Preface

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Biographical notes: Jiageng Ruan received his BS and MS in Mechanical and Electronic Engineering from China Agricultural University, in 2010 and 2012, and the PhD in Mechanical Engineering from the University of Technology Sydney (UTS), in 2016. From 2016 to 2018, he was a postdoctoral research fellow with UTS, followed by another two-year postdoctoral fellow at the Beijing Institute of Technology. Now, he is appointed as a Professor at the University of Technology Beijing. His research interests include the development of multi-speed transmissions for electric vehicles, power split systems and energy management strategies for hybrid EVs.

Yanjun Huang received the PhD from the Department of Mechanical and Mechatronics Engineering, University of Waterloo, Waterloo, ON, Canada, in 2016. He is currently a Professor with the School of Automotive Studies, Tongji University, Shanghai, China. He has published several books and over 80 papers in journals and conferences. His research interests are mainly on vehicle holistic control in terms of safety, energy-saving, and intelligence, including vehicle dynamics and control, HEV/EV optimisation and control, decision-making and planning, and human–machine cooperative driving.

Fengyan Yi received the PhD in Vehicle Engineering from Jiangsu University (UJS) in 2005. She is currently a Professor with the School of Automotive Engineering, Shandong Jiaotong University, Jinan, China. She has published over 70 papers in journals and conferences. Her research interests include energy management strategy of new energy vehicles, key technologies of vehicle fuel cell auxiliary systems, and modelling and simulation of vehicle dynamics.

Peng Dong received the PhD in Mechanical Engineering from the Ruhr-University Bochum, Bochum, Germany, in 2015. He is currently an Associate Professor with the School of Transportation Science and Engineering, Beihang University, Beijing, China. His research interests include powertrain system of green vehicles, design and control of vehicle transmission, and reliability of transmission systems.

Tailpipe emissions from road vehicles are about six gigatons of CO_2 per year, which account for around 75% of all carbon emissions from mobility or 15% of total global CO_2 emissions. Despite the tremendous challenges to be faced, the automotive sector has made a great effort to achieve the ambitious net-zero global emissions goal by 2050. Powertrain electrification is taken as a major approach to vehicle decarbonisation, which will primarily involve replacing those that currently depend on fossil fuels with new energy vehicles, e.g., hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), battery electric vehicles (BEVs), and fuel-cell electric vehicles (FCVs) to reduce the tailpipe emissions.

However, it is not easy to win the highly competitive market. To compete with their fossil fuel engine-based counterparts by adding more attractive attributes, the new energy vehicles provide a great opportunity for the application of artificial intelligence, advanced communication technologies, distributed drive technologies, and multi-source energy management strategies to improve vehicle safety, economy, and performance. This special issue aims to present the state-of-art innovations and technologies emerging in new energy vehicles that not only contribute to the green energy revolution but also change the way of driving. The inspiring contributions involved in this special issue touch upon the recent advances in electric vehicle powertrain topologies, control and optimising, to achieve either better fuel economy or improved performance.