plecs

THE SIMULATION SOFTWARE PREFERRED
BY POWER ELECTRONICS ENGINEERS

Processor-in-the-loop
- Support for multiple MCUs
- Embedded frameworks
- Peripheral block library

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- Analog
- Digital
- PWM-Generators

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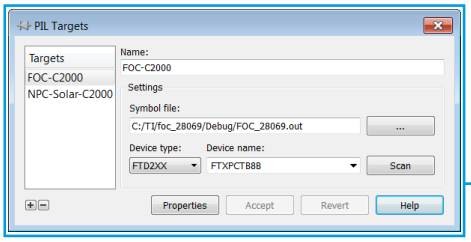
PROCESSOR-IN-THE-LOOP (PIL)

Develop, test and validate your embedded control code on the actual processor in the virtual world of a PLECS model.

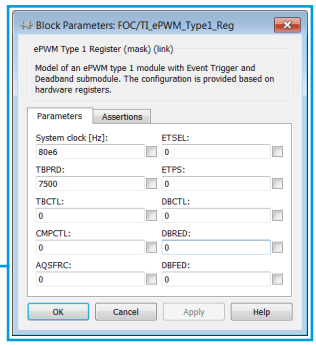
Field-Oriented Motor Control on TI C2000™ MCU

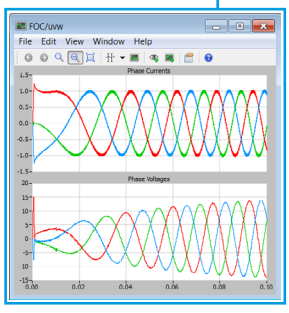
This example demonstrates how embedded code executing on a TI Piccolo 28069 MCU can be tied into a PLECS motor drive plant model. A PIL block is used to interface and communicate with the processor. High-fidelity peripheral models accurately represent the behavior of the Piccolo ADC, PWM and QEP modules.



PIL Block and Target Manager:
Interface with the code executing on an embedded processor. Override variables with values from the simulation. Feed variables from the processor back into the simulation.

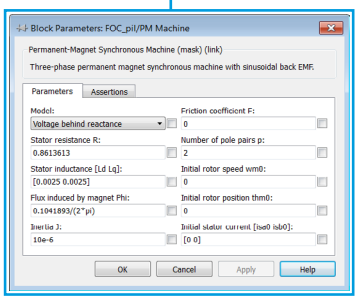
Peripheral Model:
Accurately model the peripherals of embedded processors.





PLECS Scope:
Display and analyze your simulation results. Probe variables on the target.

Plant Model:
Model the plant with high fidelity using advanced machine models, switched semiconductors and multiple physical domains.



PLECS® is the tool of choice for high-speed simulations of power electronic systems. It is available in two editions: PLECS Blockset for seamless integration with MATLAB®/Simulink®, and PLECS Standalone, a completely independent product. PLECS PIL is licensed as a separate feature.

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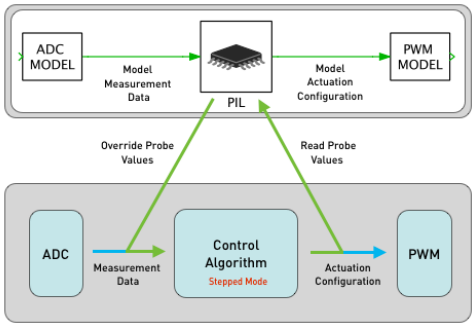
PLECS PIL

The PLECS PIL package is a complete solution for Processor-In-the-Loop (PIL) simulations.

Why PIL?

When developing embedded control algorithms, engineers often wish to test their code by executing it inside a circuit simulator.

With the PLECS PIL package, this can be done by executing actual code on real hardware. The embedded code is equipped with read and override probes to permit dynamic transition between normal operation and PIL mode.



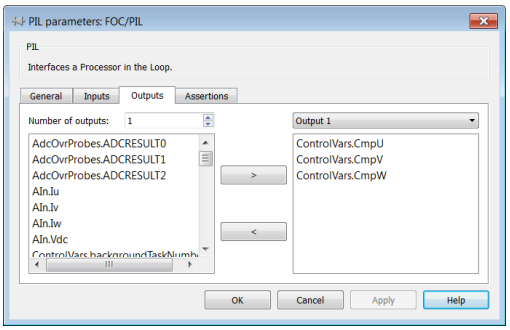
In PIL mode, values calculated by the simulation tool are used as inputs to the embedded algorithm, instead of reading the physical sensors. Similarly, outputs of the control algorithms executing on the processor are fed back into the simulation to drive the virtual environment.

With PLECS PIL, you can:

- Develop and test real code without the need for any hardware other than the MCU.
- Expose platform-specific software defects such as overflow conditions and casting errors.
- Detect and analyze potential problems related to the multi-threaded execution of control algorithms, including jitter and resource corruption.
- Unit-test code modules.
- Verify and validate software from ADC to PWM.

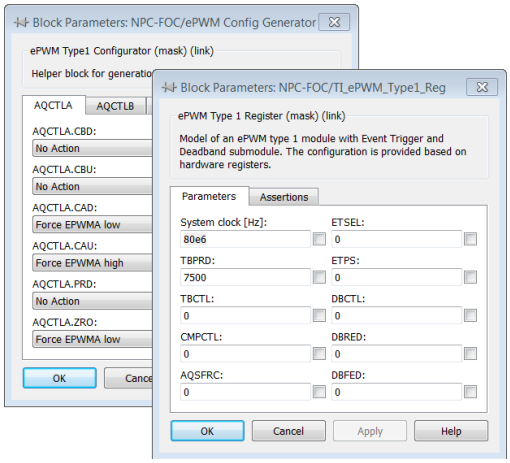
PIL Component Library

The PLECS PIL package contains a specialized PIL Block that serves as the interface between simulation model and embedded processor.



It automatically extracts the variables of the embedded code from the binary file and makes them available via input and output ports.

Also included is a collection of high-fidelity peripheral blocks to accurately model the behavior of advanced MCU peripherals such as ADC, PWM and Capture modules.



Embedded Framework

PIL Framework libraries and demo applications make the integration of PIL into your project straightforward.

Several communication interfaces are supported by the framework libraries and by PLECS to efficiently link the processor with the circuit simulator.

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