ADA

Analog-to-Digital and Digital-to-Analog Conversion

Prof. Dr. Martin J. W. Schubert

Electronics Laboratory

Ostbayerische Technisch Hochschule (OTH) Regensburg

ADA Structure

A/D & D/A Converter

Theory	Practical
1. Introduction	GetStart w. DE1-SoC Board
2. Value Discrete (Quantized)	Use ADA Board
3. Time Discrete (Sampled)	Use DSM Board
4. A/D/A Behavioral Modeling	DE1-SoC: ADC LTC2308
5. Noise / Accuracy	GetStart w. DCDCbuck Check Digital PWM
	Matlab: A/D/A modeling

ADA Contents

4 A/D and D/A Conversion Modeling

4.1 A/D/A Conversion as Two-Step Quantization

4.2 Linear A/D/A Behavioral Conversion Models

4.2.1 Linear Behavioral D/A Converter Model
4.2.2 Linear Behavioral A/D Converter Model
4.2.3 Combined Linear A/D and D/A Converter Model
4.2.4 Clipping Input and Output Data
4.2.5 Testing the Most Simple A/D/A Models

4.3 Non-Linear A/D/A Behavioral Modeling

4.4 References

5 Signals, Noise and Signal-to-Noise Ratio

5.1 Static Signal Conversion

5.2 Fundamentals on Handling Dynamic Signals

5.2.1 Signal Power and Effective / rms Amplitude
5.2.2 Effective Values of Some Particular Waveforms
5.2.3 Summation of Correlated and Uncorrelated Signals
5.2.4 Bel and Decibel
5.2.5 Signal Accuracy and Effective Number of Bits (ENOB)

5.3 Budgeting Noise Sources

5.3.1 Identification of External and Built-In Noise Sources
5.3.2 Computing the Customer's Noise-Power Budget

5.4 Computing Noise Power of the Different Noise Sources

5.4.1 Quantization Noise Power of DAC Output Waveforms

5.4.1.1 Multi-Bit Quantization

5.4.1.2 Single-Bit Quantization

5.4.2 Quantization Noise Power of an ADC's Input Samples

5.4.2.1 Multi-Bit Quantization with Sufficiently Busy Input Signal

5.4.2.2 Single Bit Toggles at Constant Input Signal

5.4.3 Quantization Noise Power in the Frequency-Domain

5.4.3.1 Using Shape Functions to Model the Frequency Domain View.

5.4.3.2 Quantization Noise at Nyquist Sampling : Bandwidth $f_B = ½ f_S$.

5.4.3.3 Quantization Noise Reduction by Simple Oversampling

5.4.3.4 Quantization Noise Reduction by Noise Shaping and Filtering

5.4.4 E_{nonlin} : Noise Due to Non-Linearity

5.4.5 E_{otin} : Other Internal Noise Sources

5.4.6 E_{alias} : Alias Noise

5.4.6.1 Computing Alias Frequencies

5.4.6.2 Required Anti-Alias Attenuation

5.4.6.3 Required Order of Anti-Aliasing Filters

5.4.6.4 Matching Analog Anti-Alias and Digital Lowpass Filters

5.4.7 E_{clkj} : Noise Caused by Clock Jitter

5.4.8 $E_{T\&H}$: Noise Caused by the Track & Hold Circuit

5.4.8.1 Ideal Sample & Hold Process

5.4.8.2 Track & Hold Process Applied on Static Quantities

5.4.8.3 Track & Hold Process Applied on Dynamic Input

5.4.9 E_{otex} : Other External Noise Sources

Preface

The objective of this communication is to present some fundamental principles of A/D and D/A conversion together with system-level considerations rather than particular applications. Consequently, the emphasis is rather on system-level decision making than detailed device application.

Section 1 is an introduction to the field of A/D and D/A conversion.

Section 2 describes value-discretization, also termed quantization, presenting D/A and A/D converter architectures o give the reader an understanding what converter type is appropriate for which need, e.g. accuracy, speed, throughput, etc.

Section 3 is describes time-discretization, also termed sampling, and its consequences like Nyquist / Shannon criteria, aliasing, how to avoid it and how match analog and digital filters.

Chapter 4 presents some first steps to mathematical and Matlab based DAC and ADC modeling.

Chapter 5 is focused on system-level noise budgeting. As “accuracy” is mainly defined as signal-to-noise ratio (SNR) we investigate noise sources, how they add and how we can budget their power to obtain a desired SNR specification.

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Martin J. W. Schubert