عنوان مقاله:

FPGA Design and Implementation of Digital PID Controller based on floating point arithmetic

محل انتشار:

همایش مهندسی برق و توسعه پایدار با محوریت دستاوردهای نوین در مهندسی برق (سال: 1392)

تعداد صفحات اصل مقاله: 8

نویسندگان:

Pourya Alinezhad - *M.Sc. student of Electrical and communication engineering Shahid Bahonar University, Iran*

Arash Ahmadi - *B.Sc. of Electrical and Electronics Engineering Karaj Islamic Azad University, Iran*

خلاصه مقاله:

This paper proposes a method for the design of digital PID controller on Field Programmable Gate Array with floating point arithmetic. Here we use Matlab HDL coder toolbox for implementing PID controller. Also an 8bit microprocessor called Picoblaze is programmed on FPGA chip to control peripherals like A/D and D/A converters, input output bottoms, character LCD etc. Required logical and mathematical operators like comparison and summation are overloaded to accept floating point numbers as input so calculations would have higher precision than software based PID controllers. Simulink model is used to plot the time response of PID controller. VHDL code generation and programming is performed in ISE9 software from Xilinx Company. We used Coregen for implementing floating point .blocks. The proposed method was implemented practically on Xilinx Spartan-3E FPGA Board

کلمات کلیدی:

FPGA, Picoblaze, PID controller, HDL, Simulink