

**Parameter Determination Method of Three-Dimensional Analytical Models
for Elastic Vibration of Railway Vehicle Carbodies**

Yuki AKIYAMA Tadao TAKIGAMI Ken-ichiro AIDA

Reducing elastic vibration of railway vehicle carbodies is required to improve passenger comfort. This paper describes a parameter determination method of a three-dimensional (3D) analytical model for elastic vibration of the carbody of a railway vehicle. In the proposed method, parameters that minimize the difference of the natural frequencies between the measured and calculated results are determined by using the particle swarm optimization (PSO), which is one of the optimization techniques. Application to a Shinkansen-type test vehicle shows good agreement between measured and calculated results with a maximum natural frequency difference of the targeted six elastic vibration modes within 1%, which indicates the effectiveness of the parameter determination method.