



Further Developments and New Applications of SIMPACK Code Export

Further Developments in SIMPACK Code Export

- extension of solver functionality
- new supported elements
- export of C-code
- access to HIL targets

“DAE Interface”

- enable solver for system of non-linear equations in Code Export (assemble system)
- enable reset of state vector from User Routines
- activate solver re-initialisation and assemble of state vector from User Routines

-> **Purpose:** enable User Routines with modifications in force law

Quasi-static Solver (driven equilibrium)

- get solution x for
$$xp = \text{sum}[F(x,u)] * M^{-1} := 0$$
or alternatively
$$M * xp = \text{sum}[F(x,u)] := 0$$

- calculates static equilibrium for given positions $u(t)$

-> **Purpose:** much faster solution for quasi-static problems than time integration

New Supported Elements



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- enable arithmetic **if-loops** in Substitution Variables for code parametrisation
- enable Code Export with parametrisation and **Elastic Bodies**
- enable **spck_dv_forceatmarker**
- enable tyre-model **TM-Easy** and **MF-Tyre** with tyre Force Element in Code Export
- enable Force „61: **Virtual Anti Roll Bar**“ and Force „64: **Virtual Steering**“ in Code Export
- enable **Moved Marker by Controller Input 6 DOF** (Moved Marker 81 and Control Element 124)
- enable **MATLAB Workspace based parametrisation** of Substitution Variables, Input Functions and Function Arrays (Dev)

Why C-code ?

- avoid usage of Fortran compiler for exported code
- enable access to arbitrary OS/CPU combinations (Hil-targets)

Problem:

- shareware f2c only available for f77 (SIMPACK contains F90 since v8.5)
- comercial converters require run-time library

Solution:

- development of SIMPACK-specific f90-2-C converter which supports reduced functionality of Fortran90: ForC (by Cobalt Blue)

Application Scenario:

- ForC will be integrated in CE-process, to convert model specific code
- aproprate C-based element library will be provided by Intec

- can be used alternatively to F90 based solution

Release:

- will be released as soon as test phase is completed successfully

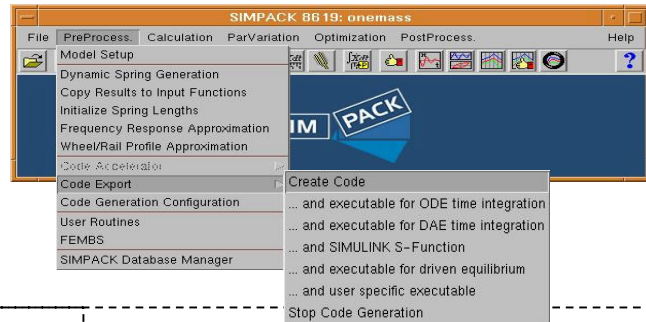
Export of C-Code (Dev)



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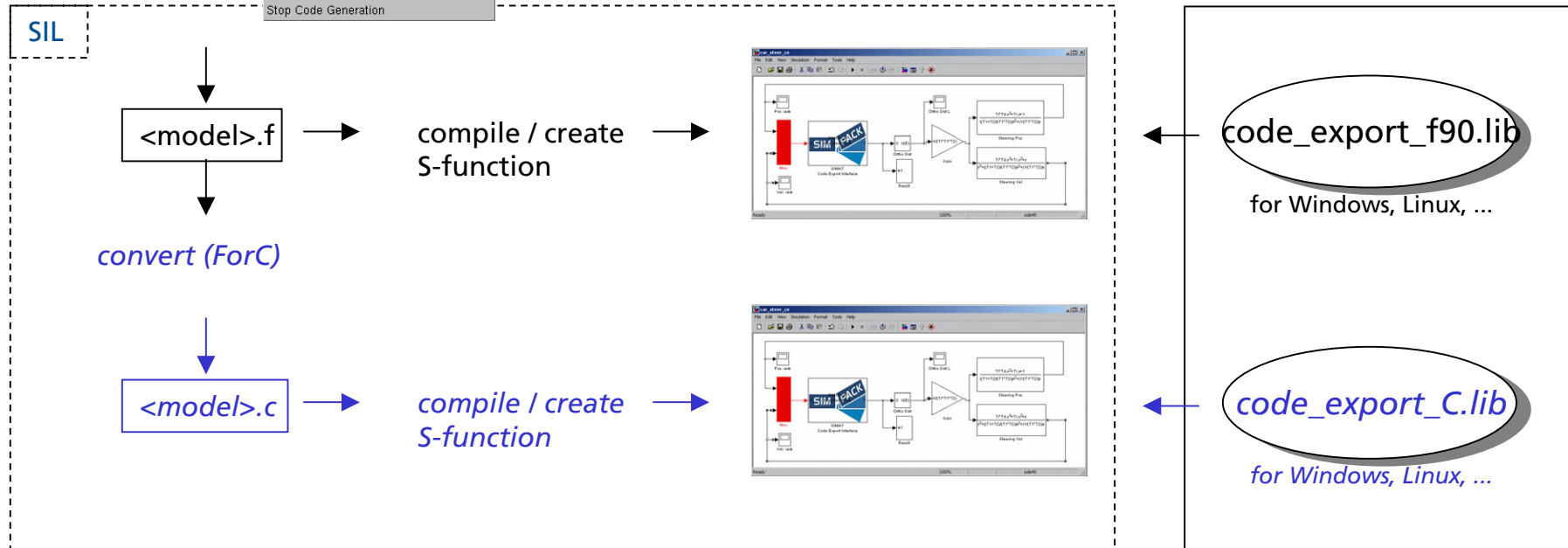
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SIMPACK Release
SIMPACK Dev Version

Licensed libraries in
SIMPACK installation



Ready to use vehicle model: VDYM

- fully parametrised
- suspension kinematics by semitrailing arm,
- (elasto-)kinematic lookup-table, macro joint
- contains ETAS road and driver and SIMPACK vehicle model
- trailer soon available
- available for ETAS RTPC, can be ported to other HIL-Targets

Code Export to Realtime Target

- available as process with engineering support by Intec
- for arbitrary user specific models
- Intec provides element libraries for:

ETAS RTPC
XPc-Target
dSPACE ds1005
dSPACE ds1006

- libraries can be provided on different platforms on user demand

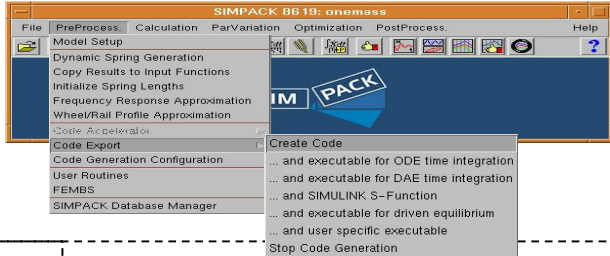
Access to HIL Targets



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SIMPACK Release
SIMPACK Dev Version
 ... with INTEC Engineering

Licensed libraries in SIMPACK installation

