Soluzioni ingegneria 2004

YOUR PARTNER IN TECHNOLOGY INNOVATION

EVE

FAST, RELIABLE AND AUTOMATED CONVERSION PROCESS FROM ADAMS MULTI BODY MODEL TO IPG MODELS

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WHY YOU NEED IT

MSC ADAMS is one of the most used tool for multibody simulations; it is commonly used for:

- designing of vehicle geometry, suspensions and other vehicle components;
- chassis FEM analyses;
- reaction force on a structure point analyses;
- bushing effects simulations;
- subsystem dynamic response simulations.

IPG CarMaker is a real-time software for vehicle simulations; it is commonly used for:

- vehicle dynamics modelling;
- complex scenarios definitions, also with traffic interactions;
- ADAS systems and logics validation;
- HIL (i.e., Hardware in the Loop) applications;
- closed loop maneuvers definition.

Car manufacturers need to deal with both these two worlds. A way to pass from one world to the other is required

WHAT WE PROPOSE

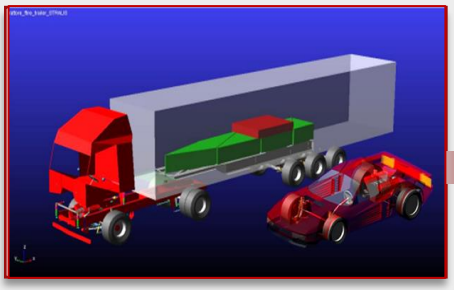
FAST VEHICLE MODEL CONVERSION

RELIABLE VEHICLE MODEL CONVERSION

AUTOMATED PROCEDURE

MSC ADAMS

IPG CarMaker



EVE© makes possible to convert a multibody vehicle model developed in MSC ADAMS into an equivalent IPG CarMaker vehicle model suitable for real-time applications. This means time and money saving.

WHAT DOES EVE CONVERT?

Masses and inertias

sprung mass and inertias, unsprung masses and inertias, rotating parts masses and inertias, Automatic import of additional trim loads (e.g. driver, passengers, additional loads...)

Suspensions

primary springs, dampers, buffers, secondary springs (e.g. bushings), axle torsional stiffnesses. Suspension K&C from ADAMS suspension test bench simulations (2D+2D mapping). General procedure, applicable to any type of suspension.

Steering system, powertrain, brakes and aerodynamics

From ADAMS files & ad-hoc simulations, to CM subsystem parametrization

Inertial & ADAS sensors

From Inertial ADAMS sensors (acceleration, velocity, height) To CM sensors (inertial, side slip). ADAS SENSORS – From external ad-hoc file To CM object sensors

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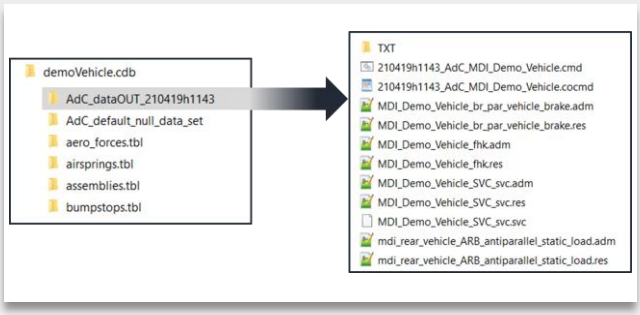
WHAT IS INCLUDED

Firstly, an ADAMS command file (i.e., CMD) is created, collecting all the simulations required for the vehicle model conversion, which can be automatically run into ADAMS environment:

ADAMS CMD GENERATION

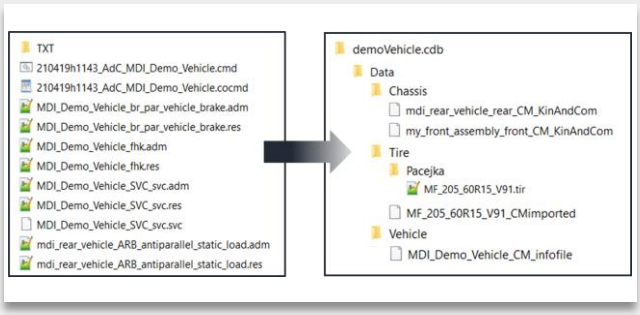
- ❑ selection of the ADAMS vehicle model to be converted
- ❑ setting of the suspension parameters (wheel travel range, steering range, static equilibrium position)
- ❑ selection of the ADAMS requests (i.e., ADAMS variables names) to be extracted from simulations
- ❑ generation of the CMD file containing all the simulations to be automatically run in ADAMS



Then, loading the ADAMS simulations output files and the subsystems parameters EVE converts the original ADAMS vehicle model into a IPG CarMaker one:

EVE CONVERSION PROCEDURE

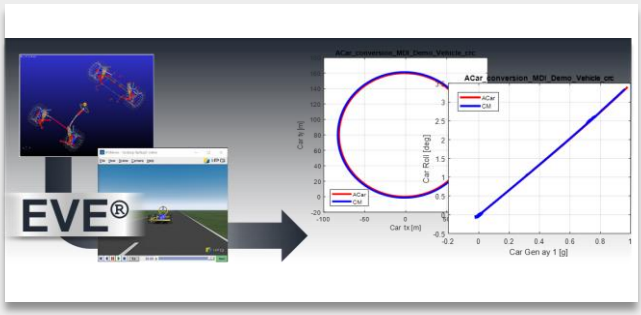
- ❑ loading of the ADAMS simulations output files;
- ❑ extraction of the variables and computation of the quantities to be converted into CarMaker environment:
  - masses and inertias
  - suspensions characterization
  - Subsystems parameters (powertrain, brake system, aerodynamics…)
- ❑ generation of CarMaker vehicle infofile, SKC files and tyres files;



Finally, a comparison of the suspensions and full vehicle maneuver results is done, for evaluating the accuracy of the converted CarMaker model with respect to the original ADAMS model

EVE COMPARE TOOL

- ❑ TARGETS:
  - to check the quality of the conversion
  - to check the results via quantities comparison
- ❑ ADVANTAGES:
  - evaluation of the converted model accuracy
  - automatic comparison for both suspensions and full vehicle
  - customizable PDF printing of the results



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