

PSIM

SIMULATION ENVIRONMENT FOR POWER ELECTRONICS AND MOTOR CONTROL

PSIM is a simulation software developed specifically for power electronics and motor control. With fast simulation, friendly user interface and waveform processing, PSIM provides a powerful and efficient environment for power electronics and motor control simulation.

PSIM's graphic user interface is intuitive and very easy to use. A circuit can be easily set up and edited. The simulation results can be analyzed easily using various post-processing functions in the waveform display program.

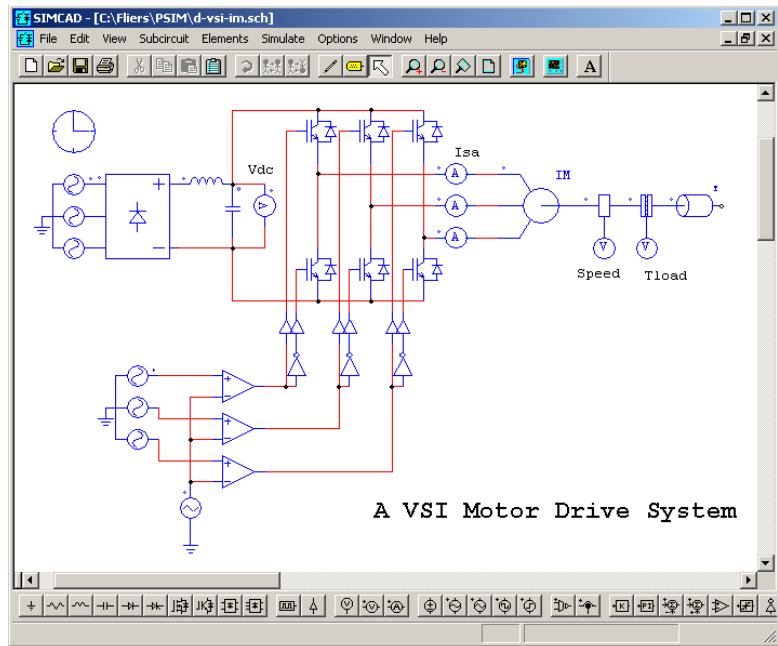
PSIM's simulation engine uses efficient algorithms that overcome problems of convergence failure and long simulation time existing in many other simulation software.

PSIM's fast simulation allows repetitive simulation runs and significantly shortens the design cycle.

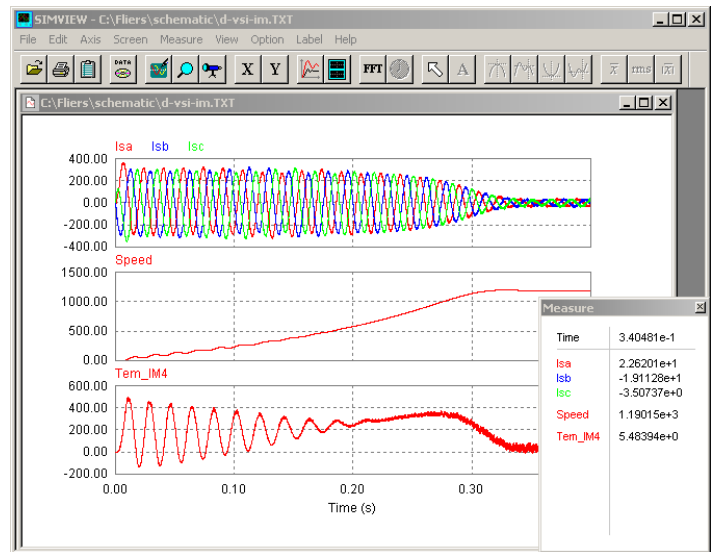
PSIM's simulation environment is interactive. It allows users to change parameters and monitor simulation waveforms in the middle of a simulation run. This makes it extremely easy to fine tune a system until desired performance is achieved.

PSIM provides several add-on Modules: **Motor Drive Module** for motor drive systems; **Digital Control Module** for digital control systems; **Thermal Module** for loss calculation and thermal analysis; **SimCoupler Module** for co-simulation with Matlab/Simulink^{*}; and **MagCoupler Module** and **MagCoupler-RT Module** for link with JMAG^{**} and JMAG-RT. Together with these Modules, PSIM is ideally suited to meet your needs in the analysis and design of power converters, motor drives, and analog and digital control systems.

^{*} Matlab and Simulink are registered trademarks of the MathWorks, Inc.
^{**} JMAG is copyright by Japan Research Institute, Ltd., 1997-2006



A motor drive system in the PSIM schematic program



Simulation waveforms in the waveform display program SIMVIEW

KEY FEATURES:

- Friendly user interface; Simple to use, and fast simulation
- Interactive simulation environment
- Magnetics modeling
- Loss calculation and thermal analysis
- Comprehensive motor drive library
- Powerful control simulation capability
- Support of custom C code and DLL
- Link with Matlab/Simulink and finite element analysis software

Simulation Speed

PSIM is one of the fastest simulators for power electronics simulation. For example, Fig. 1 shows a

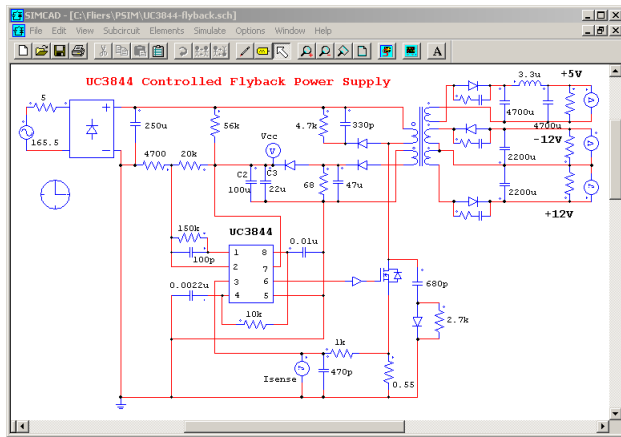


Fig. 1: A flyback power supply controlled by TI UC3844

3-output flyback power supply controlled by TI PWM IC UC3844, operating at the switching frequency of 70 kHz. It takes just

45 sec. to simulate the circuit for 4 cycles (67 msec.) on a Pentium III 866-MHz computer.

PSIM achieves fast simulation while retaining excellent simulation accuracy. This makes it particularly efficient to simulate converter systems of any size, and perform multiple cycle simulation.

Control System Analysis

One of PSIM's key strength is its ability to simulate complex control circuitry. A control circuit can be represented in one of the following forms: s-domain

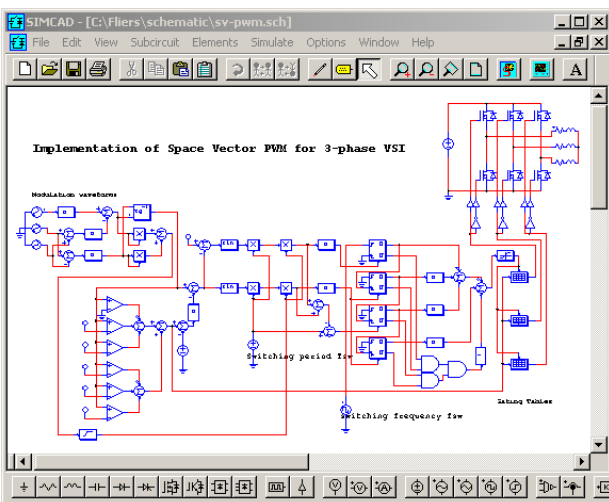


Fig. 2: Implementation of space vector PWM for voltage source inverter

transfer function block diagram; z-domain transfer function block diagram; analog op. amp. circuit, custom C/C++ code, or in Simulink. The control library provides a comprehensive list of function

blocks, making it possible to build any control circuits quickly and conveniently. As an example, Fig. 2 shows the implementation of space vector PWM.

Frequency Response Analysis

Frequency response analysis (ac sweep) is an important tool in designing control loops. While many simulation software requires switchmode circuits to be represented by average models first before performing ac sweep, PSIM can perform ac sweep even with the circuit operating in the switchmode. This makes it particularly convenient to determine circuit impedances, the frequency response of an open-loop circuit, and the bandwidth and stability of a closed-loop system.

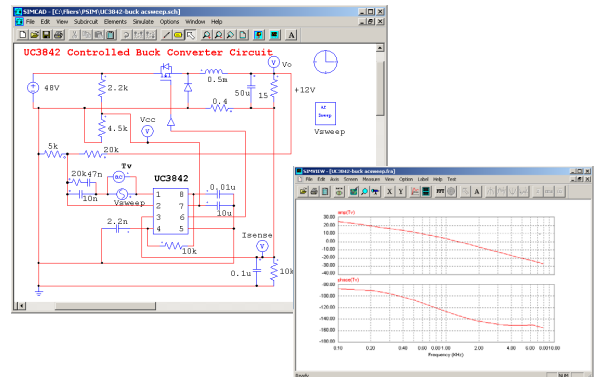


Fig. 3: Voltage loop response of an UC3842-controlled buck converter

Custom C Code

PSIM supports custom C code through a built-in C interpreter and external DLL blocks. This significantly expands PSIM's flexibility as it allows users to implement virtually any models or control circuitry in the powerful C language.

Information

For further information, please contact Powersim or your local representative.