

FPAA Implementation of Discrete Time Chaotic Maps

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The most basic structure to be used in chaotic communication systems is chaos signal generators. The chaos generators can be realized as hardware, either analogue or digital. Digital-based chaos generators can be implemented using Digital Signal Processing (DSP), Application Specific Integrated Circuits (ASIC), and Field Programmable Gate Array (FPGA). Analog-based chaos generators can be implemented using discrete circuit elements or using Field Programmable Analog Array (FPAA). The chaotic generator comes out of chaos after a certain period of time and shows predictable characteristics due to the rounding errors of the numerical based designs of chaotic systems, which significantly reduces the reliability of communication systems. These reliability issues make analog based system designs indispensable. The FPAA grabs attention as a programmable integrated circuit that allows a new design or a modification on the existing design and faster analysis. Although discrete time chaotic generators can be implemented with digital based hardware, analogue based implementation could only be realized with discrete circuit elements. This work highlights the design and experimental application of discrete-time chaotic generators using FPAA.

Keywords: Field programmable analog arrays, Discrete time chaos.

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