



## ***“Optimization and Robustness Analysis in Occupant Protection Systems”***

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### **Abstract:**

The development of the occupant protection system in cars gets more and more challenging due to increasing demands by the law, customer tests and the customer itself. It gets even more complex to develop a car for the European as well as the US-market together, due to the amount of required crash configurations and the different targets. To be competitive in this market, simulation is the driving development tool. Tests are not only expensive, but also extensively time consuming. A systematic approach in the simulation is important to investigate possible countermeasures in the occupant protection system and to combine these countermeasures wisely. This is due to the fact that the variety of countermeasures is big. However, it has to be kept in mind that the problem is a multi-objective problem, which is highly non-linear. One possible method is an intelligently chosen optimization and, furthermore, robustness analysis due to the variance of size, stiffness and performance of the different parts of the occupant protection system. The scope of the presentation is to show the optimization process with HyperStudy for different examples.

### **Keywords:**

- Safety
- Occupant Protection Systems
- Design of Experiments Optimization