

Optimizing RO-PUFs: A Filtering Approach to Reliability and Entropy Trade-offs

Abstract: Physical Unclonable Functions (PUFs) are hardware-based security primitives that exploit manufacturing-induced randomness to generate unique and non-reproducible identifiers, cryptographic keys, or device signatures. The work demonstrates the viability of challenge filtering techniques for ring oscillator PUFs (RO-PUFs), with a focus on evaluating their statistical efficiency in balancing the trade-off between reliability, entropy and Challenge-Response Pairs (CRP) size. Using industry-grade hardware data, we validate the proposed filtering method based on RO frequency measurements and verify the correctness of the proposed statistical analysis.