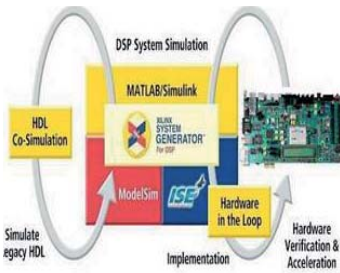


## PIDD - Digital Development and Implementation Platform



Unified view of model-based design as being used with PIDD

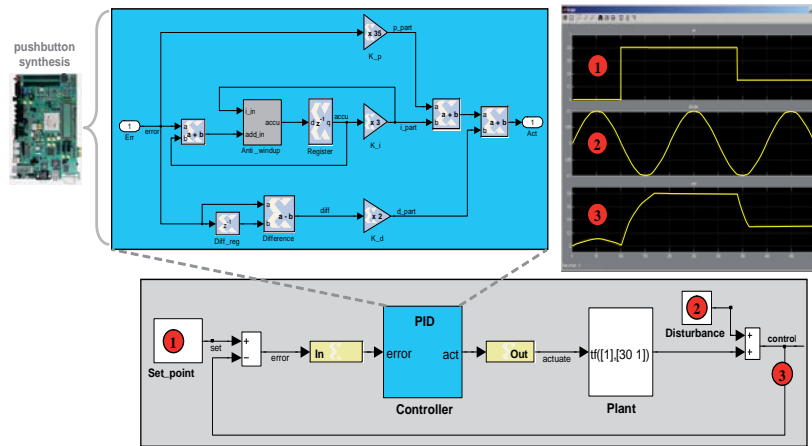
In this project a platform for the development and fast prototyping of digital signal processing algorithms for audio, video, and control applications is established. The goal is to boost subsequent R&D projects by leveraging model-based design techniques and providing a reusable library of components for communication and data acquisition tasks.

Model-based design (MBD) aims at closing the gap between abstract mathematical modeling of algorithms and physical implementation of real-time systems. By using the same source for algorithm analysis, architecture exploration, behavioral simulation and hardware/software design, MBD can help to shorten the system design cycle. PIDD employs the Xilinx tools System Generator and AccelDSP to enable direct synthesis of MATLAB/Simulink sources into FPGAs. With these tools the time-consuming and error-prone task of translating floating-point MATLAB/Simulink models into a fixed-point representation suitable for hardware implementation is considerably simplified. Furthermore it is possible to co-simulate the MATLAB/Simulink models of the DSP algorithms at hand together with any HDL sources which are usually necessary to describe the low-level details of interface circuitry. PIDD also involves an option for an embedded 32-bit RISC CPU, which can be fully integrated in the model-based design flow and used for high-performance computing with hardware acceleration.

Projekt  
PIDD

Start: 01.05.2008  
Abschluss: 31.03.2009

Projektleitung:  
Dr. Jürgen Wassner, CCE



Generator Design of a control circuit with PID-Controller targeted for FPGA implementation and a continuous-time plant model for Simulink simulation.

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Another feature of PIDD is the possibility of hardware co-simulation. This technique can provide a significant speed-up in simulation time by executing complex algorithms in hardware, while MATLAB/Simulink features are still available for stimuli generation and data analysis. Hardware co-simulation also enables processing with dynamic re-configuration of algorithm parameters, which offers interesting opportunities for real-time DSP experimentation and evaluation.

Last but not least, PIDD will fuel DSP courses taught to undergraduate students at HSLU by providing a mean for readily transfer of theoretical DSP concepts into real-world applications.