Self-healing memory hardware architecture on field programmable

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Abstrak

Hardware Fault-Tolerance is the set of techniques to remain operational after a fault by design. Programmable Logic Devices are good platforms to implement Hardware Fault-Tolerant techniques by utilizing abundant resources and facilitating self healing operations. In this paper we propose a hardware fault—tolerant architecture to duplicate components in order to replace faulty ones. The proposed architecture is markedly different from other works that mostly focuses on reconﬁguring and evolving logic units rather than our evolvable memory units. The self-reparation process for a memory failure is the reallocation and synchronization of memory content. The internal ﬂip-ﬂops form an abundant reconﬁgurable resource and are reconﬁgured to work as newly created memory.
The proposed architecture has been downloaded and tested on a real F PGA development board and has satisﬁed all of its pre-deﬁned speciﬁcations.