

DSP HW #5

1a) Time of DTFT, N^2 multiples

$$\text{Time} = 1024^2 \cdot 1\mu\text{s} = 1.048 \text{ seconds}$$

b) Time of FFT, $\frac{N}{2} \log_2(N)$

$$\text{Time} = \frac{1024}{2} \log_2(1024) \cdot 1\mu\text{s} = .005 \text{ seconds}$$

c) 4096 pt: $4096^2 \cdot 1\mu\text{s} = 16.77 \text{ sec}$ \rightarrow DTFT

$$\text{FFT: } \frac{4096}{2} \log_2(4096) \cdot 1\mu\text{s} = .024 \text{ sec}$$

2 a) $F_s = 4096$

$$F_s \geq 2B \rightarrow \frac{4096}{2} \geq F_{\text{highest}}$$

$$F_{\text{max}} = 2048 \text{ Hz}$$

b) 1 Hz