

SMARTCTRL SOFTWARE

General-purpose power electronics controller design software

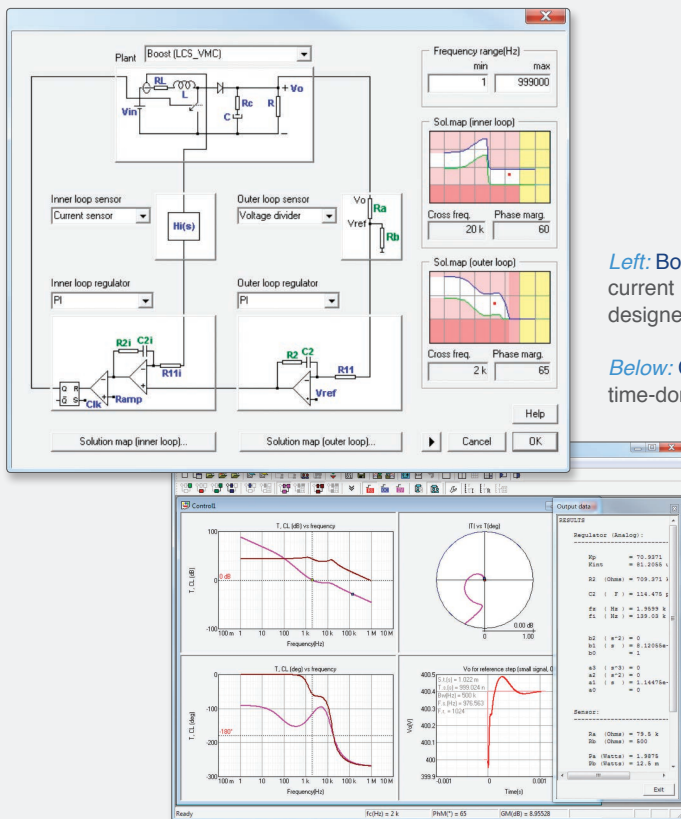
Designing a controller in minutes

SmartCtrl is a controller design software specifically for power electronics applications. It features a friendly interface, simple workflow, and easy-to-understand display of control loop stability and performance. Using SmartCtrl, one can design controllers of various power converters easily and very quickly.

SmartCtrl offers predefined topologies for buck, boost, buck-boost, flyback, forward, and power-factor-correction converters. In addition, it provides the capability to import ac sweep response externally or define a s-domain transfer function for the plant, allowing it to support converters of any topologies.

SmartCtrl can handle continuous mode and discontinuous mode operation automatically. Based on specific operating conditions, SmartCtrl generates a Solution Map that defines the safe region for the controller. The Solution Map makes it very easy for users to design the controller.

In addition, SmartCtrl provides the digital controller design capability (through SmartCtrl Pro). With this option, one can design a controller in analog s-domain, define digital delay, and check the control loop stability with the digital delay taken into account. Once the controller is designed, digital controller coefficients for z-domain implementation can be generated.

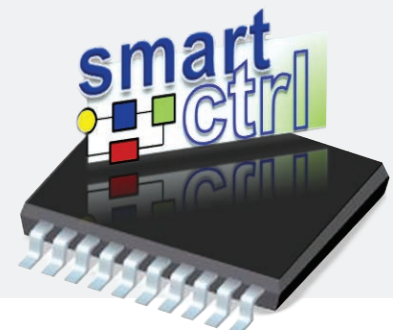


Left: Boost converter with inner current loop and outer voltage loop designed in SmartCtrl

Below: Control loop Bode plot, time-domain response, and results

FEATURES AND BENEFITS

- Friendly user interface
- Solution Map for easy controller design
- Capability to design digital controllers
- Multi-loop control structure
- Easy visualization of control loop performance
- Sensitivity analysis
- Automatic controller and converter circuit generation and seamless integration with PSIM



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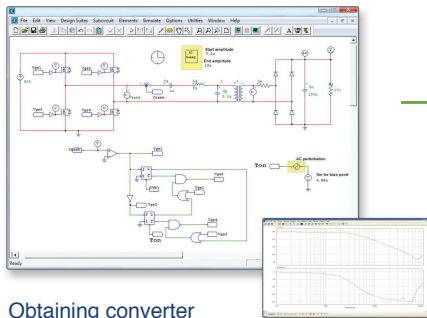


SmartCtrl Example: Resonant Converter Control Loop Design

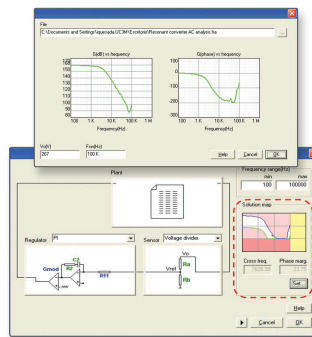
SmartCtrl is capable of designing controllers of any power converters. To illustrate this, the example below shows a resonant converter, known for its difficulty in controller design. To design the controller, first perform ac sweep in PSIM; then import the ac sweep result into

SmartCtrl, and design the controller in SmartCtrl using the Solution Map.

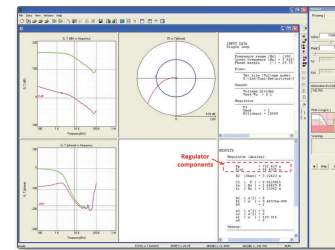
A difficult controller design task is made considerably easier with SmartCtrl!



Obtaining converter ac sweep result



Importing ac sweep result into SmartCtrl and performing controller design

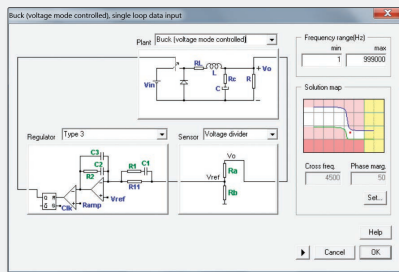


Displaying Bode Plot and controller parameters

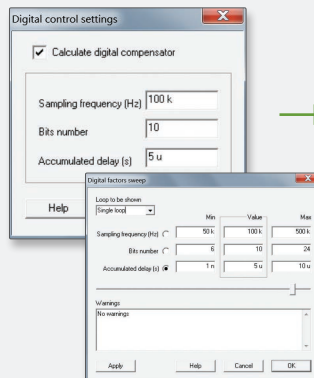
SmartCtrl Example: Digital Control Loop Design

A digital controller can be easily designed using SmartCtrl Pro. In the buck converter example below, the analog controller is first designed. Then the controller is redesigned with the digital control delay taken into account. The difference without

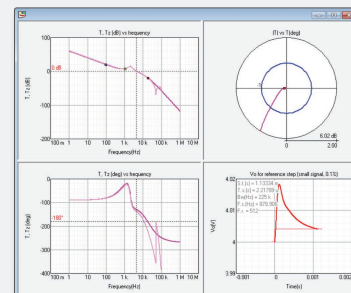
and with the digital control delay can be clearly seen in the phase Bode plot of the loop transfer function. The analog controller is then discretized for digital implementation.



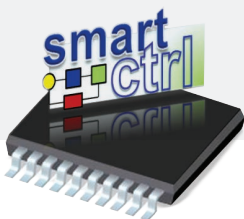
Designing the analog controller



Defining the digital delay and redesigning the controller



Comparing the design without and with the digital delay



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