

**Title:** The Evolution of Noise-Shaping SAR

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**Abstract:** The Noise-Shaping SAR is only a decade old but has quickly become a dominant ADC architecture. Noise shaping SAR combines the advantages of SAR and delta-sigma. It is more energy-efficient than delta-sigma and better suited to higher resolution than SAR. The first noise-shaping SAR ADCs were limited to moderate resolution and moderate speed. Recent work applies high-order noise shaping to extend the SNR to audio performance levels. At the other extreme, the interleaving of noise-shaping SAR effectively tackles the speed bottleneck. Noise-shaping SARs are also valuable in hybrid ADCs – as a backend quantizer, a noise-shaping SAR very efficiently increases the order of a continuous-time delta-sigma. This presentation reviews the evolution of the noise-shaping SAR, discusses fundamental tradeoffs, and considers the future.

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- Fawwaz T Ulaby Collegiate Professor of Electrical and Computer Engineering at University of Michigan
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