21AD170 Defining frequency domain performance of Analog-to-Information Converters

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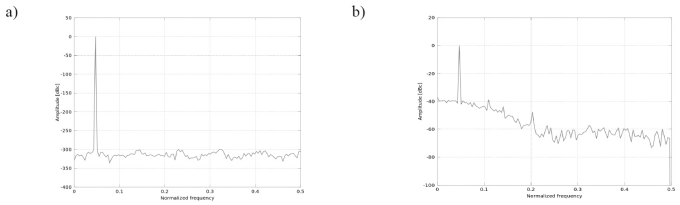
The paper deals with the definition of dynamic performance of Analog-to-Information Converters (AICs). These components allow to overcome the sampling frequency limits of the Shannon theorem, by assuming that the observed signal has a sparse representation in a given domain. The paper aims to verify the behaviour of standard parameters currently defined for Analog-to-Digital Converters when applied to these new devices. To this aim, several simulations and experimental tests have been carried out to study the influence, in the frequency domain, of quantization noise and nonlinearity on the AIC dynamic parameters.



PSDs of the AIC output signal for values of ε equal to 0.8 and 0.05, respectively.

22BP103 Decimator filter based on B-splines

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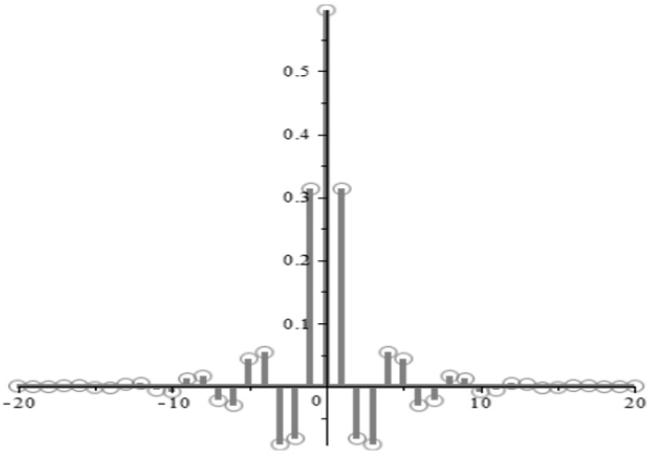
There are many applications that require high resolution AD conversion, mainly based on sigma delta converters. An important component of these converters is the digital filter is applied before decimating the oversampled signal. The main characteristics of a decimation filter are its discrimination ability, close to a rectangular frequency response which is equivalent to an ideal sinc filter. We know that this ideal filter has infinite impulse response, thus it's implementation with a FIR filter always supposes the truncation at some point. This paper proposes a filter based on B-splines, called least squares filter, which has already been proposed for digital image interpolation. The innovation proposed here is a version of this FIR filter, which is much easier to implement than the original. The advantage is that this filter combined with an interpolator filter also based on B-splines achieves a very good frequency response that approximates the ideal band limiting filter. Additionally we compare it with a commonly available decimation FIR filters encountered in commercial integrated AD converters.



FIR approximation of the least squares filter FIR, using 20 coefficients.