
Editorial

Wuwei Chen

School of Mechanical & Automotive Engineering,
Hefei University of Technology, Hefei 230009, China
E-mail: cww@mail.hf.ah.cn

Jun Wang

Department of Automation, Tsinghua University,
Beijing 100084, China
E-mail: junwang@tsinghua.edu.cn

Biographical notes: Wuwei Chen is currently a professor in the School of Mechanical and Automotive Engineering, Hefei University of Technology, China. He has visited and carried out cooperative research with University of Leeds (UK), University of Toronto (Canada) and City University of Hong Kong, etc. His research interests are in the general areas of multi-body system dynamics, vehicle system dynamics, integrated control of vehicle chassis system, vehicle vibration and control, robotics and non-linear control, etc. He is the Secretary-General of the Society of Vibration Engineering of Anhui Province, China.

Jun Wang received his BE, ME and PhD in control engineering from the Hefei University of Technology (China) in 1996, the Southeast University (China) in 1999 and the University of Leeds (UK) in 2003, respectively. He joined the Department of Automation of Tsinghua University as a postdoctoral researcher after his PhD study, and has become a lecturer in the department since December 2005. His research interests include active suspension control, integrated vehicle chassis control, robust control and multiobjective control. He is a member of both the IEEE and the IEE.

With the increasing understanding of vehicle dynamics and continuing development of control theory and technology, control is playing a more and more active role in vehicle design. For several decades, vehicle control has attracted tremendous interest of engineers and researchers from both vehicle dynamics and control engineering societies. Intensive research has been carried out to analyse vehicle dynamics and design control systems for vehicle subsystems, and many of the concepts have been implemented in production vehicles, such as anti-lock braking systems, four-wheel steering systems, etc. It is evident that control systems can greatly improve vehicle ride comfort, handling stability, and most importantly, the safety of vehicles. More recently, the focus of the research is being shifted to the integrated control of vehicle subsystems. The integrated vehicle control, by considering the dynamic coupling among vehicle subsystems, can reduce the cost of vehicle control systems and fully exploit the potentials of modern vehicles.

This special issue of *International Journal of Vehicle Design* gathers a collection of high quality papers from engineers and researchers working all over the world in the area of vehicle dynamics and control systems. The papers discuss a wide range of vehicle control problems, with an emphasis on integrated vehicle control systems. The topics included in this special issue are briefly summarised as follows:

- active steering by a quadratic-programming based control allocation scheme and by a loop-shaping control scheme
- tracking control, including trajectory-tracking of an automated ground vehicle with GPS by an integrated design approach and precise tracking control of a vehicle with an installed manipulator by a synchronisation approach
- active suspension designs by an integrated controller simultaneously improving vehicle ride comfort and steady-state handling performance, and by a convex integrated design method simultaneously optimising suspension structure and controller
- integrated control of active differential and the active roll control systems by two distinct control strategies: an optimisation method or an MIMO control method
- integrated control of electrical power steering and active suspension systems by a random sub-optimal control strategy
- integrated control of active suspensions, active anti-roll bars and an active brake by a reconfigurable control structure called fault-tolerant rollover prevention system.

We hope that the papers will capture the interest of a wide readership, provoke debates among peers and give rise to further fruitful development of the current research.

Finally, we would like to take this special opportunity to thank all the authors for their contribution to this special issue and to thank all the reviewers for their extraordinary effort to scrutinise the papers, to make invaluable comments and to further enhance the quality of this special issue.