More on the FFT: the amazing Butterfly

Sorry if we got bogged down today in class on Figure 10-11 from Ziemer.

Normally after hitting the high points of the 8 point FFT structure, I go over the simplest case: the two point DFT (N=2), also known as the **Butterfly**. From here we then show how a 4 point DFT (N=4) can be made from 2 stages of butterflies…. Then show how this process can be repeated to make an 8-point FFT (fig 10-11) (or 3 stages of butterflies). … and then this can be extended on and on and on….

Your textbook, I&J, does this in Section 3.5, starting on page121. Figures 3.4 and 3.5 illustrate the butterflies. (note: he draws the "flow graph" in a different style than Ziemer)

Speaking of Ziemer (if you don't like I&J's notation), in section 10-3, starting on page 492, he does the same thing. [this chapter is posted on the website under lesson 10 if you can't seem to find your Ziemer text]. Figure 10-5 he illustrates the 2-point butterfly. Example 10-4 and Figure 10-6 he illustrates the 4-point DFT. Then in Section 10-4, he goes through the mathematical derivation of the FFT, showing how the generic DFT can be decomposed into several stages of simple butterflies.

How about that NLog(N) thing?

Ziemer discusses this at the bottom of page 502. Cadet Miller, check out equation 10-48. I&J discuss the speed up and computation issues on page 121 and on page 132.

These readings are most fascinating!