

ABSTRACTA WIDE BAND VIDEO SIGNAL DENOISER AND
METHOD FOR DENOISING

A method and apparatus for high speed denoising of an input signal received by a radar warning receiver (RWR) system. The novel system digitizes the input signal into sample windows each having a number of sample data points. The novel system includes a signal transformation processor system which convolves Haar wavelet basis functions across individual time segments of the input signal to produce sets of coefficients. Signal noise is poorly represented by the selected Haar wavelet basis functions while expected pulse signal characteristics are well represented by the basis functions. Within the wavelet transformation process, a plurality of frequency resolution levels are simultaneously determined, each frequency resolution level having a fixed number of correlation coefficients equal to the number of sample points in the sample window. Each coefficient also corresponds to a different basis function, or a same basis function applied to a different time segment. Each level contains a different number of represented frequency bands and a different number of time segments per band. For each level, the level's coefficients are sorted into coefficient maps and the largest coefficients are selected from each map. The coefficient map best packaging the input signal energy is then selected. The coefficients of the best coefficient map can be used to (1) reconstruct a denoised digital or analog signal using a re-transformation for application to a video pulse processor for threat characterization or (2) to produce a digital report indicating vital pulse information including leading edge pulse position, pulse amplitude, pulse duration, etc.

