at international conferences. His scientific activity concerns research on vehicle performance, handling and comfort problems, active control, ADAS, EV vehicles, autonomous vehicles. He is member of the editorial board of the *International Journal of Vehicle Performance* and *Vehicle Systems Modeling and Testing*.

Recent events in the automotive industry worldwide has brought the analysis and evaluation of fuel economy for conventional and hybrid vehicles alike into the spotlight. Current methods generally employed in industry and by academia use weighted averages of standardised driving cycles to estimate fuel consumption and compare against benchmarks.

These traditional methodologies are often described as being inadequate representations of real world driver experiences and are treated with a degree of scepticism by consumers. On-going developments in electric and hybrid electric vehicle platforms (particularly plug-in vehicles) make the use of traditional standardised evaluation techniques less applicable, further skewing results, negatively impacting the consumer perception of these technologies.

This issue presents current advancements in the evaluation of vehicle fuel economy, novel techniques for the evaluation of real world fuel economy and their application to a range of vehicle platforms. The primary objective of this special issue has been to provide a platform for the dissemination of novel estimation techniques and measurement methodologies for the evaluation of fuel economy and its implementation to conventional, electric and hybrid electric (including plug-in hybrid) vehicles.

In ‘A model based approach for the analysis and simulation of an hybrid bus in a urban context’ the use of series hybrid electric vehicle topologies were applied to the development of novel energy management strategies. These EMS were then investigated through the application of multiple driving cycles to investigate its behaviour. Specialised Braunschweig City Driving Cycle and more general European Transient Cycle were applied during the analysis. Results demonstrated the capacity of this EMS to provide battery only drive during periods of lower power demand.

In ‘Theoretical and experimental investigation of the thermal behaviour of a two-speed dual clutch transmission’ investigates the influence of thermal factors on transmission operational efficiencies. It is well established that the ‘cold start’ is the worst phase of driving, and impacts negatively on vehicle emissions outputs. This paper draws attention to issues in efficiency reduction in multispeed electric vehicles. Highlighting a prolonged period of lower efficiency as the transmission attains target operational temperature.

In ‘New methods for modelling and optimisation of multispeed transmission in an electric vehicle’ provides a broad strategy of optimising the driving efficiency through selection of appropriate gear. This method relies on known characteristics of motor, transmission, and so on to identify the optimal driving gear. It is therefore independent of any particular driving cycle. This method is also both compact and easy to implement.

In ‘Dynamic analysis of a vehicle with leaf spring based on the hysteresis model’ the analysis takes on a different twist. Investigating the use of alternative and optimised suspension systems for enhancing system performance. Hysteric behaviour improves driving comfort and drive performance.