Bus-Expert-System for Dynamics Simulation, Design, and Quality Control

Results

Project Information

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Technical University Chemnitz/Zwickau
Germany

Exploitable results

Software for design of mechatronic products - Bus expert

A computer program-system for dynamics simulation and computations has been developed. Users are able to perform an effective design process of a bus, to evaluate the properties of materials, to investigate the dynamic behaviour of bus components and passengers as well as to improve safety and reliability of buses. Extensive experimental investigations have been performed in order to evaluate and verify the computational results.

The main aim of the project is to facilitate user handling of complex modelling and dynamic simulations demonstrated for buses with driver and passengers. Any future user of the BUS-EXPERT-SYSTEM will be able to modify the developed general and complex bus model and to perform

simulations by means of the user interface by a very simple interactive dialogue at a verbal level. Users can investigate all essential driving manoeuvres with a wide variety of conditions and parameters without being an expert in multibody system modelling. The developed general method can be used for creating other system solutions in vehicle dynamics, mechanical engineering, robotics etc.

The system, which can also be used as a general simulation tool, has been transferred to the first users:
- SKODA Ostrov, Czech Republic;
- IKARUS Special Coach Factory, Budapest, Hungary;
- ROCAR Factory, Bucharest, Romania.

The BUS SYSTEM in its current state can be used by bus producers or companies interested in investigating the dynamic behaviour of buses and their passengers during any driving manoeuvres. As a consequence of the project results, similar system solutions for simulating the dynamics of vehicles, machines, robots, mechanisms etc. could be developed very easily. Furthermore, marketing offices have been set up in the partners' countries, offering the bus system solution and the basic software, "Alaska". BUS EXPERT should also be able to provide other services for industrial customers and further tailored system solutions in related areas.

Users of the system are able to investigate different driving manoeuvres, such as running over obstacles, or in bends, with any function of steering angle, braking, crash and overturning situations by computer simulation. The bus model comprises parts of the platform, axles, and wheels with tyres, ABS, engine, seats, steering wheel and superstructure. The latest is modelled by means of FEM data or specific super elements representing elastic properties. The system also contains software for calculating fatigue life assessment, which can be coupled in some cases with the results of the dynamics simulation. A specific user interface and interactive dialogue make it possible to use the software very easily without experience in modelling and simulation of complex technical systems. In addition, the solution can be applied as a general simulation tool for mechatronic systems containing electromechanical and flexible components.

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