

A parallelization approach for the simulation of large scale multibody systems

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Virtual prototyping plays an important role in the engineering disciplines. The possibility to model and simulate prototypes on a computer instead of building real-world ones saves time and money. Nowadays, engineers can rely on special tools like object oriented modeling languages, e.g., Modelica, to describe their models. These models can be automatically processed and simulated using standard DAE-solvers, like the BDF-code DASSL as well as its newer offsprings DASKR and DASRT. The advantage of this approach is that the practitioners can concentrate themselves on modeling, whereas the numerical intricacies of the simulation are handled by the software. On the other hand, such simulations are usually slower than implementations which are parallelized and optimized by hand.

In this contribution we concentrate on the DASSL-family of solvers and use a parallelism across the system approach. The novelty of this approach is that the parallelization is carried out automatically and does not require any a priori knowledge about the system. In addition, we increase the parallel potential by implementing a modification of the DASSL-code, which was already proposed by M. Arnold et al. for serial speed up. The implemented methods are demonstrated on engineering examples.