Preface

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Biographical notes: Olivier Sename received a PhD in 1994 from the Ecole Centrale Nantes, France. He is now a Professor at the Grenoble Institute of Technology (Grenoble INP), within the GIPSA-lab. His main research interests include theoretical studies in the field of time-delay systems and network-controlled systems (control of teleoperation systems with communication delays and integrated control/real-time scheduling codesign), as well as control applications of automotive vehicle suspensions, and engine controls. He has collaborated with several industrial partners (Renault, SOBEN, Delphi Diesel Systems, Saint-Gobain Vetrotex, PSA, ST Microelectronics), and is responsible for international bilateral research projects (Mexico, Hungary). He is the (co-)author of six book chapters, 20 international journal papers, and more than 80 international conference papers. He has supervised 15 PhD students.

Over the past few years, automotive engineering has been characterised by rapid growth in active systems. In particular, efforts to improve driving safety and comfort under all driving conditions have been naturally focused on the chassis behaviour. The challenge in vehicle control design is the collaboration of all the devices in contact with the ground and linked to the chassis, such as brakes, suspensions, steering wheels, etc. This special issue intends to propose new methodologies for modelling and control of the vehicle dynamics (two and four wheels), with a view to improving vehicles and passengers safety.

The first four papers concern the suspension system. In Lozoya-Santos et al. the modelling step of a semi-active damper is described, which is a crucial issue for control design. In Prado et al. the optimisation of a multi-objective control for semi-active suspensions allows to improve pitch and roll comfort. In Moreau et al. an active suspension is considered to hold car-body under driver disturbance and to control roll stiffness distribution. The paper by Zin et al. emphasises that the yaw rate control can be improved using the anti-roll distribution and the online adaptation of the suspension performance (comfort/safety).

In the following three papers the braking system is discussed. Gobbi et al. use a way to measure the braking forces at the wheels to improve the yaw control. In Tanelli et al., the roll angle information is considered to implement an efficient braking strategy for two-wheels vehicles. In Villagra et al. the braking is linked to the engine in order to propose an efficient active cruise control strategy, even in the presence of noises and uncertainties.

In the remaining papers the collaboration of different subsystems is considered. In Falcone et al., a model predictive control approach of braking and steering actuators allows to stabilise the vehicle in critical situations. Finally the 'roll-over' dangerous situations are tackled in Gaspar et al. (2009) using the suspension and braking systems. (Note that this paper was published in a previous issue of IJVAS).

Reference

Gaspar, P., Szabo, Z. and Bokor, J. (2009) 'The design of a fault-tolerant vehicle control system', *International Journal of Vehicle Autonomous Systems*, Vol. 7, Nos. 1–2, pp.36–55.