

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.

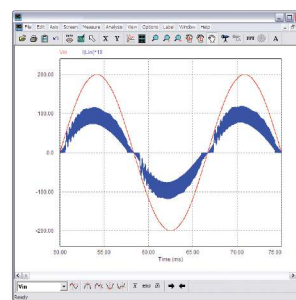
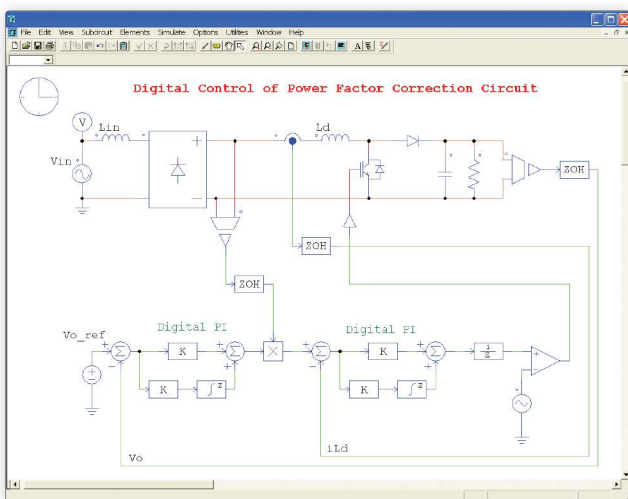
Unlike analog control, there are unique issues in digital control loop design, such as the effect of sampling and delay inherent in digital control, and errors due to A/D resolution and quantization. As a result, a controller that works in analog control may not work in digital control. Using the Digital 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.

FEATURES & 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



Above: **Simulation waveforms** of the input source voltage and current.

Left: **Boost power factor correction circuit** in digital control.