Tutorial XX: ADC and DAC Architectures, selection, and evaluation

Instructor: Dr. Fang Xu, Polytope Solutions, Newton, MA, U.S.A.

## Abstract:

Due to wide adoption of digital signal processing, data converter becomes one of the key devices in any application. At the time when the end user has great choice of data converters, selection of data converter among varies type of devices of different architectures becomes a real challenge. This tutorial will help the user to understand data converters internal architecture, their performance parameters and measurement techniques, help them make adequate decision for their application. In practice, after a continuous improvement over decades in architecture design and device manufacturing process, evaluation or test of data converters also becomes a real challenge as their dynamic performances are approaching or even exceeding today's best signal source. This tutorial will give an in-depth explanation and analysis on major limiting factors for converter evaluation. In addition to analysis of stimulus signal quality, this tutorial also provide practical advise about choices of signal generators, trade-offs when combining signal generators and other necessary electronic circuitry, such as filters, transformers, amplifiers, in order to deliver the best stimulus to the ADC under test. This session will focus primarily on ADC but will also include discussion of DACs.

Target Audience: People interested in selecting and qualifying ADCs and DACs for various applications.

## Author's biography:

**Fang Xu** is a converter test expert. Since he received the Docteur en Science from Université Paris Sud in 1990 in France, his professional experiences include varies advanced domains in instrumentation such as in-vivo P31 magnet resonance spectroscopy and medical imaging, magnet resonance Gauss meter, magnet resonance used 10-5 power supply, high performance semiconductor device testing and optical instrumentations; he is an active contributor in defining IEEE standards on waveform recorder (std1057), ADC (std1241) and DAC (std1658); he has given on-site converter test seminar or master classes to over 30 converter manufactures or institutions; he published many papers and presented tutorials at international conferences or magazines including a best paper at IEEE instrumentation and Measurement Technology Conference; he is recipient of IEEE international conference best paper award; he has been granted 17 patents in core technologies on data acquisition, signal processing and waveform generation; He is currently providing automatic test equipment and service for data converter characterization and small scale production.