EE16B: DESIGNING INFORMATION DEVICES AND SYSTEMS II

LECTURE NOTES

Interpolation Continued

Consider an arbitrary signal. I originally take 8 samples ($\vec{x}$), and the sampling time is $T_s = 1s$. If I want 16 samples ($\vec{y}$) over the same duration, then $T_s = 0.5s$.

Recall: the jth DFT basis element corresponds to a physical frequency of $\frac{j}{nT_s}$.

Recipe for Interpolation:

(1) Take samples to get $\vec{x}$.

(2) Compute DFT: $\vec{X} = U_n^* \vec{x}$.

(3) Add in zeros to get $\vec{X}_{new}$ that has length b_n ("zero padding").

(4) Multiply by $\sqrt{b}$ where b is the factor of increase in resolution.

(5) Compute inverse DFT: $\vec{x}_{new} = U_{b_n} \vec{X_{new}}$.

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