23W-EC ENGR-113-LEC-1 HW4

SANJIT SARDA

TOTAL POINTS

46 / 50

QUESTION 1

1 **4 / 5**

    + 5 pts Correct

    ✓ **+ 4 pts** *One incorrect*

    + 3 pts Two incorrect

    + 0 pts All incorrect

QUESTION 2

2 **5 / 5**

    ✓ **+ 5 pts** *Correct*

    + 4 pts Partially correct graphs

    + 3 pts Incorrect/No graphs

    + 0 pts Incorrect

QUESTION 3

3 **37 / 40**

    ✓ **+ 5 pts** *2.1 Correct*

    ✓ **+ 5 pts** *2.2 Correct*

    + 3 pts 2.2 Partially Correct

    ✓ **+ 5 pts** *2.3 Correct*

    + 3 pts 2.3 Partially Correct

    ✓ **+ 5 pts** *2.4 Correct*

    + 3 pts 2.4 Partially Correct

    ✓ **+ 4 pts** *3.1 Correct*

    + 3 pts 3.1 Partially Correct

    + 8 pts 3.2 Correct

    ✓ **+ 5 pts** *3.2 Partially correct*

    ✓ **+ 8 pts** *3.3 Correct*

+ 5 pts 3.3 Partially Correct

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①

ⓐ $x[n] = \sin\left(2\pi \cdot \frac{1}{8} n\right)$ for $n = [0, 1 \ldots 7]$

$$= \frac{1}{2j}\left(e^{j 2\pi \frac{1}{8} n} - e^{-2\pi \frac{1}{8} n}\right)$$

$\therefore DFT(x[n]) = \frac{4(\delta(k-1) - \delta(k-7))}{j}, \quad 0 \leq k \leq 7$

$$= 4j(\delta(k-7) - \delta(k-1))$$

ⓑ $y_1[n] = [0, -1, 0, 1] \rightarrow$ two spaced impulses

$DFT(y_1[n]) = Y_1[k] = 2j \sin\left(\frac{\pi}{2} k\right), \quad 0 \leq k \leq 3$

ⓒ $y_2[n] = [j, 0, 1] \rightarrow [1j, 0, 1j, 2]$

$DFT(y_2[n]) = Y_2[k] = 2j \cos\left(\frac{\pi}{2} k\right) + e^{j \frac{\pi}{2} k} \quad 0 \leq k \leq 3$

    + 5 pts Correct
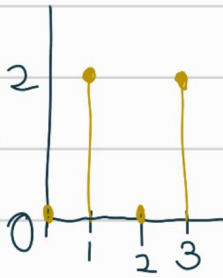
✓ **+ 4 pts** *One incorrect*

    + 3 pts Two incorrect

    + 0 pts All incorrect

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② $y_3 = y_1 \otimes y_2$ ∴ $Y_3[k] = Y_1[k]\,Y_2[k]$

Plot Y_3: $Y_3[k] = 2j\sin(\frac{\pi}{2}k)(2j\cos(\frac{\pi}{2}k) + e^{j\frac{2\pi}{4}})$ $0 \le k \le 3$

∴.

Magnitude:

Phase:

2 **5 / 5**

    ✓ **+ 5 pts** *Correct*

       + 4 pts Partially correct graphs

       + 3 pts Incorrect/No graphs

       + 0 pts Incorrect

    ✓ **+ 5 pts** *Correct*

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3 **37 / 40**

✓ **+ 5 pts** *2.1 Correct*

✓ **+ 5 pts** *2.2 Correct*

+ 3 pts 2.2 Partially Correct

✓ **+ 5 pts** *2.3 Correct*

+ 3 pts 2.3 Partially Correct

✓ **+ 5 pts** *2.4 Correct*

+ 3 pts 2.4 Partially Correct

✓ **+ 4 pts** *3.1 Correct*

+ 3 pts 3.1 Partially Correct

+ 8 pts 3.2 Correct

✓ **+ 5 pts** *3.2 Partially correct*

✓ **+ 8 pts** *3.3 Correct*

+ 5 pts 3.3 Partially Correct

✓ **+ 5 pts** *2.1 Correct*

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