



## PSIM® - Simulation software for power electronics, motor drives, and dynamic system simulation

PSIM is specifically designed for power electronics and motor drives. It is ideally suited for circuit-level and system-level simulation, and is capable of handling power converter circuits of any size and simulating complex control circuitry. In addition, PSIM supports custom C code and links to third-party software through DLL blocks.

### COMPANY OVERVIEW

Powersim develops and markets leading simulation and design tools for research and product development for power supplies, motor drives, and power conversion and control systems.

### PSIM'S KEY FEATURES

- Fast simulation speed
- Intuitive and very easy to use
- Interactive simulation
- Comprehensive motor drive library
- Flexible control simulation
- Custom C code
- Automatic code generation
- Link to 3rd-party software (such as Matlab/Simulink\*)

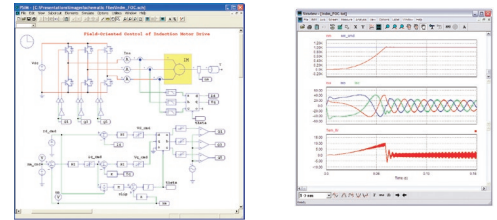
### APPLICATION AREAS

- Switchmode power supplies
- Electric motor drives
- Industrial & consumer electronics
- Renewable energy
- Automotive and transportation
- Aerospace and defense
- Education and training

### The following options are available:

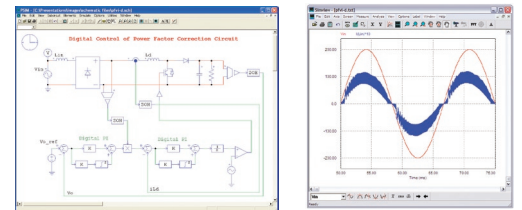
#### Motor Drive Module

It provides commonly used electric machine and mechanical load models. Using the Motor Drive Module together with PSIM's control library, one can set up and analyze a motor drive system easily.



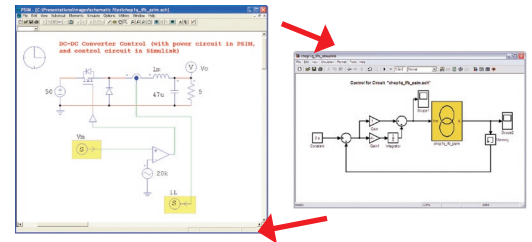
#### Digital Control Module

It provides the capability to analyze digital control systems. It can be used to simulate the performance of digital control loops, study digital filters, and evaluate various effects in digital control.



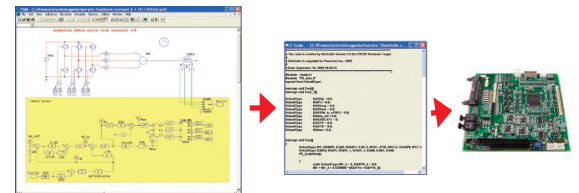
#### SimCoupler Module

It provides the link for co-simulation between PSIM and Matlab/Simulink. For example, the power circuit of a system can be implemented and simulated in PSIM, while the control circuit can be implemented and simulated in Simulink.



#### SimCoder Module

It provides the capability to generate C code automatically from the PSIM schematic for TI F28335 DSP hardware. With SimCoder, one can dramatically reduce the time from simulation/concept verification to hardware implementation.

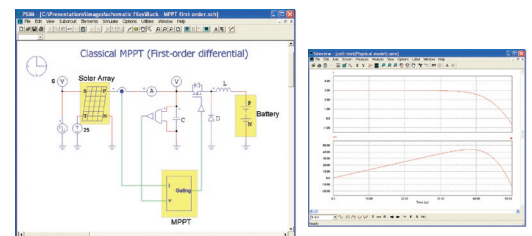


#### Thermal Module

It provides a quick way of calculating conduction and switching losses of semiconductor devices (diodes, IGBT, and MOSFET).

#### Renewable Energy Package New

It includes the basic PSIM package, the Motor Drive Module, and necessary models (such as solar array, MPPT, wind turbine, etc.) for solar power, wind power, and other renewable energy applications.



#### Also Available:

• **MagCoupler** and **MagCoupler-RT Modules** provide dynamic link with finite element analysis software JMAG, and with JMAG-RT data files.

• **PsimBook Exercises** is a set of electronic exercises with interactive simulation capability for teaching use.

\* Matlab and Simulink are registered trademarks of the MathWorks, Inc.



## SmartCtrl - General-Purpose Controller Design Software for Power Electronics

SmartCtrl is a general-purpose controller design software specifically for power electronics applications. It features easy-to-use interface, simple work flow, and visual display of control loop stability and performance. Using SmartCtrl, one can design controllers of various power converters easily and with confidence.

### SmartCtrl'S KEY FEATURES

- Easy user interface
- Support of various power converters
- Solution Map for easy controller design
- Multi-loop control structure
- Easy visualization of control loop stability and performance
- Sensitivity analysis
- Automatic controller design and optimization
- Seamless integration with PSIM

### CONVERTER SUPPORTED

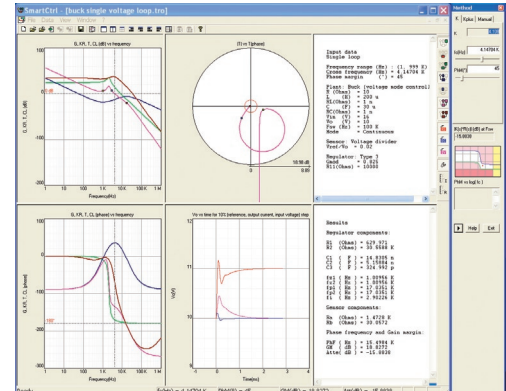
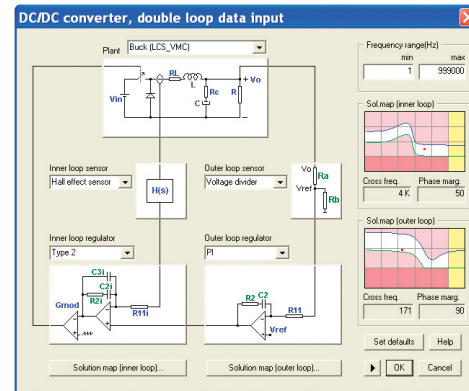
- DC/DC converters
- AC/DC converters, including PFC converters
- DC/AC inverters
- AC/AC converters
- Resonant converters
- Other types of converters

For more information, please visit us on the web at:  
[www.powersimtech.com](http://www.powersimtech.com)

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### Key Features:

#### Support of Any Power Converters

SmartCtrl supports any power converters, including dc/dc, dc/ac, ac/dc, ac/ac, resonant converters, and other converter types. An important feature of SmartCtrl is that a converter plant can be represented and the regulators designed using the ac sweep results of the converter from experiments or from software such as PSIM.

#### Solution Map for Easy Controller Design

Based on specific operating conditions, SmartCtrl automatically generates a Solution Map that defines the safe region for the controller. The Solution Map makes it very easy for users to choose the crossover frequency and the phase margin.

#### Multi-Loop Control Structure

The control loop structure can be either a single loop, or double loops. The difficult task of designing controllers of a double-loop structure is made easy with SmartCtrl.

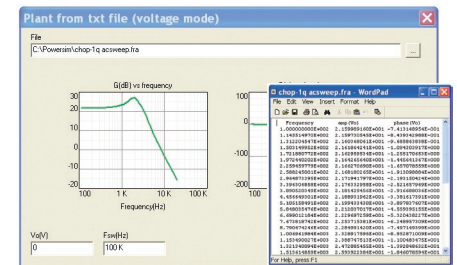
#### Easy Visualization of Control Loop Stability and Performance

Bode plots and Nyquist plots of the plant, controllers, open-loop and closed-loop transfer functions can be displayed in SmartCtrl, allowing easy inspection and visualization of control loop stability. In addition, time-domain transient response can also be evaluated and displayed.

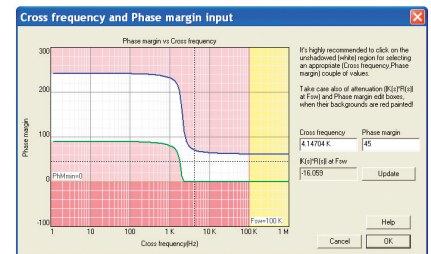
#### Sensitivity Analysis

One can vary converter parameters, sensor gains, and controller parameters, and see in real time how the changes affect the control loop stability and performance.

Converter plant in ac sweep data



Solution Map



Sensitivity analysis

