

MSDL

Modelling, Simulation and Design Lab

applications of (domain-specific) modelling and simulation-based design

WEST Experiment - cont

WEST Simulat

TANK WARS

MAMMOTH

Google

(c) Prof. V. Natler-Glaser

courtesy DaimlerChrysler AG

Software is part of ECU

ECU's are part of mechatronic systems for measurement and control

Language engineering: **meta-modelling** and **model transformation**

- * transformation ++; evolution; distribution; ...

A Tool for Multi-formalism and Meta-Modeling

Even our logos are modeled!

Attributes:
- T :: String
Constraints:
> T

Attributes:
- T :: String
Actions:
> T

rule 2: Flow2PNTTransition

CONDITION:
node = getMethod(LHS_nodeWithLabel(1))
return node.in_connections == []

ACTION:
node = RHS_nodeWithLabel(1)
node.capacityAndLockInState = true

Chart Model

Scale Mode

Rotate Mode

visual modelling

- * specification of reactive behaviour
- * link concrete and abstract syntax

theory/foundations: new formalisms (e.g., variable structure Modelica), multi-formalism modelling, formalism weaving (e.g., structure & behaviour), formalism transformation, ...

assemble

3D mechanics

state machines

www.modelica.org

control systems

power trains

electrical systems

hydraulics

power systems

PDE

KTG

DAE non-causal set

Bond Graph a-causal

Cellular Automata

Bond Graph causal

State Charts

Petri Nets

Process Interaction Discrete Event

System Dynamics

DAE causal set

Transfer Function

Activity Scanning Discrete Event

DAE causal sequence (sorted)

Finite State Automata

Event Scheduling Discrete Event

scheduling-hybrid-DAE

DEVS&DESS

Difference Equations

state trajectory data (observation frame)