



# World Conference on Mechanical Engineering

Berlin, Germany

09-11 Dec 2022

## Verification of Virtual Vehicle Dynamics Models of Commercial Passenger Bus by Tests

Erol Cifci, Ahmet Salih Yılmaz, Kemal Demir

R&D Center, Anadolu ISUZU, Çayırova, Kocaeli, TURKEY

### Abstract

In a Class-III commercial vehicle project to be produced by Anadolu Isuzu company, data obtained from lane change and bump pass tests performed with a prototype vehicle, virtual vehicle model verification studies were carried out with a virtual vehicle model created as part of R& D studies. In order to be able to perform the physical tests performed on the prototype vehicle in a virtual environment, the same road models were also created in virtual conditions and virtual tests were performed using the MSC Adams/Car program. Since the characteristics of the wheel installed on the test vehicle are not fully known, it will be able to differ depending on the wheel used in the virtual model. Especially in the lane change test, the reaction of the wheels and the driver's behavior will affect the test data. In order to evaluate the data decisively, it is aimed to verify the peaks between the maneuvers. In addition, the method of obtaining values appropriate to the test data by changing the wheel parameter values that most affect the lateral sliding angle of the wheels with the help of pSeven optimization software was followed. The minimum and maximum lateral slip angle values obtained in the test results were determined as the target and optimization analyses were performed. Vertical displacement values of the chassis were compared and verified with 4-poster virtual analyzes. As a result of virtual analyses, the virtual vehicle model was verified with test data by providing competencies at certain speeds in wheel center movement, damper displacement, chassis vertical displacement changes and lateral slip angle values.

**Keywords:** Vehicle Dynamics Analysis, Adams/Car, Vehicle Dynamics Tests, Optimization, pSeven