

Discrete-Time Analytic Signal Generation System

Inventor: Gagan Mirchandani, Mohammed Elfataoui
The University of Vermont, Office of Technology Commercialization

UVM innovations
The Office of Technology Commercialization

Overview

Hilbert transformers have many applications in signal processing. A common type of efficient communication scheme is Single-Side Band (SSB) Transmission. This is obtained from Double Side-Band (DSB) signals. Hardware, in the form of Hilbert transformers on a chip, exist for this (and many other) purposes. Since the bandwidth of the SSB signal is ideally, half that of the DSB signal, good recovery of the original signal is possible. Also, again for the ideal case, one can safely sample by (decimation). This means lower power consumption in the transmission process. In practice, the SSB signal is not fully single-side band since it does have non-zero spectra in the negative frequencies. Consequently, the exact signal may not be recovered and decimation will cause aliasing.

Invention

The invention, based on theoretical analysis and design, provides a way of designing Hilbert transformers that yield SSB signals that have greater attenuation of the spectrum in the negative frequency range. Accordingly, a better recovery of the signal and less aliasing after decimation becomes possible.

I.P. Status

US Patent # 7,873,686

Advantages

- “Truer” signal and better reconstruction
- Less aliasing
- Smaller sized data, less memory required, lower power requirements

Applications

- DSP/SSB convertor
- Instantaneous frequency estimation
- Feature detection and signaling denoising

Learn more about Dr. Mirchandani's research at:
www.cems.uvm.edu/~mirchand

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