Abstract

Designing a Fuzzy Proportional Integral Derivative (FPID) controller that can control single link flexible joint robotic system which is nonlinear and have a complex mathematical model, led to the need of finding a way that could be efficient to hardware implementation, using Field – Programmable Gate Array FPGA (small device size, cost effective, short time to market, Reliability and Long – Term Maintenance) could solve that issue. Fuzzy Logic Controller (FLC) system is a most promising area for industrial application and by combining it with PID control algorithms features; they offer a high speed process using simple rules with the accuracy of PID tuning methods. In this paper, we have demonstrated the implementation of FPID controller using Very high speed integrated circuits Hardware Description Language (VHDL) code in FPGA, we have used Mamdani type as a FLC structure. The controller algorithm have been developed, synthesized, simulated and implemented on FPGA Spartan6, XC6SLX150T, FGG676 board.


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Index Terms

Computer Science Circuits And Systems
Keywords

FPID  SLFJRS  VHDL  Hardware Implementation in FPGA.