Signal Statistics Compression-Based Quantization Method in an ADC

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BRIEF DESCRIPTION

The technology is a new architecture for analog-to-digital converters (ADCs).Its properties include the use of unique signal statistics compression quantization technique, lower power than other ADC techniques, no degradation of effective number of bits and conversion rate, and automatic adaption to power-optimized state of input signal.With this technology, users will be able to produce more power efficient ADCs

FULL DESCRIPTION

The proposed ADC method uses a signal compressor-decompressor engine around the ADC to focus only on the signal, resulting in little wasted space and significantly improved power efficiency. Likewise, the proposed method can recognize that there is wasted frequency spectrum when not occupied by the signal and quantize only the signal spectrum in a highly power efficient manner. The compression ADC uses an instantaneous comparison technique on each sample of the input signal to determine whether the instantaneous signal is to undergo compression or is too large in amplitude or too fast in frequency to compress. In the former case, the significant power can be saved using a skip-ahead quantization technique. In the latter case, the ADC will resort to traditional full scale and full spectrum quantization. Amplitude and frequency parameters can be adjusted and adaptively controlled to determine whether the instantaneous signal is compressible or not.

In traditional analog to digital conversion, the signal is “blindly” converted without any consideration to what the signal type or statistics are. As a result, the conversion process wastes a great deal of power. If the signal type or statistics are used wisely, the ADC power can be pushed to its lower limit. This invention proposes analog-to-digital converters (ADCs) using a unique signal statistics compression quantization technique that utilizes significantly lower power than competing ADC techniques. All these benefits come at no degradation of the effective number of bits (ENOB) and conversion rate compared to the traditional ADCs. Furthermore, the proposed technique needs no pre-knowledge of the signal type. Simply plug in the input signal and the proposed ADC will automatically adapt to the power-optimized state of the input signal.

SUGGESTED USES

- Analog to digital converters

ADVANTAGES

- Utilizes lower power than current ADC techniques
- No degradation of ENOB and conversion rate

PATENT STATUS

Country	Type	Number	Dated	Case

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .

INVENTORS

- Heydari, Payam
- Tzeng, Fred T.

OTHER INFORMATION

CATEGORIZED AS

- **Communications**
  - Internet
  - Networking
  - Wireless
- **Computer**
  - Hardware
  - Software
- **Energy**
  - Storage/Battery
  - Transmission
- **Engineering**

United States Of America	Issued Patent	8,587,463	11/19/2013	2011-079	» Engineering

RELATED CASES

2011-079-0

LEAD INVENTOR

Fred Tzeng
Department of Electrical Engineering
Henry Samueli School of Engineering
University of California, Irvine

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- CMOS Linear Differential Distributed Amplifier and Distributed Active Balun
- Phased-Locked Loop Coupled Array for Phased Array Applications