MagCoupler Module

DYNAMIC LINK TO JMAG* FOR FINITE ELEMENT ANALYSIS OF MAGNETIC DEVICES

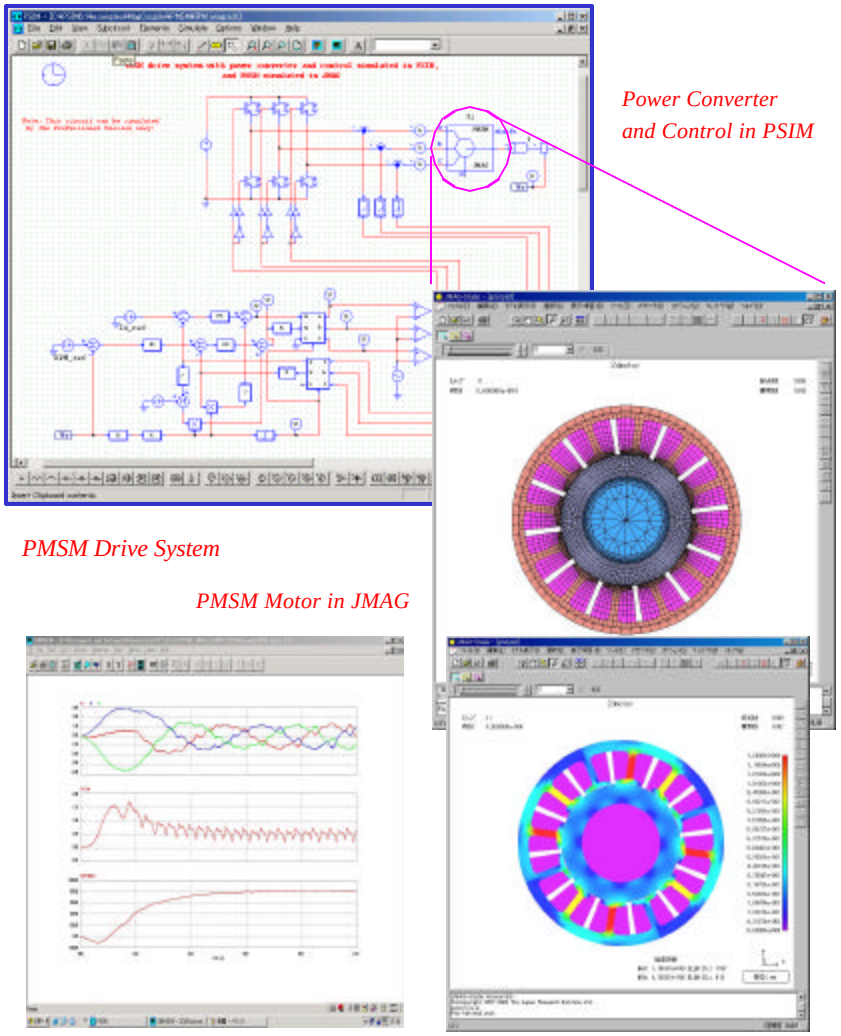
The MagCoupler Module is an add-on module to the PSIM software. It provides the dynamic link for PSIM and JMAG co-simulation, so that the power converter and control part of a system can be implemented and simulated in PSIM, and electric machines and other magnetic devices can be implemented and solved in JMAG.

JMAG is a finite element analysis software for electromagnetic field analysis. It supports the development and design of electrical and magnetic devices such as motors, actuators, and circuit components. JMAG features friendly user interface, powerful mesh generation and editing capability, robust and accurate solver, and comprehensive material database. It is particularly suitable for rotating devices such as electric machines.

With the MagCoupler Module, motor manufacturers can interface and test their motor design with the intended power converters and control schemes, and optimize the design based on performance, size, and cost. On the other hand, the MagCoupler Module expands PSIM's capability to finite element analysis. A direct benefit is that one can simulate electric machines based on the definition of the machine dimension, structure, and materials, thus eliminating the need to extract or derive machine parameters. This gives more accurate results that take into account magnetic saturation and losses, time harmonics and space harmonics, and other nonlinear effects that would be difficult to consider otherwise.

In addition, since PSIM links to Matlab/Simulink** through the SimCoupler Module, one can run all three software together by having the control in Simulink, the power converter in PSIM, and the electric machine in JMAG.

The MagCouple Module is very easy to use, and the link can be easily set up with the minimum user input and without any custom C/C++ programming.



Power Converter and Control in PSIM

PMSM Drive System

PMSM Motor in JMAG

KEY FEATURES:

- *Easy to set up*
- *Minimum user input*

The figure above shows an example of a permanent-magnet synchronous motor (PMSM) drive system with the power converter and control implemented in PSIM, and the motor implemented in JMAG. At each simulation time step, PSIM passes stator voltages and the rotor position into JMAG. JMAG then solves the machine and in return sends the calculated stator currents and the developed torque back to PSIM.

The MagCoupler Module provides the perfect solution to address your need in power converter and control simulation, as well as the finite element analysis.

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