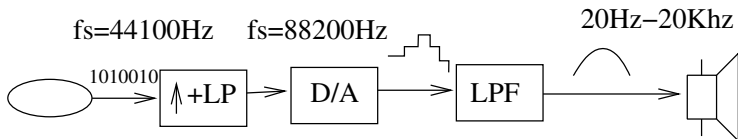
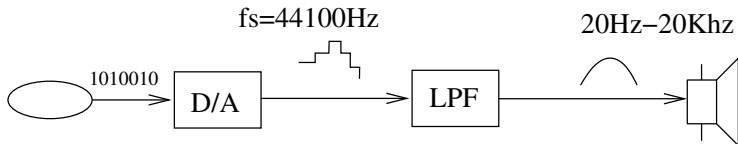


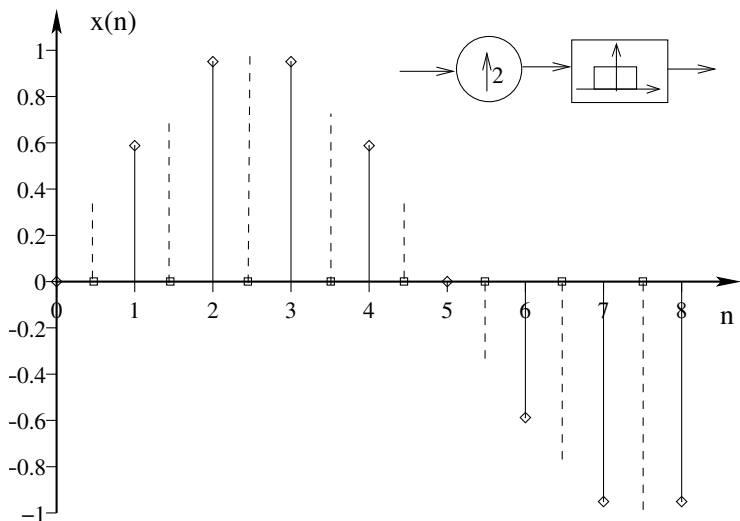
# EDISP/CPS[M|WM]: Advanced Techniques

Jacek Misiurewicz

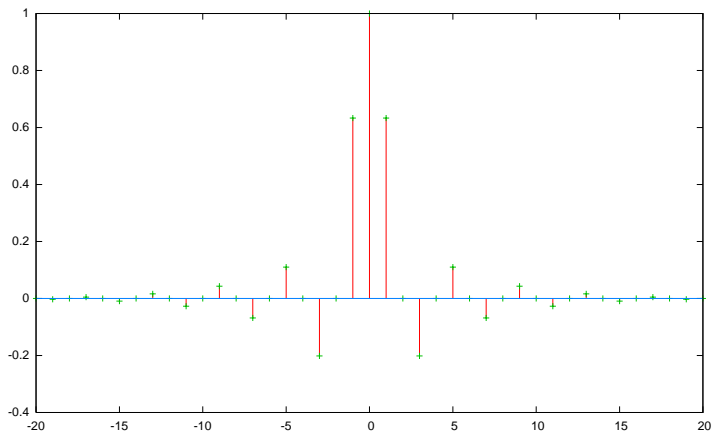
January 23, 2007

- ▶ CD sampling frequency: 44100 Hz
- ▶ Nyquist limit: 22050 Hz
- ▶ Hi-Fi audio: up to 20000 Hz
- ▶ → Analog reconstruction filter problem





- ▶ Adding points (*upsampling*)
- ▶ Finding values (*interpolation*) – LP filtering

Interpolating filter ( $\theta_b = \pi/2$ )

Note *zero* coefficients at even  $n$  positions!

## Do it with FFT

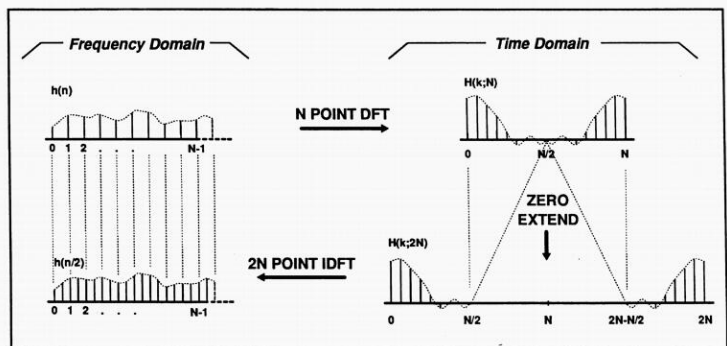
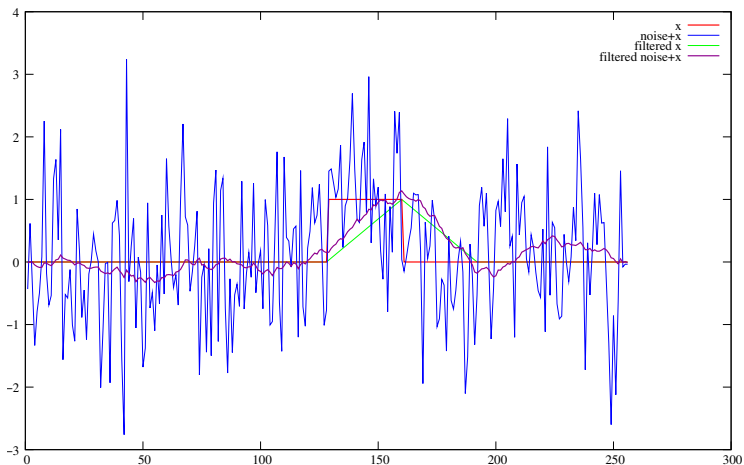


Figure 1. Band-Limited Interpolation with Zero-Extended Spectra

## Matched filter - square impulse



## Matched filter - LMF impulse

