Dynamic characterisation of composite materials with 4a impetus

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Abstract

With the increased use of fiber-reinforced plastic composites in the automotive industry, the demands on the accuracy of the simulation results and their informative value are constantly rising. Since the mechanical properties of these materials are often very complex, a high experimental effort is necessary to obtain the required material parameters for the simulation. The use of reverse engineering methods offers the possibility of a material characterization with much less experimental effort.

Until now this method was mainly used in the area of unreinforced or short fiber reinforced thermoplastics, foam materials and other isotropic materials. In combination with micro-mechanical models the number of determining parameters will be minimized so that even here the use of reverse engineering is possible, useful and cost efficient.

LS-Dyna offers many ways to inplement composite materials in FE simulations. In addition to the numerous orthotropic / anisotropic material models, the modelling method plays a crucial role, too. 4a Impetus offers the possibility to get material cards for single-layer as well as for multilayer models. Both methods have their advantages in different load cases. This is illustrated in several examples.

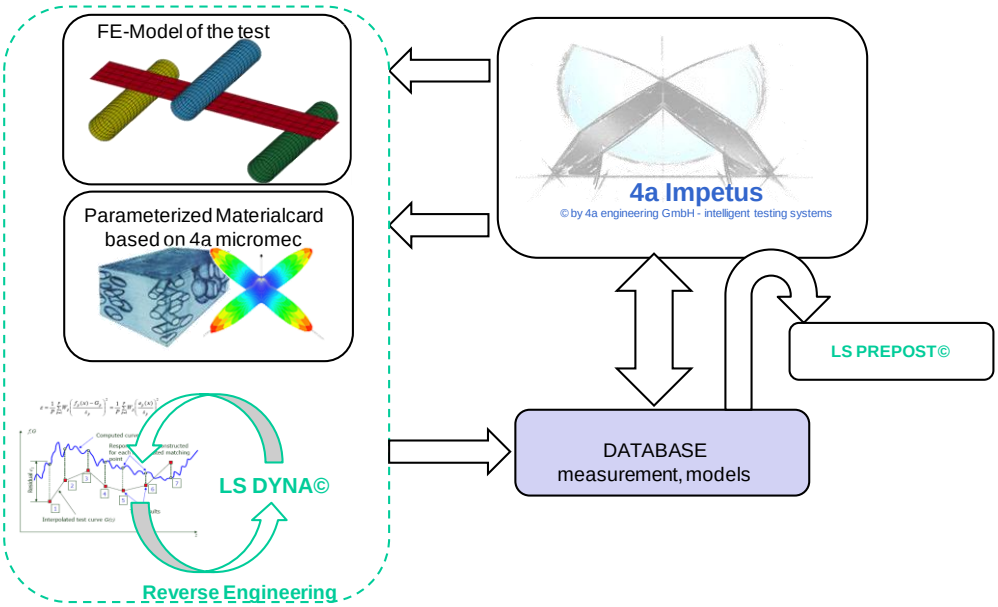

Fig. 1: 4a Impetus workflow – reverse engineering based on 4a micromec

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