

**Estimation of Wheel/Rail Contact Conditions Based on State Space Model Using Acquired Data
by Instrumented Wheelset**

Shoya KUNUYUKI Takatoshi HONDO Mitsugi SUZUKI
Takefumi MIYAMOTO Kimihiko NAKANO

This paper describes a practical method of estimating wheel/rail contact conditions using the measurement data from an instrumented wheelset. The aim is to improve the accuracy of running safety evaluation without significantly increasing measurement costs. This method uses state-space theory and a Kalman filter-based state estimator to calculate contact conditions of a wheelset, including the angle of attack, contact positions and friction coefficients. Estimation results obtained through vehicle dynamics simulations demonstrate that the proposed approach reliably estimates contact conditions in curved track sections with radii under 600 m. The feasibility of the method was validated using running test data, which demonstrated that it provides an efficient solution for estimating contact conditions.