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Wavelet techniques: A suitable tool to characterise and optimize encoders' based systems

J.M. Dias Pereira ^{a, b} , O. Postolache ^{a, b}, P. Girão ^b[Show more](#) 

Outline



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Abstract

Calibration data together with the approximation and details of wavelet decomposition functions can be used to obtain important parameters of digital transducers based systems.

Besides offset and gain errors that are usually easy to evaluate and compensate, digital transducers exhibit differential and integral nonlinearity errors whose estimation, whenever possible, can be used to increase measurement's system accuracy. An error compensated system can easily be implemented by adding to the digital transducer, a microcontroller and a memory with a code conversion table. The proposed technique, based on wavelet data processing, can also be applied to estimated analogue-to-digital converters parameters, namely differential and integral nonlinearity errors.

In the present paper, simulation and experimental results, obtained from a low-cost angular encoder, are used to validate the proposed characterisation method for different wavelet decomposition levels and wavelet mother function types.

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Keywords

Encoders; Wavelet transforms and error compensation

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