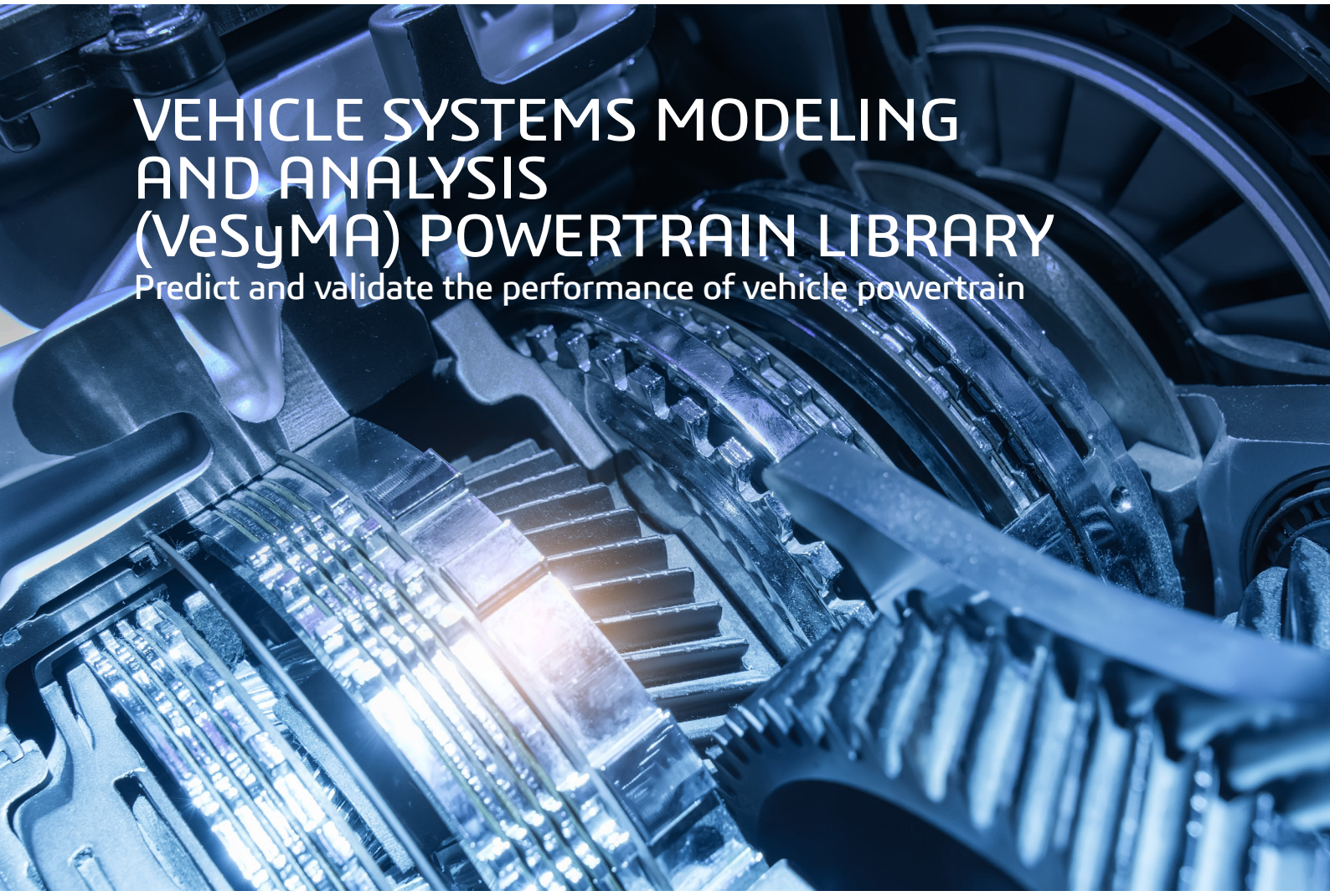


VEHICLE SYSTEMS MODELING AND ANALYSIS (VeSyMA) POWERTRAIN LIBRARY

Predict and validate the performance of vehicle powertrain

POWERTRAIN DESIGN AS A BUSINESS EXPERIENCE

The Powertrain Dynamics library is a Modelica library for modelling rotating multibody systems like automotive powertrains. It has been designed to provide a convenient modelling methodology and deliver efficient simulation of these complex systems. The models support the full design cycle using simple 1D representations for concept evaluation that easily evolve into detailed multibody models for detailed analysis. Animation is included in all the parts to aid understanding of the system dynamics. The library uses standard Modelica connectors and is compatible with all the other automotive libraries available for Dymola.

APPLICATIONS

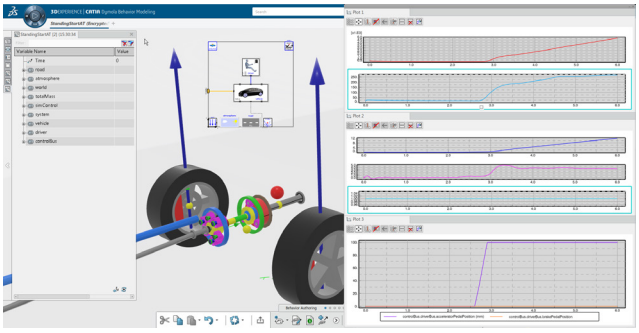
- Vehicle performance, fuel economy and drivability assessment capturing the full motion of the powertrain
- Hardware specification – complete torsional characteristic of transmission and driveline
- Conceptual architecture design – efficiency studies
- Control system optimization using detailed physical models of the complete vehicle
- Modal analysis of the powertrain for predicting torsional excitation modes i.e. shuffle
- Shift quality and feel – detailed components for capturing the dynamics of the gear shifting system
- Powertrain-chassis interaction – fully compatible with the VeSyMA Suspension library allowing the interaction between the chassis and powertrain to be analyzed

HIGHLIGHTS

- Gear set models from simple variator type to detailed gear mesh and mesh loads
- Manual, automatic and Dual Clutch transmissions models, composed of clutches, torque converters and synchronizers
- Front and rear suspensions and mounts
- Templates and examples of gear bearing and shaft arrangements for a wide variety of differential arrangements including slip control devices.
- Numerous options for uniform and composite shafts are included with a wide variety of torsional characteristics from rigid and simple linear to non-linear plastically deformable characteristics
- Mapped based engine model for torque generation, emissions and fuel consumption calculation.
- Transmission and Engines controllers
- Linear systems analysis package with functions for natural frequency analysis and plotting.
- Contains all the templates and models from the VeSyMA library (included)

BENEFITS

- Detailed powertrain modelling with efficient simulation as a multibody system.
- Includes engine, transmission, driveline and chassis models for complete vehicle simulation.
- Build complex mechanical systems from individual elements such as bearings, shafts, gears, clutches, joints and mounting systems.
- Evaluate 3D gear mesh forces, bearing loads and losses.
- Shafts with a large number of linear and nonlinear compliance characteristics.
- Longitudinal chassis models with Pacejka tire slip and simple suspension with pitch and bounce.
- 3D Effects (torque reactions, gyroscopic effects etc.).
- Faster simulation performance than Standard multibody library.
- Flexible implementation.
- Highly configurable with wide range of component fidelity.



Automatic 6 speed gear box simulation

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