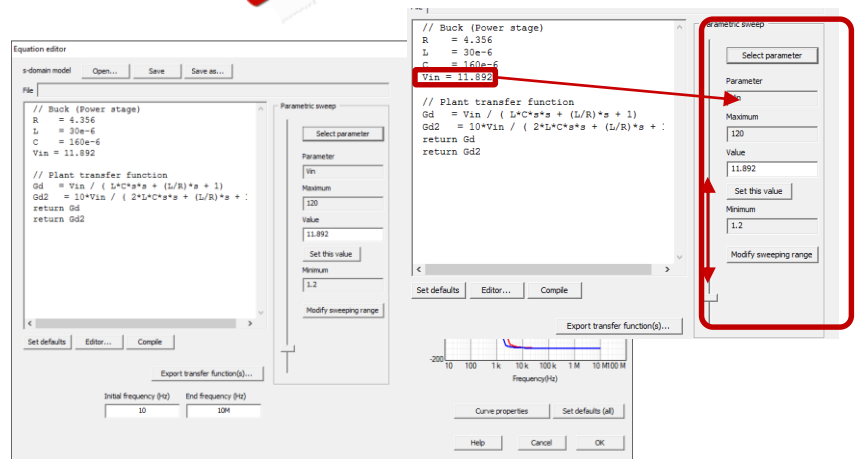




Equations Editor

The new Equations Editor

- This built-in function supports the **definition of customized plants and sensors transfer functions.**
- Multiple transfer functions can be plotted at the same time to compare the results.
- **Sensitivity analysis** can be performed for any of the parameter of custom model.

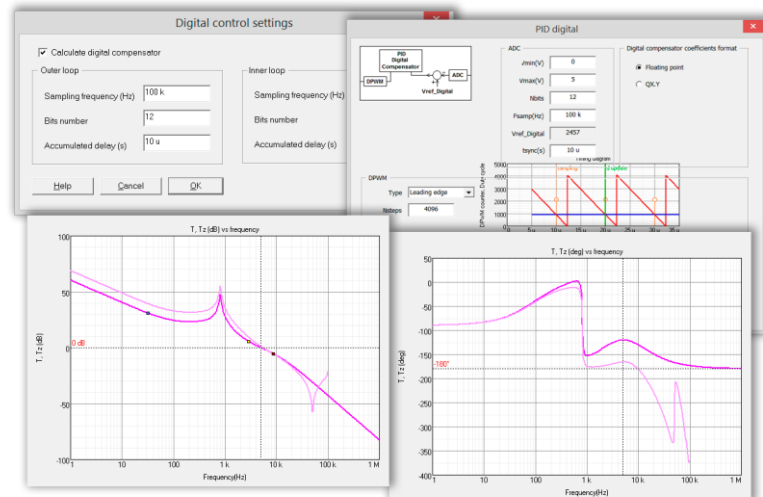


Digital Control

Digital Effects are considered

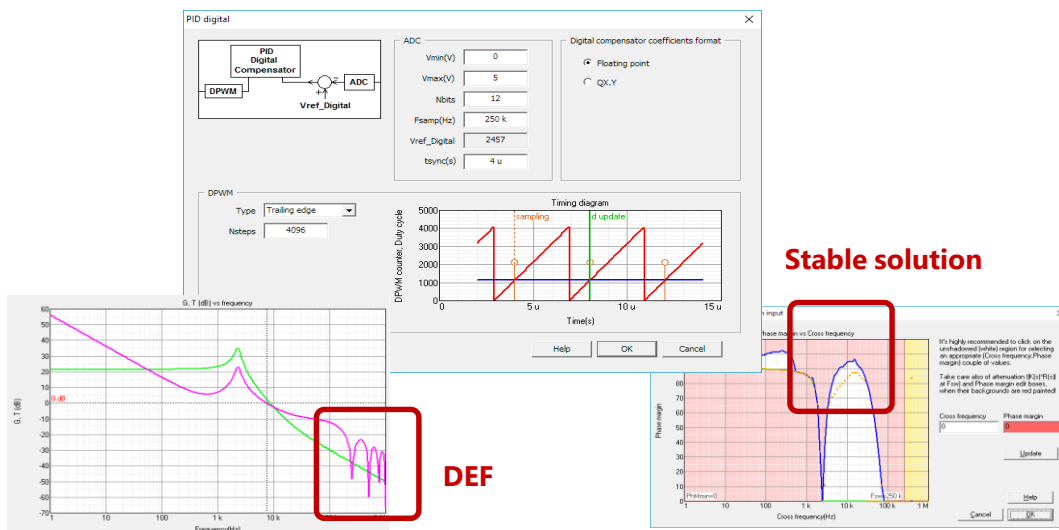
The key features of the **Digital Control** module are the following:

- **Digital effects** (DEFs) such as sampling frequency, DPWM delays, and rounding effects due to the limited bits number of ADC and compensator coefficients are considered.
- **New Bode plots** considering DEFs are shown.
- **Sensitivity analysis** of DEFs can be performed.
- The designed **digital compensator** can be exported to **PSIM in z-domain format.**



Digital Control design

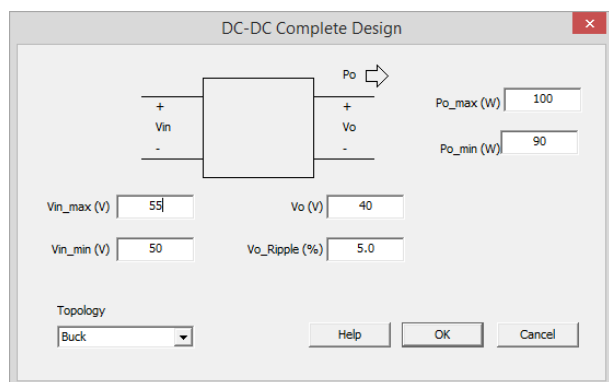
Digital control design in SmartCtrl; regulator is calculated **directly in digital domain (z-domain)**



System on Chip Module

Digital Control Design in SmartCtrl

Starting from a specification



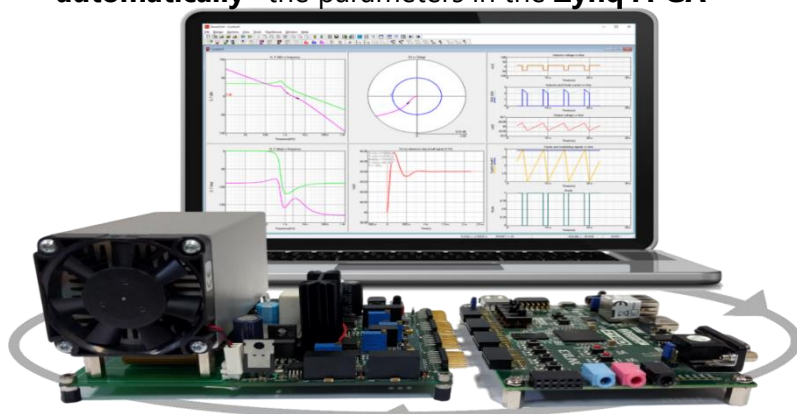
Starting from a **specifications** of the Output Voltage, Input Voltage, Output Power, Ripple...



Control implementation in Zynq platform

Control Design & Optimization in SmartCtrl

Design and optimize the control in SmartCtrl and load **automatically** the parameters in the **Zynq FPGA**



DC-DC Converter or Inverter

Zynq implementation

Why All Programmable SoC?

Performance, and Power

Flexibility

Gap Knowledge

Time to market

Years Active

IP Cores Opportunities

- Complex algorithms, communications and variable logging
- Cots boards are preferred by industry. They can select the one that fits its particular performance and cost
- Code templates and IP Cores can easily adapted from one platform to others. **Maximum reuse**
- VHDL knowledge is not indispensable to use Zynq devices
- Direct C/C++ with HLS (High Level Synthesis) generates efficiently VHDL IP cores
- Powerful tools: Vivado IDE (Integrated Development Environment) for IP integration, SDK, System generator (VHDL generation from Matlab)
- Very large power. Difficult to become obsolete
- Almost standard
- Advanced IP Cores generation is an interesting opportunity for universities and small high tech companies

PSC SoC Boards Main Features

Main Control blocks supported

Communications

Flexibility

Gap Knowledge

Best Time To Market

PE Hardware boards available

- Compensators (PI, PID, PI resonant, etc. Feedforward compensations, PWM modulators, PLL, protections and programmable limiters, mathematical transformations, etc.)
- Real-time logging of external and internal variables
- Control of Power Electronics via Wi-Fi or Ethernet
- Full customizable / parameterizable code templates and IP cores
- Any development board can be used. Not specific board is required
- Compensator design in SmartCtrl taking into account all the digital effects. The control problem is not
- SmartCtrl Console to send and change the SoC Control
- A complete reference design is provided. This totally functional code is not closed but it can be adapted to specific requirements
- "On line" courses and custom trainings are offered
- Reference designs
- Final solutions almost in phase of manufacturing
- Hardware Boards of power converters for testing the implemented controls
- Flyback DC-DC converter
- 3-ph inverter plus 3-ph rectifier

SmartCtrl distributors: <http://powersmartcontrol.com/how-to-buy/worldwide-distribution>

SmartCtrl® is developed by *Power Smart Control S.L.* a power electronics company

