



## Special Feature: Vehicle Engineering

### Overview

#### **Eiichi Ono**

Division Manager  
Vehicle System Research Division

To improve the safety, comfort and performance of automotive vehicles, it is necessary to study not only vehicle dynamics, but also human factors. In recent years, research on human sensitivity for comfortable vehicle motion and passive safety based on human dynamics has attracted considerable attention.

This special issue focuses on our recent research results concerning vehicle engineering. In the first article, a vehicle dynamics integrated control algorithm, which achieves the theoretical limited performance of vehicle dynamics, is proposed. This control algorithm contributes to active vehicle safety. The second article shows an active human finite element (FE) model with 3D geometry of muscles and simulates a bracing driver and the driver's evasive maneuvers before collision. This model contributes to passive vehicle safety. In the third article, target vehicle dynamics to enhance a driver's perception of a vehicle's agility and stability in the yaw and lateral motions are suggested. A four-wheel active steering system has the capability to achieve these target dynamics. In the fourth article, a numerical approach and its applications to wind noise are introduced. Estimation of wind noise contributes to the comfort and performance of vehicles. The fifth article simulates thrust force generated by tripod constant velocity joints. These joints are used in the driveshaft of front-wheel drive vehicles. Reduction of thrust force contributes to reduced lateral vibration in these vehicles.