

Abstract

In the automotive industry well-established different simulation tools targeting different needs are used to mirror the physical behavior of domain specific components. To estimate the overall system behavior coupling of these components is necessary. As systems become more complex, simulation time increases rapidly by using traditional coupling approaches. Reducing simulation time by still maintaining accuracy is a challenging task. Thus, a coupling methodology for co-simulation using adaptive macro step size control is proposed. Convergence considerations of the used algorithms and scheduling of domain specific components are addressed. Finally, the proposed adaptive coupling methodology is examined by means of a cross-domain co-simulation example describing a hybrid electric vehicle. Considerable advantages in terms of simulation time reduction are presented and the trade-off between simulation time and accuracy is depicted.