

Transient Effect Ring Oscillators Leak Too

Ugo Mureddu¹, Brice Colombier²,
Nathalie Bochar², Lilian Bossuet², Viktor Fischer²

(1) STMicroelectronics france

(2) Laboratoire Hubert Curien, St-Etienne

Abstract

Up to now, the transient effect ring oscillator (TERO) seemed to be a better building block for PUFs than a standard ring oscillator, since it was thought to be immune to electromagnetic analysis. Here, we report for the first time that TERO PUFs are in fact vulnerable to electromagnetic analysis too. First, we propose a spectral model of a TERO cell output, showing how to fit it to experimental data obtained with the help of a spectrum analyser to recover the number of oscillations of a TERO cell. We then extend it to two TERO cells oscillating simultaneously, and show how this ability can be used to fully clone a TERO PUF. These results should help designers to better plan for susceptibility of TERO PUFs to electromagnetic analysis in their future designs.