SRAM-PUF Based on Selective Power-Up and Non-Destructive Scheme

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Abstract. Research in hardware security, particularly on Physical Unclonable Functions (PUF) has attracted a lot of attention in recent years. PUFs provide primitives for implementing encryption/decryption and device fingerprinting. Though a wide range of solutions exists for PUF-based CMOS devices, the most investigated solutions today for weak PUF implementation are based on the use of random start-up values of SRAM, which offers the advantage of reusing memories that already exist in many designs. However, the start-up value availability is compromised during memory write access which causes a limitation in using SRAM as both memory and PUF. Although using a dedicated SRAM as PUF could overcome the problem, it comes with high extra overhead. In this work, we propose a new scheme called ‘selective power-up and non-destructive’ scheme to enable SRAM as memory and PUF. A case study of generating a 128-bit key shows that the area overhead of proposed scheme is approximately 12.5 smaller than for a dedicated SRAM-PUF