Wavelet Denoising Method: Application to the Flow Rate Estimation for Water Level Control

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Abstract

The wavelet transform decomposes a signal into time- and frequency-domain signals and it is well known that a noise-corrupted signal could be reconstructed or estimated when a proper denoising method is involved in the wavelet transform. Among the wavelet denoising methods proposed up to now, the wavelets by Mallat and Zhong can reconstruct best the pure transient signal from a highly corrupted signal. But there has been no systematic way of discriminating the original signal from the noise in a dyadic wavelet transform. In this paper, a systematic method is proposed for noise discrimination, which could be implemented easily into a digital system. For demonstrating the potential role of the wavelet denoising method in the nuclear field, this method is applied to the steam or feedwater flow rate estimation of the secondary loop. And the configuration of the S/G water level control system is proposed for incorporating the wavelet denoising method in estimating the flow rate value at low operating powers.