

Estimation Procedures That Enhance Homomorphic Wavelet Deconvolution

The Cepstral processing has made its mark in a number of applications since the first papers were published in the 1960's. The principal author demonstrated the technique on biomedical data in his dissertation. Subsequent research was done on hydroacoustic, seismic, infrasound, gear-fault, and ground penetrating radar data. In most of these applications, the Complex Cepstrum was used, requiring the phase information to be utilized in the process. This current research employs a novel approach to the use of predictive filtering, that being, the use of a predictive filter on the Complex Cepstrum to remove the effect of the echo. This removal process has traditionally been accomplished by the use of a "comb" lifter. However, in many cases, this comb lifter causes severe distortion in the recovered wavelet partly due to the phase unwrapping problem, as well as the distortion caused by the necessary Nyquist filtering of the data. Additional signal processing techniques explored are time series weighting, zero padding of the data, and employing higher sample rates. Examples are shown on modeled data as well as on data from real events which demonstrate these improvements in the deconvolution process.

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Track Classification: Theme 3: Advances in Sensors, Networks and Processing