MOTOR DRIVE MODULE

For adjustable speed drives and motion control

POWERSIM

Simulating motor drive systems made easy

The Motor Drive Module provides an easy and effective way of modeling and simulating motor drive systems.

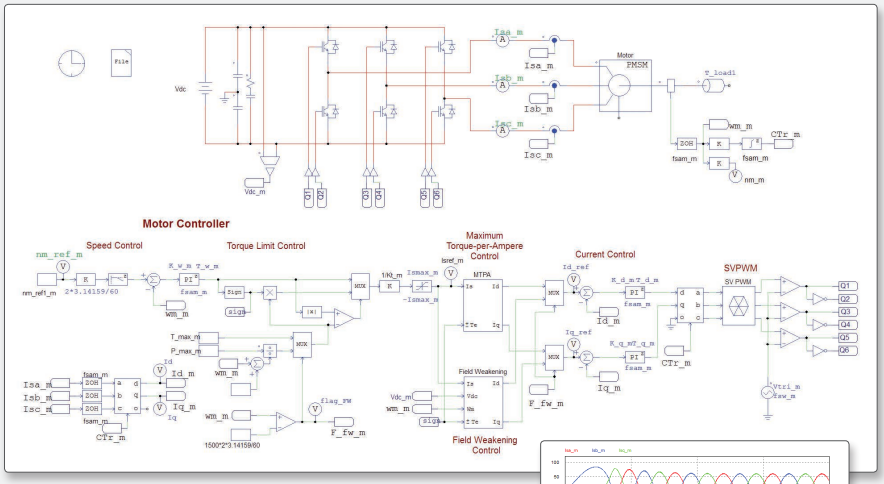
Analysis and design of a motor drive system is often a challenging task, due to the complexity in machine modeling and controller design. Such a task becomes considerably easier with the Motor Drive Module. Commonly used electric machine models, mechanical load models, and control blocks (such as Maximum-Torque-Per-Ampere Control and Field Weakening Control blocks) are provided. Using Motor Drive Module elements and other library elements, one can set up a motor drive system quickly and conveniently.

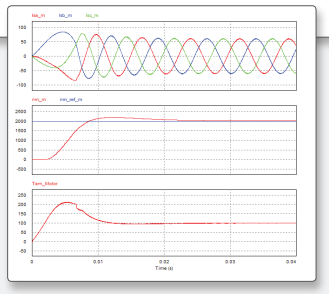
In addition, provision is given so that one can connect custom-built machine or load models to the models in PSIM, providing great flexibility.

The example below illustrates PSIM's capability to simulate motor drive systems. The system consists of a PMSM drive with current and speed control. Maximum-Torque-Per-Ampere control is implemented to achieve the maximum torque possible. Also, for this system, field weakening control must be used at high rotor speed as the dc bus voltage is not high enough to maintain a normal operation.

FEATURES AND BENEFITS

- Comprehensive electric machine library and mechanical load library
- Easy setup of motor drive systems
- Commonly used power and control blocks available
- Motor control loop stability analysis





Above: PMSM drive system with maximum-torque-per-ampere control and field weakening control

Right: Simulation waveforms of the motor currents, rotor speed, and motor developed torque.

For more information and to purchase: WWW.POWERSIMTECH.COM

DIGITAL CONTROL MODULE

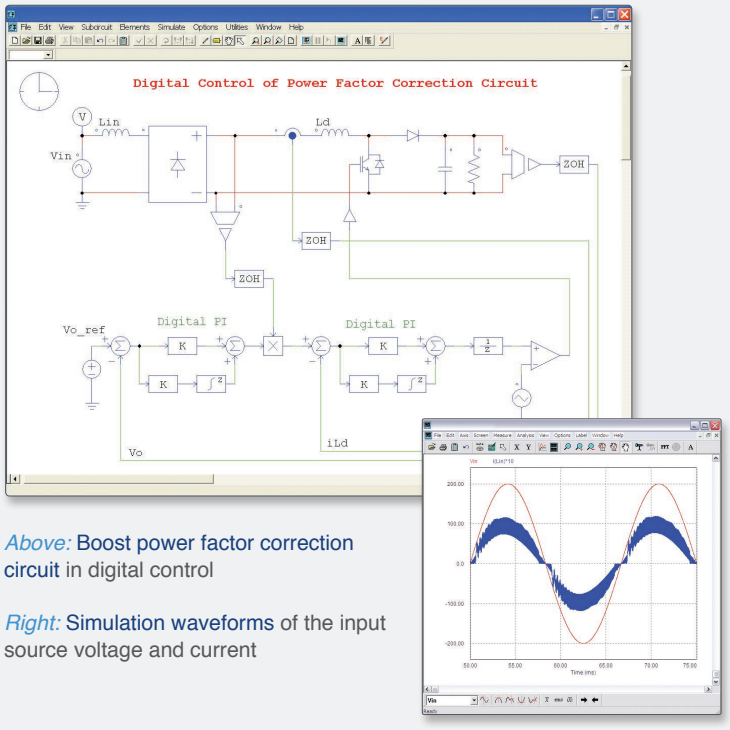
For analysis of digital control systems

Validating digital controllers quickly for microcontroller/DSP implementation

With higher performance and lower cost, microcontrollers/DSPs have been increasingly used in converter control in power supply and motor drive applications, requiring control algorithms to be implemented in digital control in discrete z-domain.

Unlike analog control, there are unique issues in digital control loop design, such as the effect of sampling and delay inherent in digital control, and errors due to A/D resolution and quantization. As a result, a controller that works in analog control may not work in digital control. Using the Digital Control Module, one can implement the digital control algorithm in z-domain block diagram, making it easy to check the performance and stability of the digital control loop, and debug the circuit thoroughly in a simulation environment rather than in the hardware which is much more difficult and time consuming.

To facilitate digital controller design, a utility tool is provided to convert an analog controller to a digital controller. After the controller is designed in analog s-domain taking into account the digital delay, the controller can be converted to a digital controller in z-domain and implemented directly in PSIM.



Above: Boost power factor correction circuit in digital control

Right: Simulation waveforms of the input source voltage and current

FEATURES AND BENEFITS

- Easy to use
- Commonly used digital control blocks provided, such as digital filters and PI controller
- Utility tool available to convert an analog controller to a digital controller