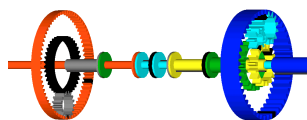


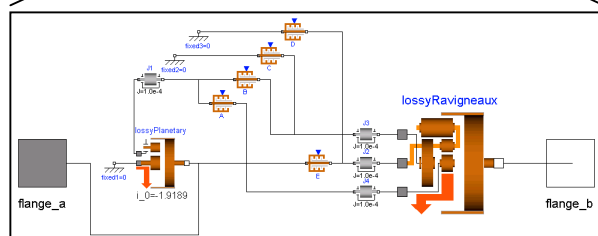
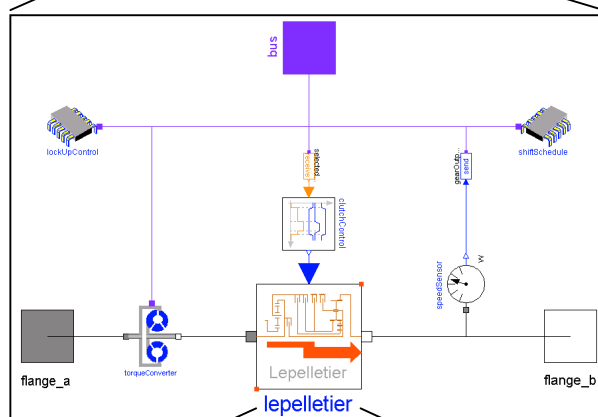
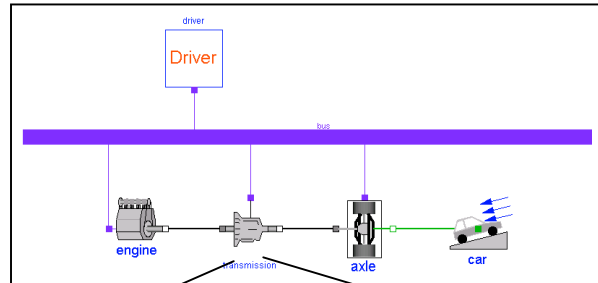
The **PowerTrain** library is a licensed Modelica® package providing 1-dimensional rotational mechanical components for **vehicle power trains**. It is also useful in general for modeling of gear boxes. The library includes from easy to use to very sophisticated components to model power trains.

Main Features of PowerTrain 1.0

- **Over 45 user-callable components** (not counting interface objects) and **10 example models**.
- **Speed and torque dependent friction** can be handled in a robust and efficient way based on new research results. Therefore, gear efficiency is now easy to simulate. Many elements in the library, especially most clutches, gears, planetary gears, automatic gearboxes, engines, have now optional speed and torque dependent losses.
- **Bus concept** to get rid of the complex connection structures of signal connections and support the user to easily extend the bus with user-defined signals.
- **Variant selection** using the replaceable feature of Modelica. Basically, there is now just one model - PowerTrain.DriveLine - (see figures) consisting of a typical drive line from which all the main variants provided in the library can be selected, e.g., 3 different types of detailed automatic gearbox models but also user-defined gearboxes.
- **Animation** of gears and shafts of a drive line as built-in feature of many components. Figure shows animation of a 6-speed automatic gear box of Lepelletier type. Animation can be switched off with a parameter to remove the animation code completely from a model, e.g., for hardware-in-the-loop simulation.
- **Control units** to control the various parts of a drive line, such as engine and transmission. All of them are parameterized with the control lever position of the driver (P, R, N, D, ..., 3, 2, 1) and do not depend on a specific number of gears.
- **Sophisticated examples** which may be used as a starting point for user drive line models. Especially, examples are provided for power consumption calculation and analysis of shift strategies based on detailed models of 4- and 6- speed automatic gearboxes.



- **Tutorial and Reference Manual**, both in pdf- and html-format (for online-help).



Development

This library is designed, implemented and maintained by DLR, the German Aerospace Center, Institute of Robotics and Mechatronics, Oberpfaffenhofen, Germany.



www.robotic.dlr.de/control/