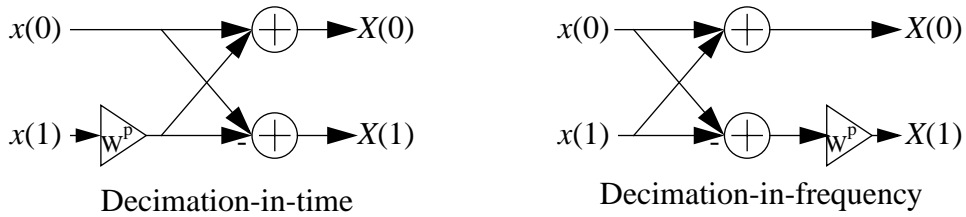


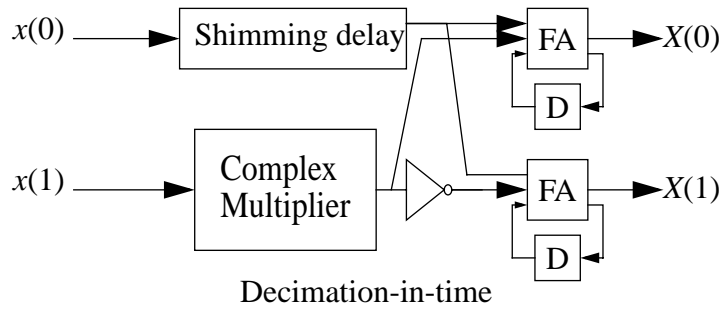
11.23 We give only one example here: radix-2 butterfly element(including the twiddle factor multiplication).

The decimation-in-time and decimation-in-frequency butterfly is shown below.

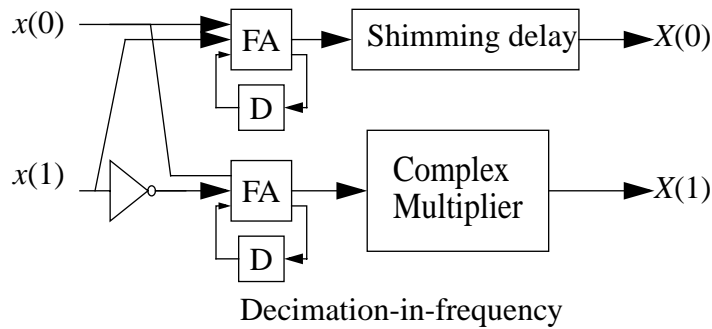


Radix-2 Butterfly Elements

The twiddle factor multiplication is a complex multiplication. Since we know the coefficients in advance, we can use distributed arithmetic to reduce the number of real multiplications (See section 11.17). The complete shift-accumulator with s/p multiplier is shown in Figure 11.45, section 11.15. The radix-2 butterfly element can be implemented as follows.



Decimation-in-time



Decimation-in-frequency

Butterfly Elements