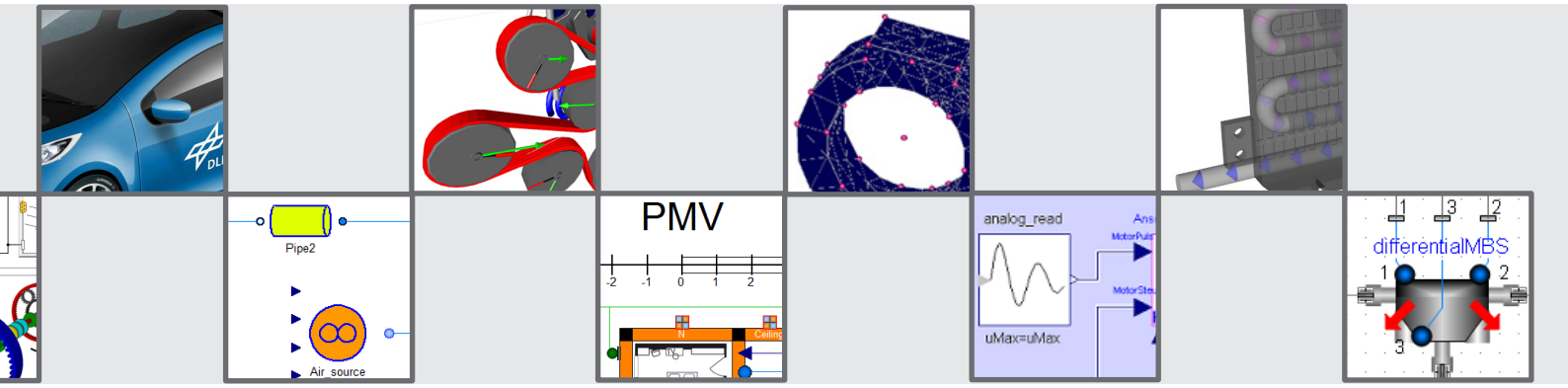
Modelica Libraries

Catalog

Version 8



Actuator	**AlternativeVehicles**	**Belts**
ClaRaPlus	EDrives	EWITAC
FlexibleBodies	**FluidDynamics**	**HumanComfort**
HVAC	**Hydronics**	**PowerTrain**
Statistics	**TIL**	**Visualization**

About Modelica Libraries

User Benefits

Modelica Libraries contain modeling know-how in a standardized way. They provide ready-to-use equation-based model components, as well as application-oriented parameter sets and advanced interfaces to related technologies of Modelica (e.g. FEM, real-time simulation and 3D visualization). Since Modelica source code is available in most cases, the model components are highly customizable to user needs.

Library Development and Distribution

Many Modelica Libraries were already developed or are currently under development by research labs, companies and engineering specialists. Some of these model libraries are free and can be downloaded from the Modelica homepage (www.modelica.org).

Other libraries which implement specific know-how will not be available free of charge. We distribute some of these commercial Modelica Libraries which will not be sold by the developers or via other sales channels. We offer marketing, distribution and support. Our goal is to make these libraries available for all Modelica-based simulation environments.

Are you interested in one of the Modelica Libraries?

Please do not hesitate to ask for more information, demo versions and quotations:
Phone +49 89 20970055
Email: sales@ltx.de

Contents

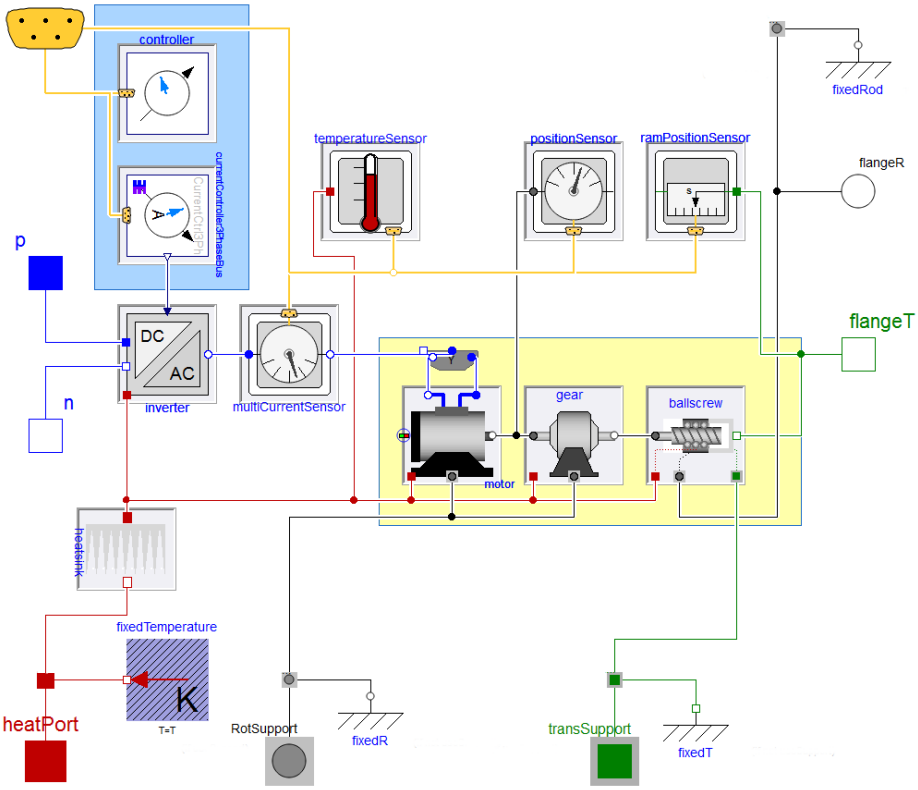
Actuator Library – new

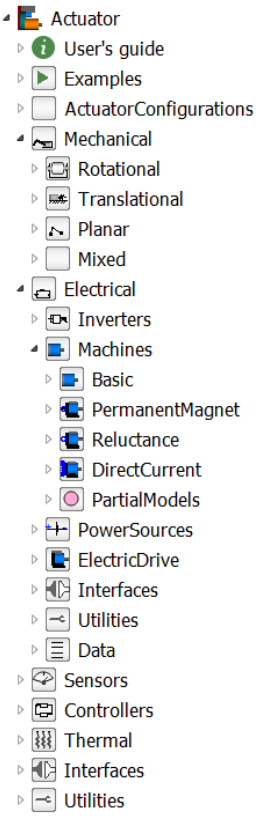
Electromechanical Actuators in multiple modeling levels

Actuator | Modelica Library

developed by DLR and partners
distributed by LTX Simulation GmbH

For the full electrical operation of aircraft systems, electromechanical actuators are a key enabler. But also high performance rail vehicles or custom machines are often limited by used actuators. The interaction of the mechanical, thermal and electrical domain combined with control algorithms makes the design of these actuators challenging.





The Actuator Library allows you to model electromechanical actuators from very early design stages up to detailed design or even the development of health monitoring algorithms. The library contains templates of common actuators and detailed actuator components such as nutscrews, gear transmissions, permanent magnet motors, inverters, heatsinks, sensors and controllers. The actuator library not only supports the design of healthy actuators, but also allows to model non-nominal working of these actuators using components with pre-defined faults.

Included modelling levels

1. Perfect
2. Linear, invertible
3. Nonlinear, invertible
4. Hard nonlinear
5. Fully switched

Development

DLR, German Aerospace Center, Institute for System Dynamics and Control, Oberpfaffenhofen, Germany (www.dlr.de/sr)

Further developers: Airbus Group Innovations, IK4 TEKNIKER, INSA Toulouse, MTA Sztaki, TU Hamburg-Harburg, University of Nottingham

The research leading to these results has received funding from the European Union's Seventh Framework Program (FP7-284916) for ACTUATION 2015 under grant agreement no. 284915.

Availability

Version 1.2.1 is available for Dymola

Tested on Dymola 2017 FD01 and Modelica Standard Library 3.2.2

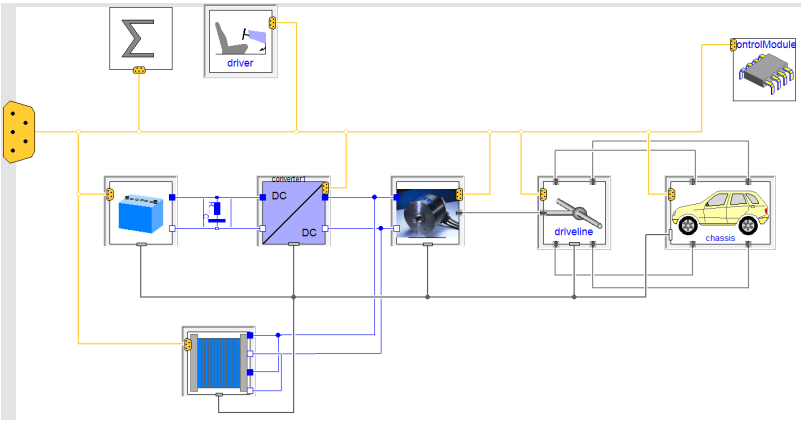
AlternativeVehicles Library

Hybrid Vehicle Power Trains, Battery-Electric and Fuel-Cell Vehicles

AlternativeVehicles Modelica Library

developed by DLR
distributed by LTX Simulation GmbH

The AlternativeVehicles Library provides one-dimensional mechanical and electrical components for alternative power trains. It contains ready-to-use vehicle architectures including battery-electric vehicles, range-extender vehicles and fuel-cell vehicles and component models for electric drives, energy storages, fuel cells, engines, drivers and drive cycles.



- AlternativeVehiclesExt
  - MapDir
  - Users Guide
  - Examples
  - VehicleArchitectures
    - BatteryVehicle
    - ConventionalVehicle
    - RangeExtender
    - FuelCellVehicle_01
    - BaseClasses
    - FuelCellVehicleWithCo...
    - FuelCellVehicle_02
  - Chassis
  - DriverEnvironments
  - ElectricDrives
  - EnergyStorages
    - Batteries
    - UltraCapacitors
    - Flywheels
  - Engines
  - Transmissions
  - Converter
  - Roads
  - Controllers
  - Accessories
  - Data
  - Icons
  - Inspectors
  - Interfaces
  - Types
  - Utilities
  - Drivelines
  - CoolingCycle
  - FuelCells

The focus of this library is on modeling of alternative power trains with emphasis on fast and simple parameterization of component models by using commonly available manufacturer datasheets and / or measured data.

- Examples for parallel-hybrid vehicle MB S400H and conventional vehicle MB S350
- Test benches for batteries, combustion engines, transmissions and electrical drives
- Improved tutorial and documentation

The AlternativeVehicles Library was developed within the European research project EUROSYSLIB. The models are based on the VehicleInterfaces library ensuring compatibility to already existing automotive libraries.

Development

DLR, German Aerospace Center, Institute of Vehicle Concepts, Stuttgart, Germany (www.dlr.de/fk) with contributions of Institute of Robotics and Mechatronics, Oberpfaffenhofen, Germany.

DLR

Availability

AlternativeVehicles Library is available for Dymola and Modelica Standard Library 3.2.2

Belts Library

Static and Dynamic Analysis of Belt Drive Systems

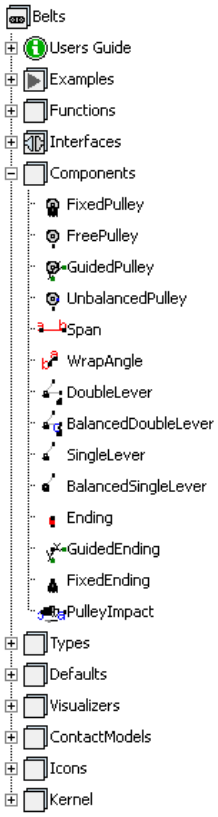
Belts | Modelica Library

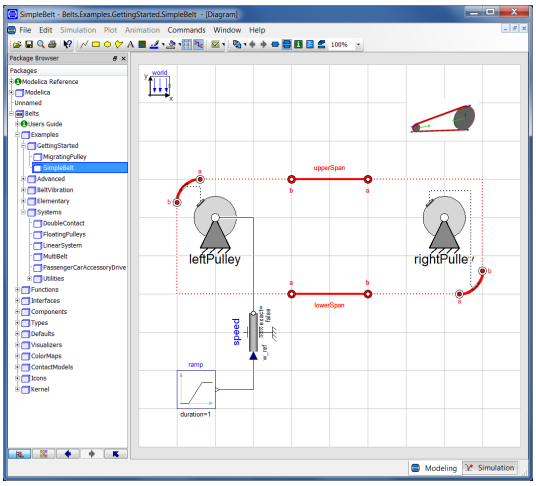
developed by Frank Rettig
distributed by LTX Simulation GmbH

The Belts Library contains elements for the static and dynamic analysis of belt drive systems.

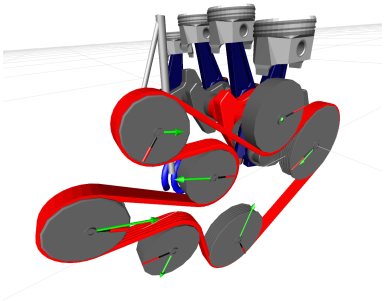
It is assumed that the belt drive is a planar system. The most important elements of the model library include:

- belt pulleys with fixed axis and specified rotation
- belt spans as idealized spring/damper elements (Kelvin-Voigt model)
- belt spans capable of transversal vibrations
- belt pulleys whose axis of rotation is connected to a frame from the Multi-Body Library





Simple belt model



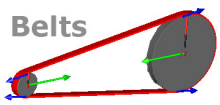
Animation of a passenger car accessory drive

The Belts Library includes components like levers, endings, wraps, contact models, functions for belt calculations and interfaces for belt drive components.

Adapted advanced animation components make it easier to understand the dynamic behaviour of the model. Visualizers for 2- and 3-dimensional visual objects are used for animation of the belt drive. Many examples are delivered to explain the usage of the Belts Library. A User's Guide completes the package.

Development

Frank Rettig, Germany



Availability

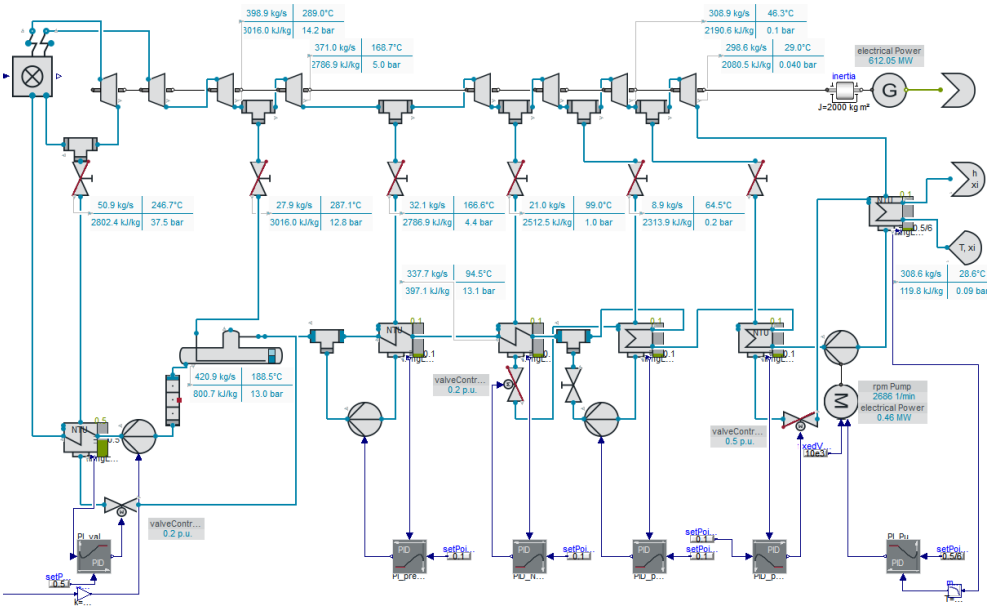
Belts Library is available for Dymola and Modelica Standard Library 3.2.2

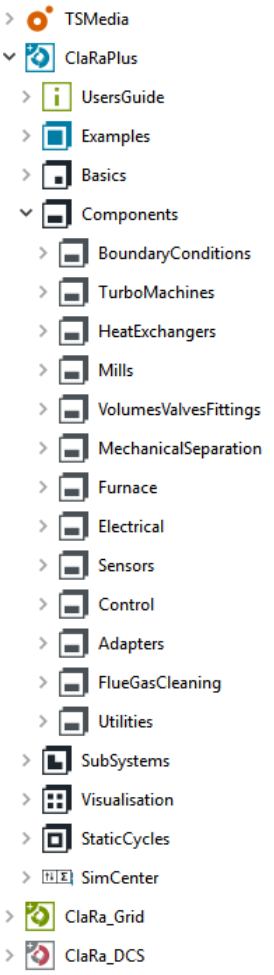
Tested on Dymola 2017 FD01 and Modelica Standard Library 3.2.2

ClaRa$^+$ Library – new
Power Plant Simulation

ClaRaPlus | Modelica Library
developed by TLK-Thermo and XRG Simulation
distributed by LTX Simulation GmbH

Create a digital twin of your power plant, investigate transient behavior and gain greater understanding to optimize your processes for use in the future energy market. Use ClaRa$^+$ to support all project phases: from evaluation of concept variants to component design, optimization of control technology, virtual commissioning and optimization during operation.





Use ClaRa$^+$ to analyse your

- **Hard coal power plants** - from the coal grinding to the grid
- **Combined cycles** - catch transients of drum swelling
- **Industry power plants** - always on demand of your process
- **District heating systems** - track critical pressure oscillations
- **Controller system** - optimize your plant efficiency
- **Organic Rankine cycles** - optimal integration into your process
- **Natural circulation boiler** - be aware of unwanted evaporation

The ClaRa$^+$ bundle consists of four main packages: The TSMedia package, an extensive media library including ORC Media and a large steel data base. The ClaRa$^+$ main package, providing models for the complete power plant equipment and detailed models for pressure loss and heat transfer. The ClaRa_DCS, a library for modelling state-of-the-art control systems. The ClaRa_Grid, providing models for the electrical grid.

Development

XRG Simulation GmbH, Hamburg, Germany (www.xrg-simulation.de)
TLK-Thermo GmbH, Braunschweig, Germany (www.tlk-thermo.com)

Availability

ClaRa$^+$ Library 1.2.0 is available for Dymola and Modelica Standard Library 3.2.2.

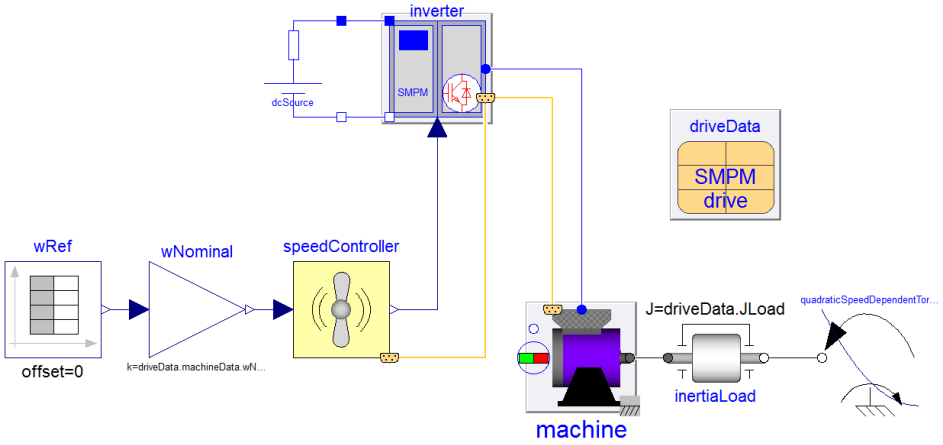
EDrives Library

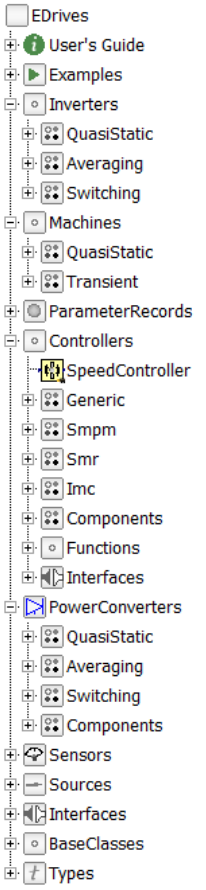
Modular, Multi-phase Controlled Electric Drives

EDrives | Modelica Library

developed by Haumer & Kral
distributed by LTX Simulation GmbH

Improved redundancy and reliability of electric drives is vital for many applications such as full and hybrid electric vehicles, more electric aircrafts, etc. Powerful simulation libraries are required to develop concepts and to assess power and energy efficiency. Multi phase electric machines with phase numbers greater than three are already state of the art. EDrives is currently the only Modelica library for investigating the electro-mechanical behavior and concept of such multi-phase drives.



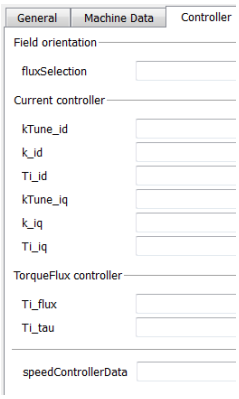


In the EDrives library simulation models of electric drives for

- permanent magnet (PM) synchronous machines,
- synchronous reluctance machines and
- induction machines with squirrel cage

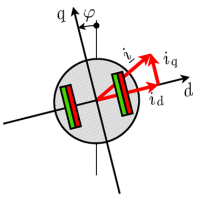
are provided. The entire library is designed to support phase numbers greater or equal to three. All electric machine and control (!) models consider copper (Joule) loss, core loss, friction loss, stray load loss and PM loss. This allows the investigation of consistent configurations and de-tuning effects. The library supports three levels of abstraction:

- quasi static electric machines and power converters (all electrical time transients are neglected)
- transient electric machines with averaging power converters
- transient electric machines with switching power converters



Due to the modularity of the EDrives library the level of abstraction of machine and power converter models can be easily exchanged without re-building a simulation experiment. Drive and control data are stored hierarchically in records to increase productivity of simulations. Further developments:

- active mains converters with voltage oriented control
- extended loss models of power converters
- advanced machine models considering saturation effects
- multi level inverter configurations



Development

Anton Haumer and Christian Kral (www.edrives.eu)

Availability

EDrives Library is available for Dymola and Modelica Standard Library 3.2.2

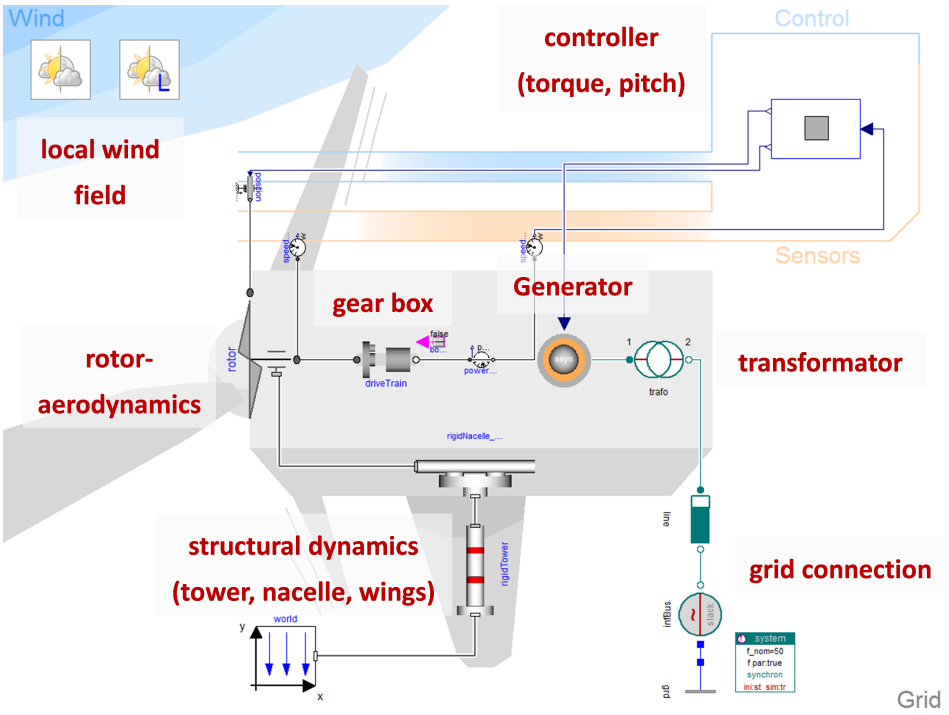
EWITAC Library – new

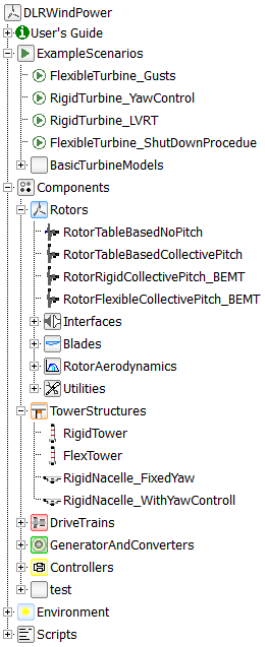
Grid-connected Elastic Wind Turbines

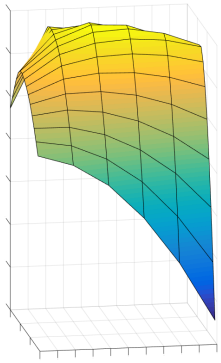
EWITAC | Modelica Library

developed by DLR
distributed by LTX Simulation GmbH

Wind energy is a vital part of today's energy production. Modern wind turbines are multi-domain devices that combine advanced aerodynamics and structural design with modern power electronics and control components. Optimizing the design, control and net-integration of wind turbines thus demands a complete system understanding.







Aerodynamics based on performance maps or blade-element momentum theory

The DLR EWITAC Library gives you a jump-start for modeling wind turbines with Modelica. It contains complete turbine models, including all relevant components such as flexible rotor blades, flexible tower structures, standard control blocks and power electronic models for net-integration. Models for the environment enable you to test scenarios such as gust load alleviation or a low-voltage-ride-through for grid-code compliance.

Components are available at different level of detail in order to allow switching between highly efficient and highly detailed simulations. The rotor aerodynamics model has been validated using the FAST reference tool with the NREL 5 MW standard turbine.

Development

DLR, German Aerospace Center, Institute for System Dynamics and Control, Oberpfaffenhofen, Germany (www.dlr.de/sr)

Availability

The DLR EWITAC Library is available for Dymola and Modelica Standard Library 3.2.2.

It is recommended to us the library together with DLR FlexibleBodies library. It also requires components from the free Modelica_PowerSystems Library.

Additional support for the Visualization Library is available upon request.

FlexibleBodies Library

Flexible Beams, Annular Plates and general FE-based Bodies

FlexibleBodies | Modelica Library

developed by DLR
distributed by LTX Simulation GmbH

The FlexibleBodies Library provides Modelica models to represent flexible bodies as beams, annular plates with optional thermo-elastic properties and modal bodies. The user can define beam-like structures such as the rotor blades shown in figure 1 by simply parametrizing an analytical model of a straight and homogeneous beam considering two-dimensional bending, torsional and lengthening deformations. The same approach is also applied to model the bending behaviour of annular plates such as a helicopter swash plate in figure 1. For both model types, a graphical user interface allows the definition of a complete set of geometrical and physical properties.

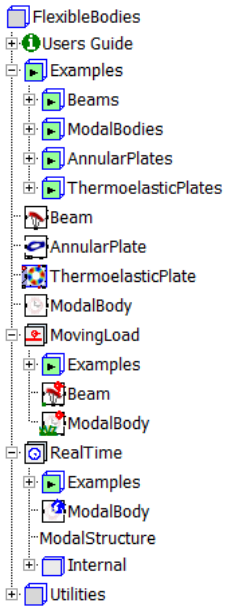


Figure 2 shows an automotive brake system with a floating caliper. Due to the chosen so-called arbitrary Lagrangian-Eulerian description also non-rotating loads such as brake normal and friction forces (visualized by green arrows) and the associated heat flow may be applied in a very convenient way since the contact modelling is substantially simplified.

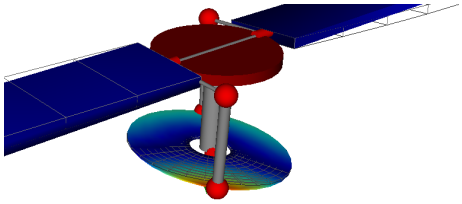


Figure 1: blade pitch control

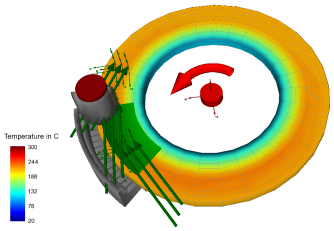
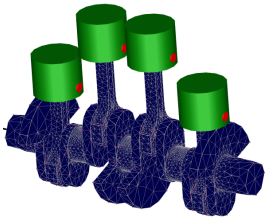
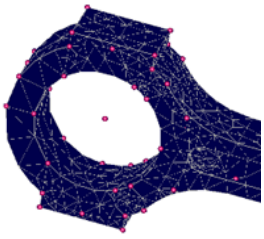


Figure 2: brake system

The component ModalBody allows to represent flexible bodies of a general geometrical shape. The geometrical and physical properties are defined by an SID (standard input data) file that is usually generated by an external program.



The SID file can be exported from Abaqus directly (as of version 6.10-EF). For users of ANSYS, Nastran, I-DEAS and PERMAS, we recommend to use Simpack, which is capable of generating an SID file from the FE programs. The user of the ModalBody model has to define which SID file is to be accessed to parametrize the body via the Modelica user interface. The SID data of a beam are completely generated by Modelica while ModalBody needs a file. For the application of ModalBody models in real-time environments the SID-data may be converted into a Modelica package so that external file access is avoided.



The motion of a flexible structure is defined by superposition of a large nonlinear motion of a reference frame with small elastic deformations. In order to consider initial buckling behavior, stress stiffening and softening effects can be described if supported by the preprocessor.

Development

DLR, German Aerospace Center, Institute for System Dynamics and Control, Oberpfaffenhofen, Germany (www.dlr.de/rm/en)

Availability

Version 2.2 is available for Dymola and Modelica Standard Library 3.2.2

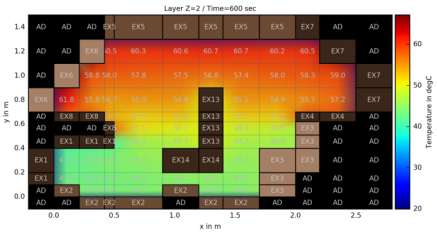
FluidDynamics Library

Transient Coarse-Grid-CFD Simulation

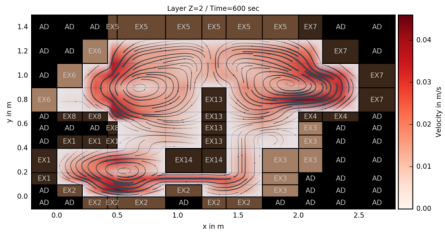
FluidDynamics | Modelica Library

developed by XRG Simulation GmbH
distributed by LTX Simulation GmbH

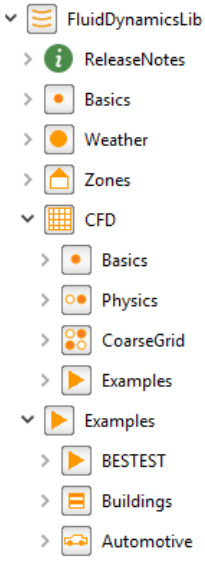
The FluidDynamics Library allows the modelling and simulation of gas flows (e.g. humid air) in three-dimensional spaces. At the boundaries of the grid model, local boundary conditions may be defined which can change transiently. Alternatively, wall and window models can be attached. The maximum resolution of the cubic grid depends on the capacity of the computer hardware and is typically limited to about 1.000 - 2.000 cells. Larger spaces may even be modelled through the definition of symmetry boundary conditions.



Temperature



Velocity



User benefits:

- No middleware needed for coupling, since CFD models are part of the Modelica model
- Significantly reduced license costs by using less expensive Modelica simulators
- Reduced elapse time for iterative work through faster simulations
- Instant simulation success since convergence is automatically controlled by the solver
- Full Modelica flexibility since the model code is open and transparent, user modifications can be introduced and the tool has more options for symbolic transformation
- Cost-efficient post-processing by using the XRG Score light Application included in the software package
- Physical gas dynamics are a pure result of geometry and the Navier-Stokes-equations
- Radiation calculation using view factors (exact calculation of the thermal radiation between visible surfaces)

The use of standardized interfaces enables an easy coupling to existing Modelica libraries (e.g. combination of automotive cabin models with AC models using Modelica.Fluid connectors). The user may also combine existing building simulation models with the FluidDynamics module.

FluidDynamics Library

Development

XRG Simulation GmbH, Hamburg, Germany (www.xrg-simulation.de)

Initial development has been partly funded within the research project EUROSYSLIB.

XRG Simulation GmbH

Availability

FluidDynamics Library 2.6.0 is available for Dymola and Modelica Standard Library 3.2.2.

HumanComfort Library® – enhanced version

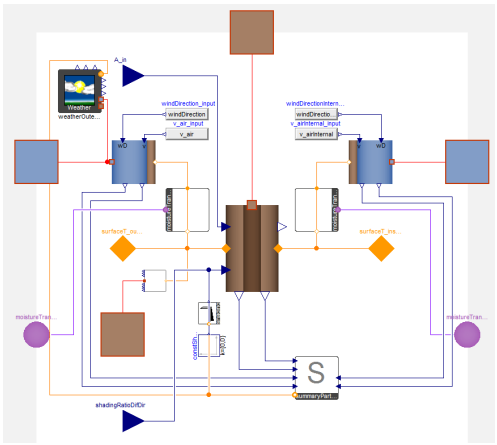
Human Comfort within Air-Conditioned Zones

HumanComfort | Modelica Library

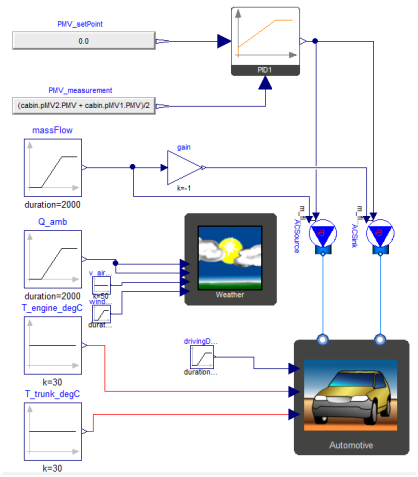
developed by XRG Simulation GmbH
distributed by LTX Simulation GmbH

Humans feel comfortable within certain limits defined by thermal and personal factors, but energy systems are often optimized with regard to economical rules.

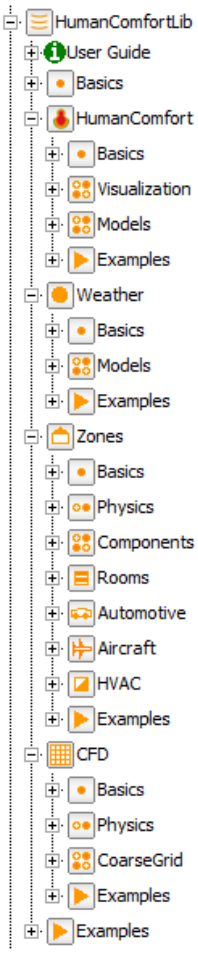
The Library contains basic models to estimate the thermal comfort of occupants or a group of occupants within an air-conditioned zone (applied standards: DIN EN ISO 7730; ASHRAE Standard 55; Dutch Thermal Comfort Guideline). The comfort results are provided in form of mathematical criteria and graphical visualizations.



Multi-layer partition (wall or window)



Automotive cabin (pulldown simulation)



The HumanComfort Library was initially developed within the research project EUROSYSLIB and has been extended by modeling details like shading, 3D heat conduction for thermal bridges, condensation at cold surfaces (cooling ceilings, windows), more pressure loss models and CO2 emission of occupants.
The library has a modular approach consisting of three packages:

- HumanComfort: thermal comfort analysis
- Weather: weather model for annual simulation
- Zones: buildings, aircrafts and automotive models

The use of standardized interfaces enables an easy coupling to existing Modelica libraries (e.g. combination of automotive cabin models with AC models using Modelica.Fluid connectors). The user may also combine existing building simulation models with the HumanComfort module.

HumanComfort Library

Advanced features since version 2.0:

- CFD flow simulation and 3D coarse grid (finite-volume method to subdivide the air volume, making it possible to reduce the number of required cells. The calculation is made on the basis of Navier-Stokes equations, which achieves conservation of momentum)
- Radiation Calculation using view factors (exact calculation of the thermal radiation between visible surfaces)

Development

XRG Simulation GmbH, Hamburg, Germany (www.xrg-simulation.de)

XRG Simulation GmbH

Availability

HumanComfort Library 2.6.0 is available for Dymola and Modelica Standard Library 3.2.2. A library bundle, consisting of HumanComfort Library and HVAC Library is available for a discounted price.

HVAC Library – enhanced version

Heating and Cooling Systems in Buildings

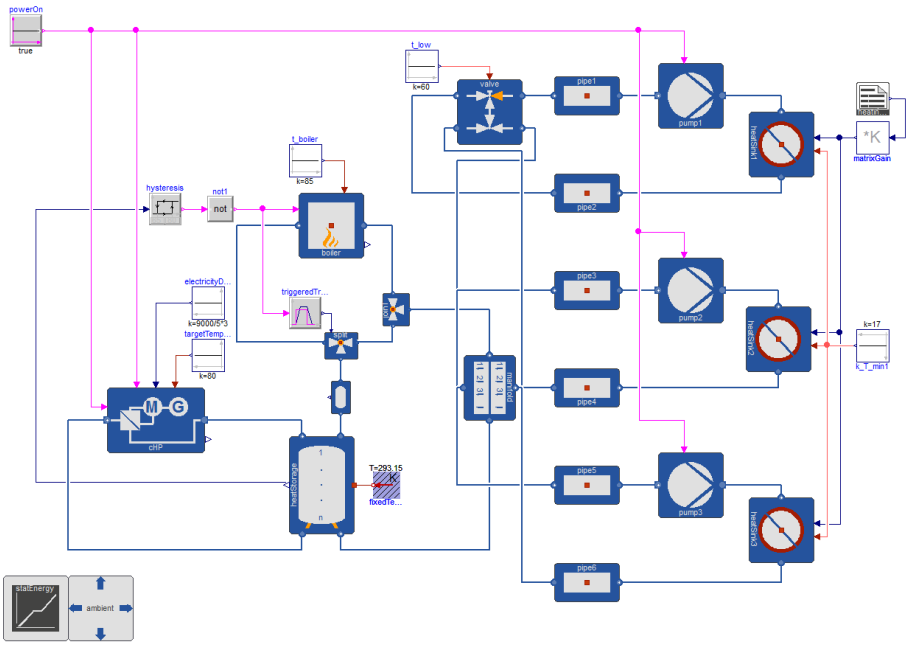
HVAC | Modelica Library

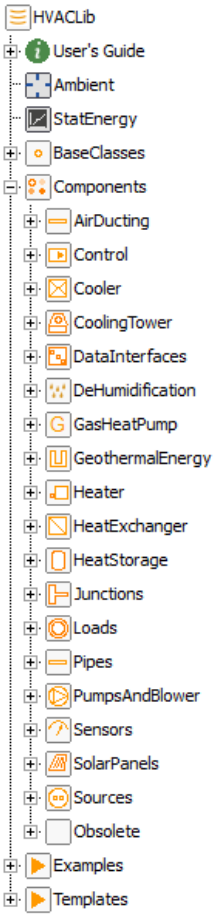
developed by XRG Simulation GmbH
distributed by LTX Simulation GmbH

The HVAC Library serves as a flexible tool to analyze different system layouts and compare their primary energy consumption with regard to any reference period (usually one year of operation). The modeling is dedicated to find an optimum trade-off between the simulation accuracy and simulation time. Only a limited set of parameters is needed in order to get started with system analysis.

A wide range of components is provided: chillers, cooling towers, dry cooler, boiler, gas-driven heat pump, heat exchangers, control devices, storage tanks, split valves, manifold and mixing devices, heating/cooling loads, discretized pipes and solar panels.

The example in the figure below shows the usage of a combined heat and power (CHP) unit in combination with a heat storage and a peak load boiler to satisfy the heat demand of various heat sinks.





The unique concept of HVAC Library enables the user to carry out whole-year simulations in the shortest possible time (few minutes). Hence, systematic optimizations, e.g. by using XRG's model optimization tool ModelOpt, are becoming possible.

Since version 2.0.0, many air-conditioning components like heat exchangers, air ducts, fans, humidifiers, water extractors are included. They can be used to model HVAC applications in large buildings. The automatic energy balance summary is extended by information about carbon dioxide emissions and energy costs. AC components can be connected to HumanComfort building and room models.

Development

XRG Simulation GmbH, Hamburg, Germany (www.xrg-simulation.de)

Availability

HVAC Library 2.6.0 is available for Dymola and Modelica Standard Library 3.2.2.

A library bundle, consisting of HumanComfort Library and HVAC Library is available at a discounted price.

Hydronics Library®

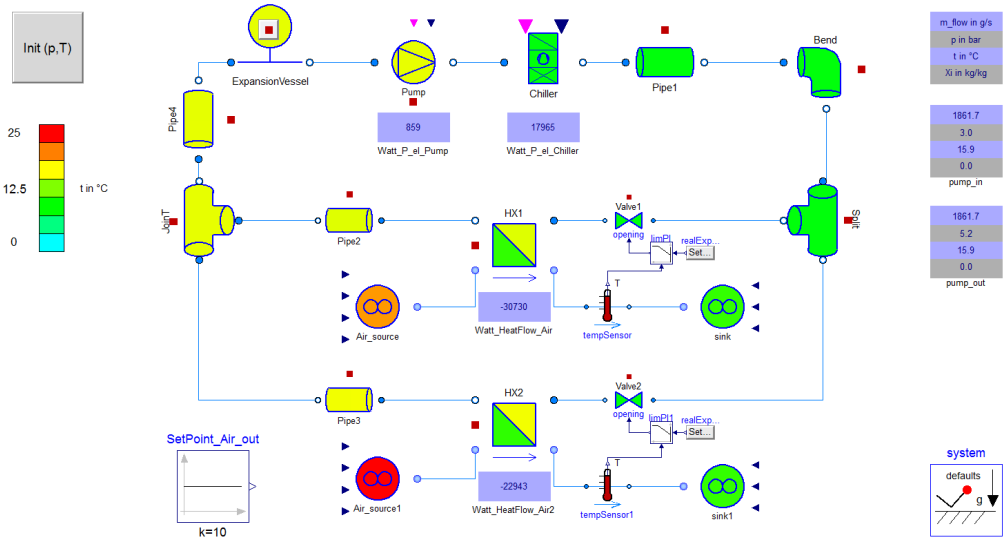
Incompressible Thermo-Hydraulic Fluid Systems

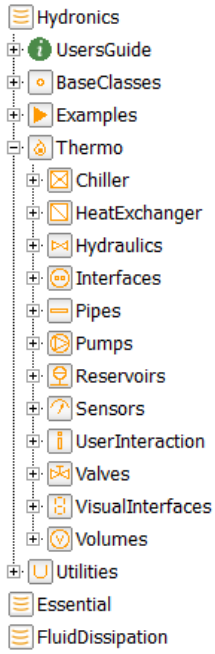
Hydronics | Modelica Library

developed by XRG Simulation GmbH
distributed by LTX Simulation GmbH

The Hydronics Library allows detailed modeling of thermo-hydraulic systems including heat exchangers for humid air and liquids. All components like pipes, bends, pumps and valves can be insulated, non-insulated or adiabatic. Joints, orifices, sudden expansions, contractions and expansion vessels complete the range of model components.

The example in the figure below shows the cooling of two different air flows in two heat exchangers. Control valves distribute the coolant mass flow. Model diagrams get animated according to fluid temperature and visualizers for model outputs like pressure, heat flow and electric power can be added.





This library is used for cooling and heating applications in automotive, aircraft and shipbuilding industries as well as for building services engineering. Modern heat distribution networks require detailed analysis of the ratio of mechanical effort to thermal performance of heat exchangers.

By design, this library is limited to incompressible media. In return, systems with more than 100 sub-components are supported with robust initialization. User specific media data can be easily added in a table-based way.

Another benefit is the support of both dynamic and steady-state simulations. Dynamic simulations allow the optimization of pump and valve controls, while steady-state simulations allow rapid calculation of pressure loss or performance in arbitrary operating points.

The library uses XRG's free FluidDissipation Library for pressure loss and heat transfer calculation. The fluid ports and the air side of heat exchangers can be easily combined with libraries using stream connectors like AirConditioning, HumanComfort or Modelica.Fluid.

Development

XRG Simulation GmbH, Hamburg, Germany (www.xrg-simulation.de)

Availability

Hydronics Library is available for Dymola and Modelica Standard Library 3.2.2

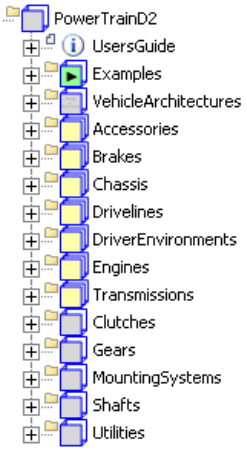
PowerTrain Library

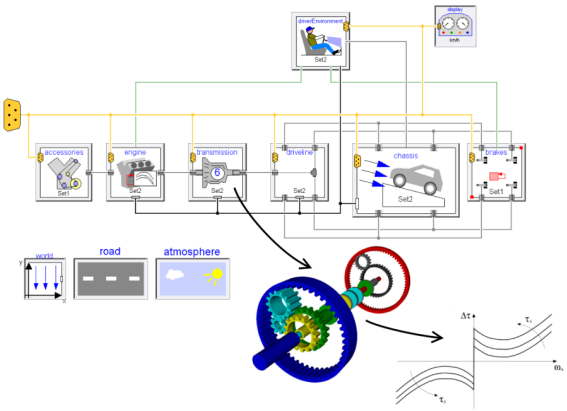
Vehicle Power Trains and Planetary Gearboxes with Losses

PowerTrain | Modelica Library

developed by DLR
distributed by LTX Simulation GmbH

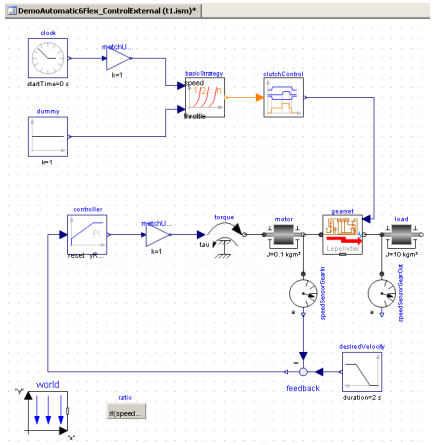
The PowerTrain Library provides primarily one-dimensional rotational mechanical components for vehicle power trains. Optionally, all three-dimensional mechanical effects can be taken into account, e.g. when mounting a power train on a multi-body vehicle dynamics model.



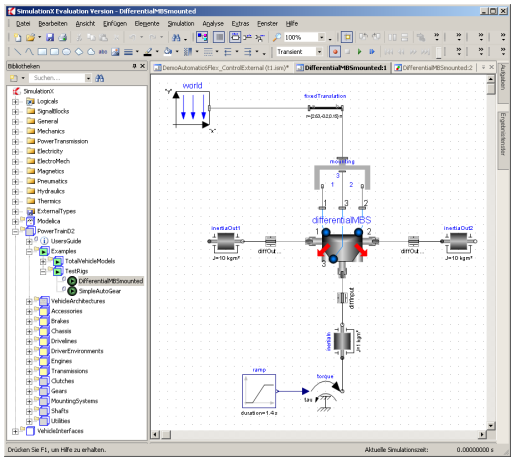


In addition, basic components for modeling the longitudinal dynamics of a whole car are available. The focus however is on power train modeling with emphasis on standard and planetary gears with losses and flexible driveline models.

Examples in SimulationX



Automatic transmission



Differential

Development

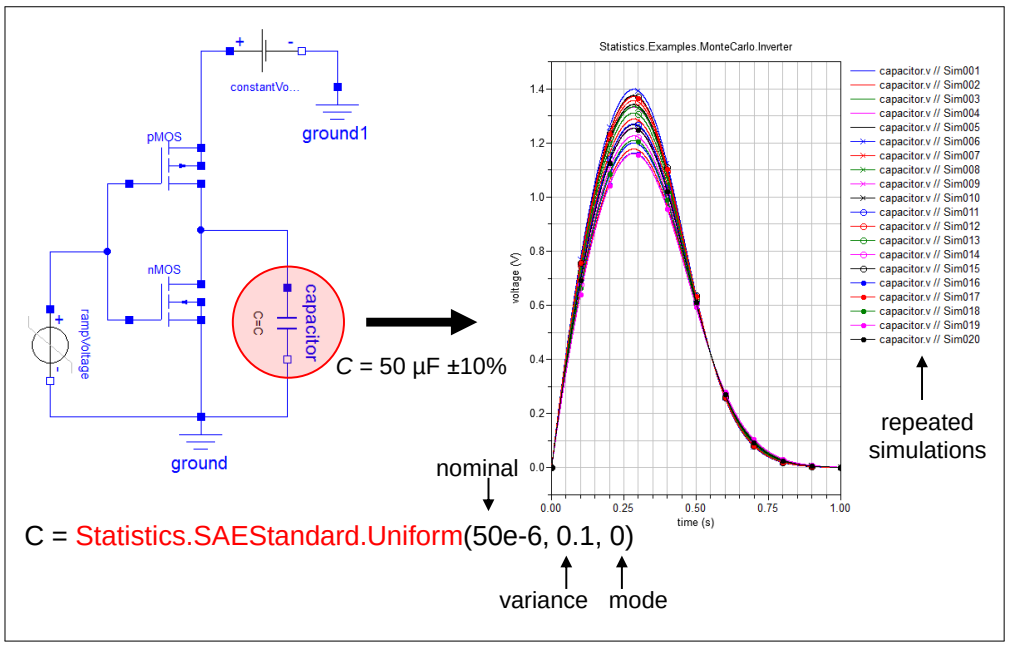
DLR, German Aerospace Center, Institute for System Dynamics and Control, Oberpfaffenhofen, Germany (www.dlr.de/sr)

Availability

PowerTrain Library is available for Dymola and Modelica Standard Library 3.2.2.

The Statistics Library is designed to handle statistical analysis tasks using Modelica functions by variation of parameters and variables. In order to analyze the performance and robustness of system models, there are two main applications of the library:

1. Monte Carlo analysis, where the model parameters are calculated by statistical distribution functions. Repeated simulation varies the parameters according to the chosen distribution.



2. Noise Generation: The sampled call of a statistical distribution function generates noise during transient simulation.

The Statistics Library was developed in the Fraunhofer research project CAROD. It includes a set of statistical functions based on standard SAE J2748 and supports:

- Usage of the same model for nominal and Monte Carlo analysis
- Possibility to assign different statistical distributions to one parameter
- Continuous and discrete distributions which may be user-defined
- Possibility to specify correlation between parameters and variables
- Independent random number generation for each parameter and variable
- Reproducibility of a Monte-Carlo simulation

Development

Fraunhofer Institute for Integrated Circuits IIS, Design Automation Division EAS, Dresden, Germany (www.eas.iis.fraunhofer.de)

Availability

Statistics Library is available for Dymola and Modelica Standard Library 3.2.2

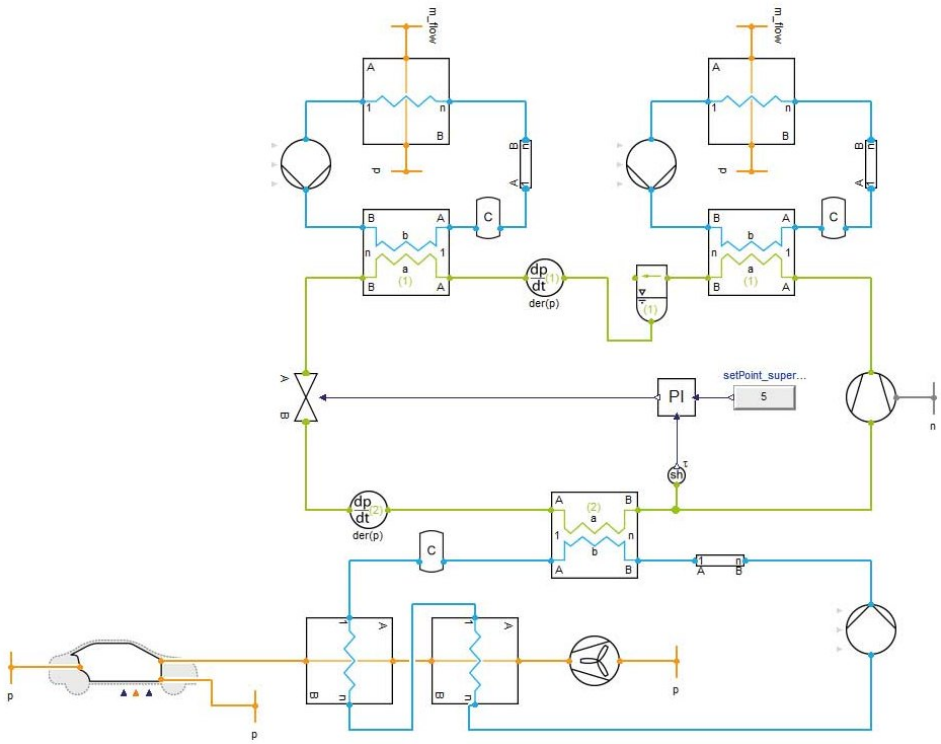
TIL Suite – new

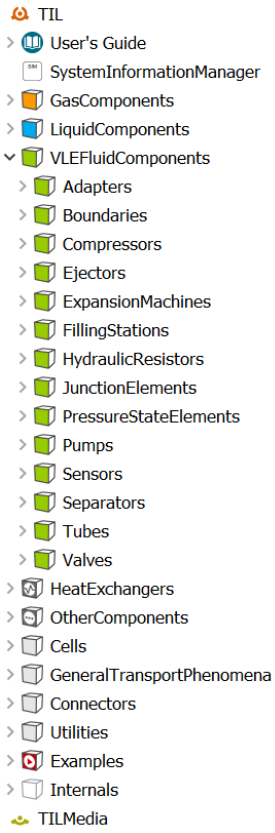
Stationary and Transient Simulation of Thermodynamic Systems

TIL Modelica Library

developed by TLK-Thermo GmbH
distributed by LTX Simulation GmbH

TIL Suite is suitable for the stationary and transient simulation of freely configurable thermodynamic systems. Thanks to the substance property library, TILMedia - a component of the TIL Suite - system simulations can be performed extremely quickly and accurately.





TIL is a library of extremely versatile models. On the one hand, individual components can be modeled and calculated in detail. On the other hand, the models are ideally suited for the design and optimization of large and complex systems. In this respect, TIL is characterized not only by its precision, but also by extreme speed. TIL may be used, among others, for the modeling of the following systems:

- Refrigeration cycles, including refrigeration mixtures
- Heat pump systems
- Systems with ejectors
- Hydraulic networks
- Clausius-Rankine cycles
- Heating, ventilation and air-conditioning systems
- Ab- and adsorption systems
- Fuel cell systems

Development

TLK-Thermo GmbH, Braunschweig, Germany

TLK-Thermo GmbH

Availability

TIL Suite is available for Dymola and Modelica Standard Library 3.2.2

Visualization Library

Advanced, Model Integrated, Offline and Real-Time Visualization

Visualization | Modelica Library

developed by DLR
distributed by LTX Simulation GmbH

The Visualization Library provides an advanced, model-integrated and vendor-unspecific visualization tool for Modelica models. It is especially useful in the mechanical, fluid and electrical area. Many components are available for offline, online and real-time animation. Most components are attached to a Modelica model with a Frame connector of the Modelica.Mechanics.MultiBody library.

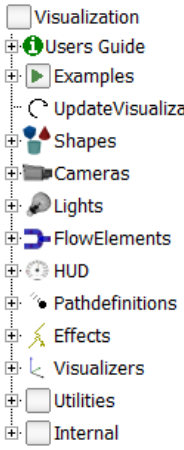
The library contains visualizers for basic shapes, CAD files (.3ds, .obj, .dxf, .stl, .vrml and more), flexible bodies and surfaces, text, light, energy-/mass-flow visualizers, analogue instruments and weather effects. A camera system can be used to define the point of view manually or controlled by simulation.

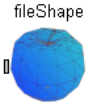
Components like Buttons, Checkboxes and Sliders are available for the creation of graphical user interfaces for the visualization software. These elements can be used to control the simulation interactively during the simulation run.

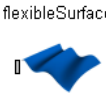
The components are visualized in an integrated system providing support for multi-camera scenes, a fullscreen mode, several monitors, replays and stereo/wireframe modes. It is based on the OpenSceneGraph framework.

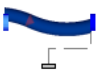
The integrated video-export function allows the export of the animation replays as MPEG4, Windows Media Video, Flash Video and Lossless HUFF video.

The standard Modelica visualization for multi-body models can be replaced by this Visualization tool, if the Shape component in the ModelicaServices Library is replaced by the user.

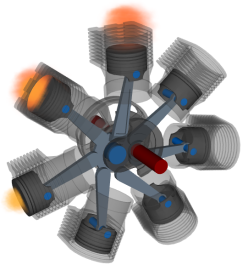




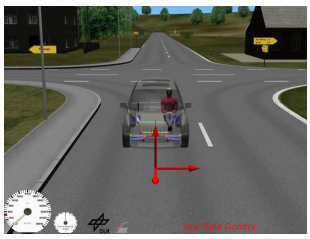




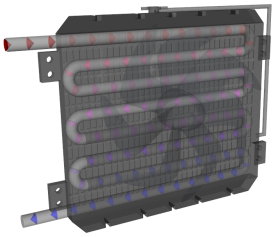
Examples



Radial Engine with visualization of combustion



Vehicle dynamics visualization with a landscape from Vires



Flow visualization of a cooling system

Highlights of the current version:

- Support for 3D glasses (head-mounted display)
- Vehicle example connecting the collision detector to the contact model of a tire.

Development

DLR, German Aerospace Center, Institute for System Dynamics and Control, Oberpfaffenhofen, Germany (www.dlr.de/rm/en)

Availability

Visualization Library is available for Dymola on Windows and Linux.

About us

LTX Simulation GmbH provides support in the selection, development and optimization of solutions for system simulations based on Modelica, FMI and Dymola. LTX gives a wide support, develops custom-made solutions and provides training courses.

Furthermore LTX distributes model libraries and software from XRG Simulation GmbH, TLK-Thermo GmbH and other developers. The close and extensive collaboration of the three companies (LTX, TLK and XRG) ensures the optimum support for its customers.

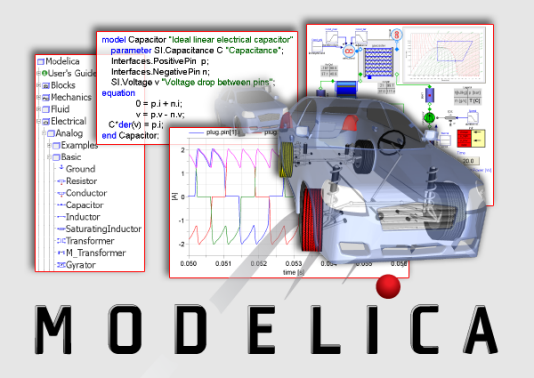
The distribution of Modelica Libraries has been initiated by BAUSCH-GALL GmbH in 2009. LTX continues this business in tight cooperation with library developers. LTX is a organizational member of the Modelica Association in order to support the efforts for international standardization.

Please visit www.ltx.de for more information.

About Modelica

Modelica is a non-proprietary, object-oriented, equation-based language to conveniently model complex physical systems containing, e.g., mechanical, electrical, electronic, hydraulic, thermal, control, electric power or process-oriented subcomponents.

Modelica Libraries with a large set of models are available. Especially, the open source Modelica Standard Library contains about 1600 model components and 1350 functions from many domains.



Modelica Simulation Environments are available commercially and free of charge, such as CATIA Systems, CyModelica, Dymola, LMS AMESim, JModelica.org, MapleSim, OpenModelica, SCICOS, SimulationX, Vertex and Wolfram SystemModeler. Modelica models can be imported conveniently into Simulink through export features of Dymola, MapleSim and SimulationX.

The Modelica Association is a non-profit organization with members from Europe, U.S.A. and Canada and Asia. Since 1996, its simulation experts have been working to develop the open standard Modelica and the open source Modelica Standard Library.

Please visit www.modelica.org for more information.

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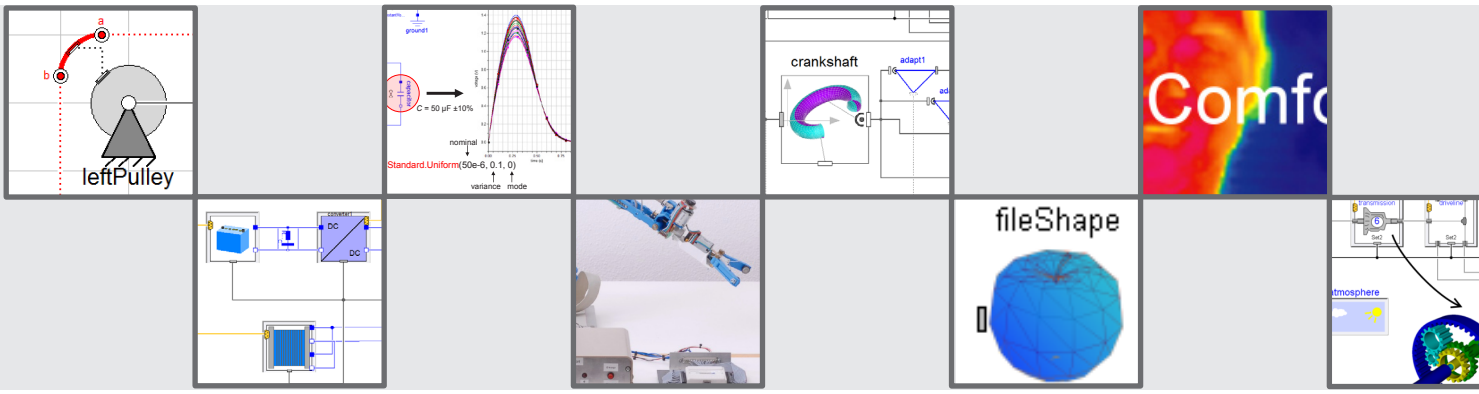
Please check our website for local resellers.

Date: 2019-03-01



Further Libraries

As part of the Dymola portfolio, we are able to offer the following additional libraries:

- Battery Library
- Brushless DC Drives Library
- Cooling Library
- Engines Library
- Electrified Powertrains Library
- Flight Dynamics Library
- Hydrogen Library
- Pneumatic Systems Library
- VeSyMA Library
- Wind Power Library