

Ecomechatronics: innovative methods and technology

Sirris & FMTC translate research results and innovative technology into practical and applicable methods for improving the energy efficiency, performance and user comfort of machines. These methods relate to the model-based design, intelligent adjustments and optimisation of machines in the following themes:

Component selection and architecture of energy-efficient power trains

Issue

Requirements with respect to energy efficiency and its necessary technology make power trains increasingly complex mechatronics systems. The hybrid power train of a vehicle is an example of an advanced power train.

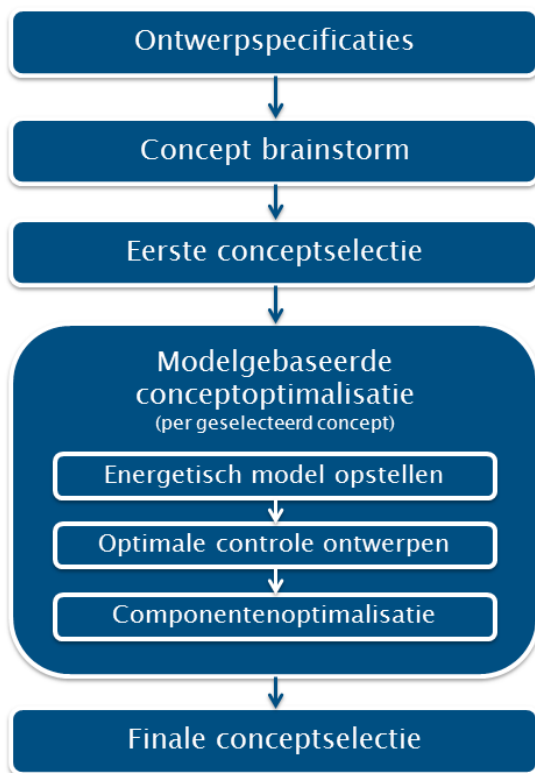
The complexity of similar systems increases development time and costs: different prototypes are often needed to optimally design a hybrid power train.

Solution

A systematic and model-based design approach allows for:

- Selecting a design without building prototypes;
- Elaborating a suitable adjustment strategy without having to conduct hazardous and detailed experiments with unadjusted regulators.

Approach



Energy efficiency steering with current steering modules

Energy recovery and energy storage

Issue

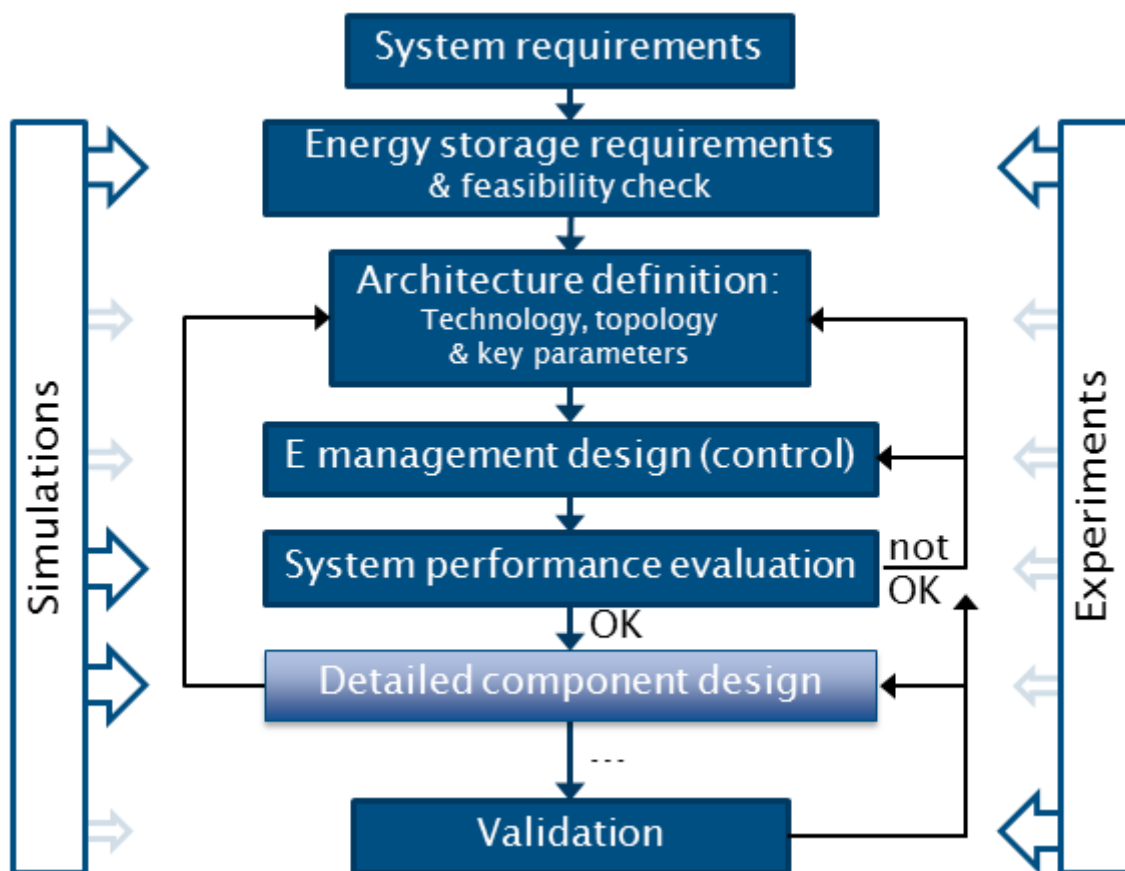
- Energy storage technology can help reduce the energy use of a machine, make components 'smaller' (cheaper), improve the power quality on the mains side or increase availability during mains interruptions;
- Besides knowledge of the technology for selecting and sizing components, successful integration of energy storage technology into the design of a machine also requires insight into the topology and energy management of the entire system.

Solution

A systematic and model-based design approach allows for:

- Making a selection of technology and topology based on system requirements and limitations
- Evaluating an optimal adjustment for energy management of the design without building prototypes.

Approach



Performance regulation and rapid control prototyping

Reduction of noise and vibrations