
Advances in Signal and Data Processing, pp 147-155 | Cite as

# Ring Oscillator-Based Physical Unclonable Functions

Authors | Authors and affiliations

Shruti Sakhare, Dipti Sakhare

Conference paper
First Online: 12 January 2021



Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 703)



## Abstract

Physical unclonable function is playing an important and efficient role in system security. Ring oscillator is basically a delay-based PUF, and during fabrication process variations, the delay introduced is used for detecting secrecy of the PUF design. A framework of ring-oscillator PUF is built to check the unpredictability of the response based on the challenge created by a 4 bit-LFSRs. Simulation results of ring-oscillator PUF show that the response bits generated are unique for every challenge. Experimental results of National Institute of Standard technology Test (NIST) Suite demonstrate that the PUF's secrecy generated by the ring-oscillator PUF is random, and it varies from different FPGA platforms. The ring-oscillator PUF is evaluated according to the metrics namely security, uniqueness, and randomness of the response bits generated. The RO-PUF uniqueness and randomness calculated are more efficient in comparison with any other RO-PUF implemented.

## Keywords

Physical unclonable function | Linear feedback shift register | Field programmable gate arrays