All-digital scalable ADC TAD for SoC in nano-scale CMOS focusing on sensor/RF digitization

Abstract:

For achieving sensor/RF digitization, an all-digital ADC TAD (Time A/D converter) is presented, which deals with only two voltage levels (i.e., $V_{in}$-supply voltage and ground-level). In a much broader sense, digital circuits can be used for time-domain processing instead of conventional analog signal processing.

A maximally-digital direct-conversion RF-receiver IC is introduced with passive mixers, TADs and digital-baseband sections. They are implemented in 65nm CMOS. Measurement results (constellation, EVM, etc.) are shown as well.

In addition, all-digital adaptive sensor/RF-ADCs in 650nm/180nm CMOS are explained using measured results for high-resolution and low-power applications.