

# Automated Modelica Package Generation of Parameterized Multibody Systems in CATIA

Daniel Baumgartner, Andreas Pfeiffer  
German Aerospace Center (DLR), Institute of System Dynamics and Control  
82234 Wessling, Germany  
Daniel.Baumgartner@dlr.de, Andreas.Pfeiffer@dlr.de

In early stages of the product development process computer-aided design (CAD) and multibody simulation (MBS) work concurrently to build a virtual mechanical system. While CAD handles the geometric design and space analysis, MBS leads to a deeper understanding of the dynamic behavior of the future system. The CAD system has to provide physical and geometrical data, such as mass, inertia and connecting frames in order to improve simulation results. Automation at this point helps to create consistent simulation and design models and shortens the amount of time needed to produce realistic simulation results. Based on Visual Basic for Applications (VBA) a method is implemented to automatically generate an isolated Modelica model package or a single Modelica model from CATIA assemblies or parts. The introduction of design controlling parameter variables in addition to the multibody data enables optimization loops between multibody simulation and the related CAD model (Figure 1). An example demonstrates the three main steps of the presented method, divided into model processing, package generation and parameterized package update. Furthermore, the update process is integrated in a manual parameter variation as well as an automated optimization routine to enable parametric design studies coupled with multibody simulation.

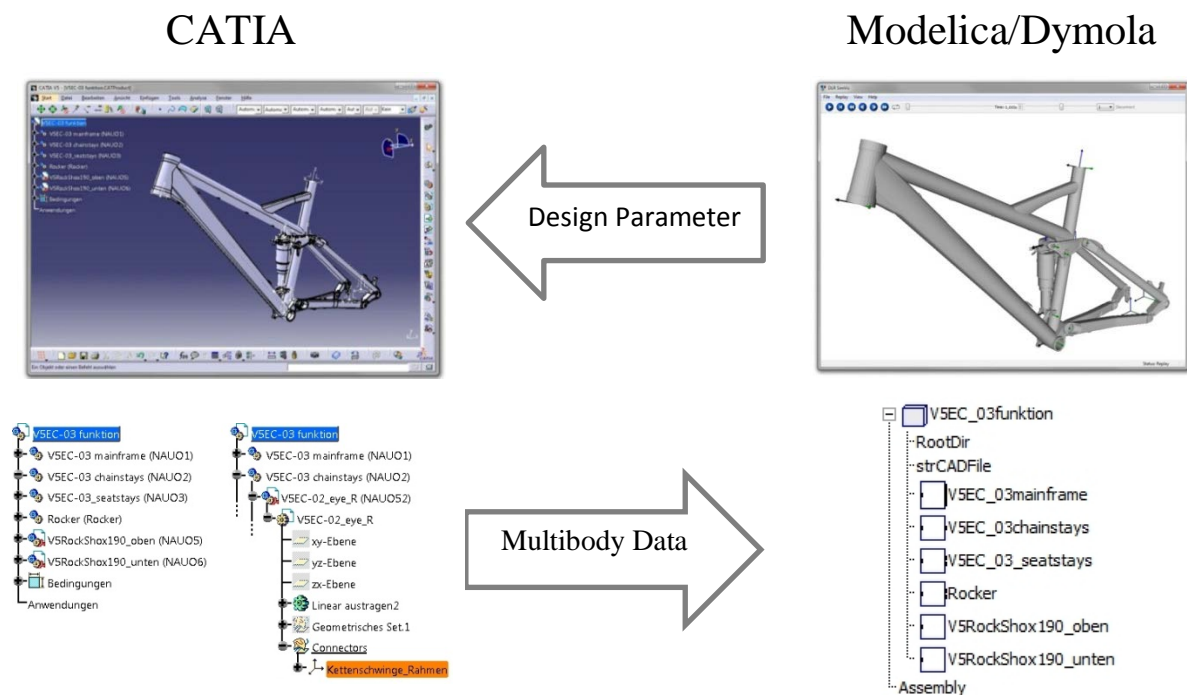


Figure 1: Automated package generation and parametric design