

HEV DESIGN SUITE

For hybrid electric vehicle powertrain design

Design solution for HEV powertrain systems

HEV Design Suite provides a quick solution to design and simulate a complete hybrid electric vehicle (HEV) powertrain system from scratch.

A HEV powertrain system is highly complex, and designing such a system is a non-trivial task. A series/parallel HEV powertrain system, for example, consists of PMSM generator and converter, PMSM traction motor and converter, bi-directional dc/dc converter, lithium-ion battery, internal combustion engine, and vehicle load with clutch. Furthermore, a generator controller and traction motor controller may include multiple control blocks, such as Maximum-Torque-Per-Ampere control, field weakening control, torque control, speed control, and voltage control.

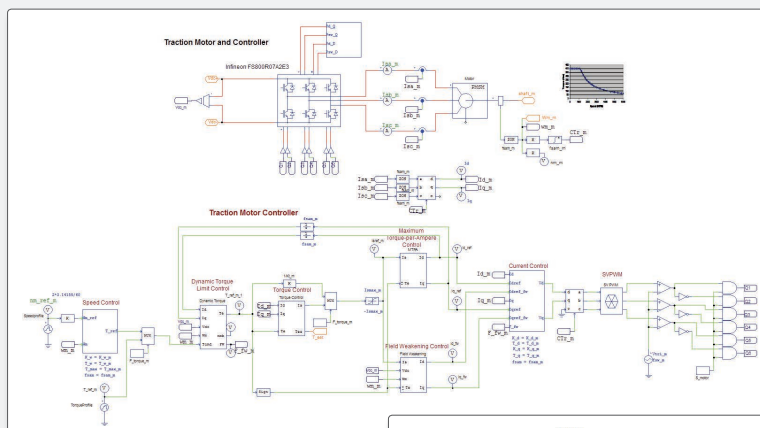
One major advantage of the HEV Design Suite is that, based on input system specifications, it will design all the controllers automatically with minimum user intervention and effort. In a very short time, users will have a functional HEV powertrain system set up and ready to simulate.

The HEV Design Suite can handle multi-mode operations of a HEV powertrain system, such as charging mode, battery drive mode, engine and motor drive mode, engine drive with charging mode, engine and motor drive with charging mode, full power mode, and regeneration braking mode.

The HEV Design Suite helps significantly shorten the development of a HEV powertrain system.

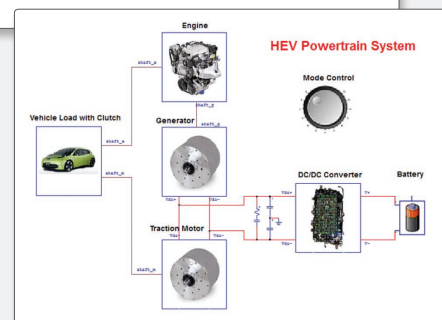
FEATURES AND BENEFITS

- Complete powertrain system design and simulation
- Controllers for generator and traction motor
- Controller for bi-directional dc/dc converter
- Dynamic battery model for charging and discharging
- Multi-mode operations



Above: Traction motor and controller

Right: HEV powertrain system in Design Suite interface



MOTOR CONTROL DESIGN SUITE

For controller design of motor drive systems

Designing a motor control system effortlessly

The Motor Control Design Suite provides a very quick way of designing a motor drive system from user specifications.

The Motor Control Design Suite includes a number of design templates for induction motors and linear and nonlinear PMSM. The nonlinear PMSM design template, for example, is for a nonlinear PMSM drive system that includes space vector PWM, current control, maximum-torque-per-ampere (MTPA) control, field weakening control, dynamic torque limit control, and speed control. Such a system includes multiple control loops (current loops and speed loop). In addition, the motor parameters are changing as a function of the current. All these

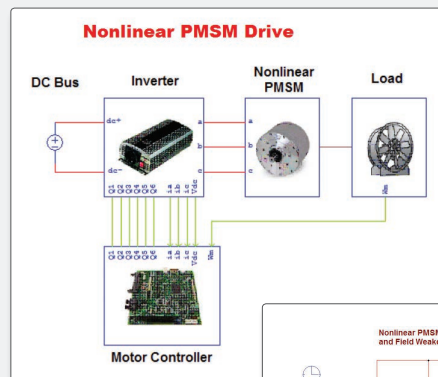
factors combined make it very challenging to design the controllers of the motor drive system.

The task of designing the controllers of the motor drive system is made very easy with the Motor Control Design Suite. Given high-level system input specifications, the Motor Control Design Suite will design all the controllers automatically. In no time, users will have a complete and functional motor drive system that is ready to simulate for further analysis.

The Motor Control Design Suite is an indispensable tool for motor drive system development.

FEATURES AND BENEFITS:

- Design template for linear and nonlinear PMSM with MTPA and field weakening control
- Design template for induction motor with vector control and field weakening control
- Designing motor controllers from input specifications in one easy step



Left: Nonlinear PMSM Drive template in Design Suite interface

Below: Nonlinear PMSM Drive system

