

EECS 4452 - Assignment 1

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1 DTFT Properties

1.1 Notation

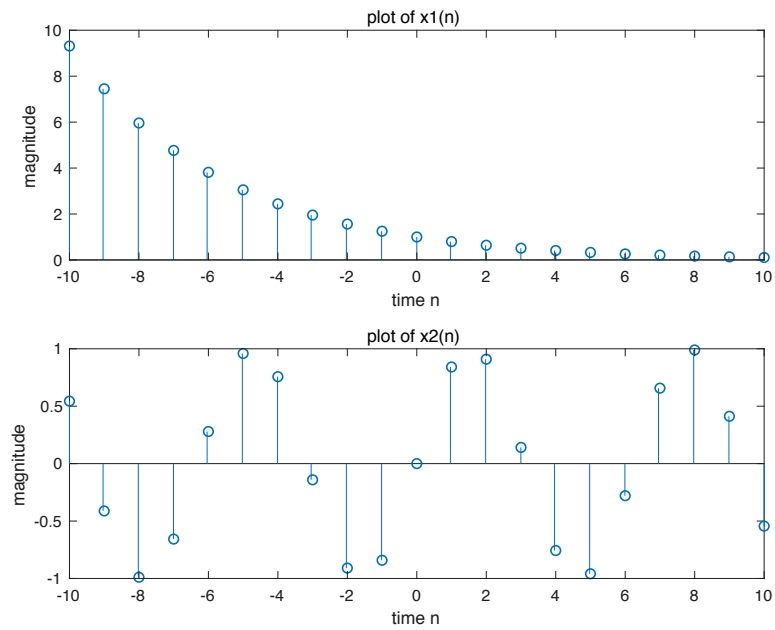


Figure 1: Two complex functions x_1 and x_2

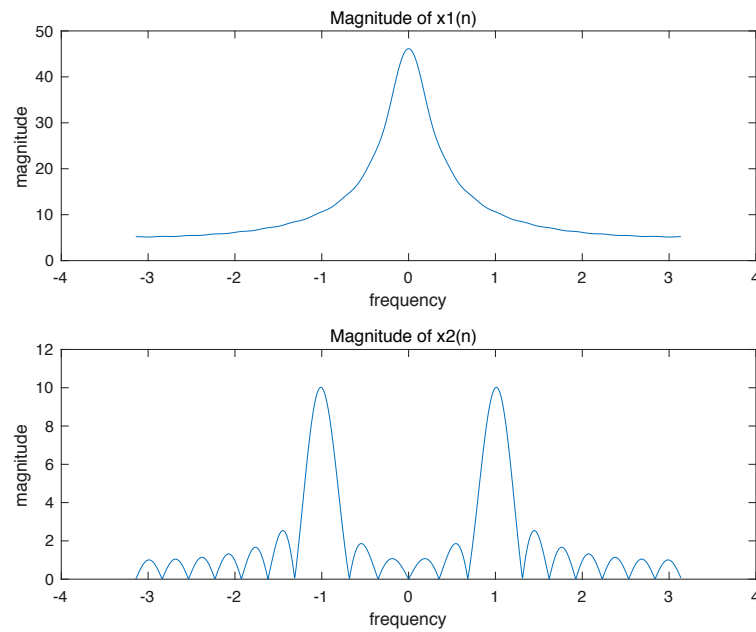


Figure 2: Freq spectrum of both signals

1.2 Linearity

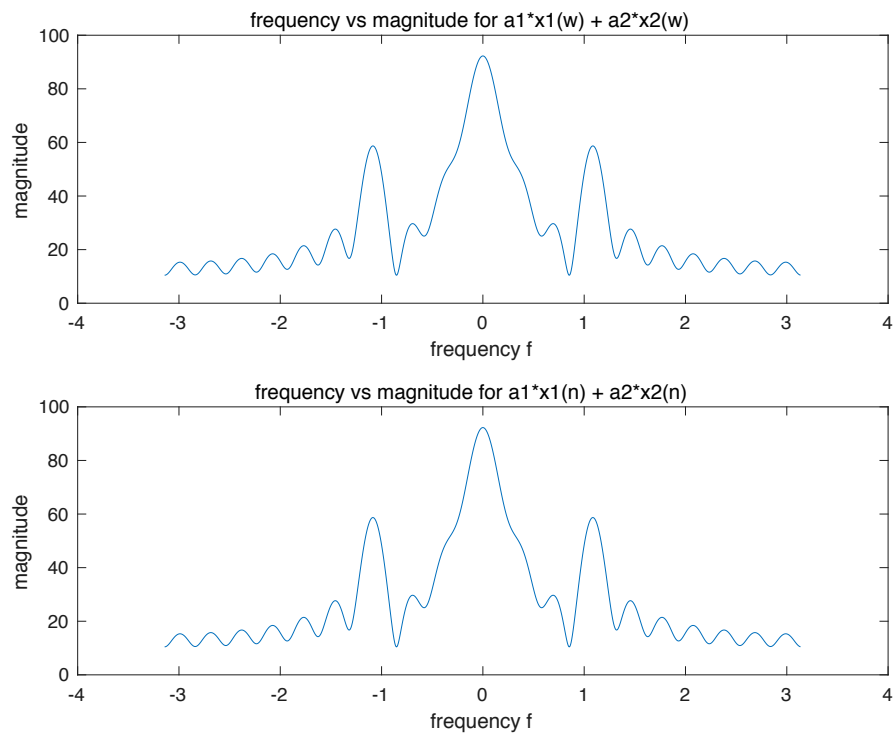


Figure 3: Proof of Linearity property of DTFT

1.3 Time Shift

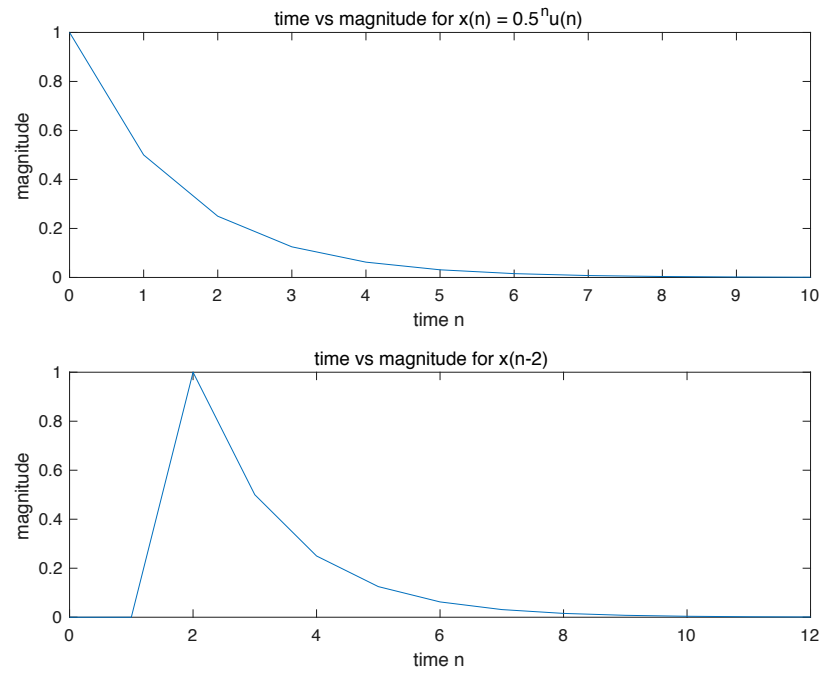


Figure 4: $x(n)$ and $x(n-2)$ plots

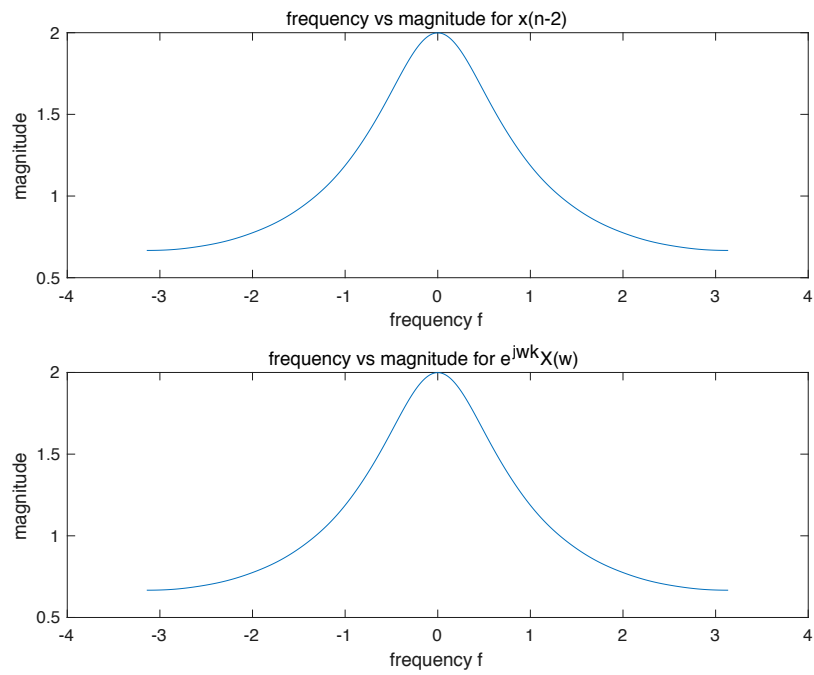


Figure 5: Frequency spectrum of $x(n)$ and $x(n-2)$

1.4 Time Reversal

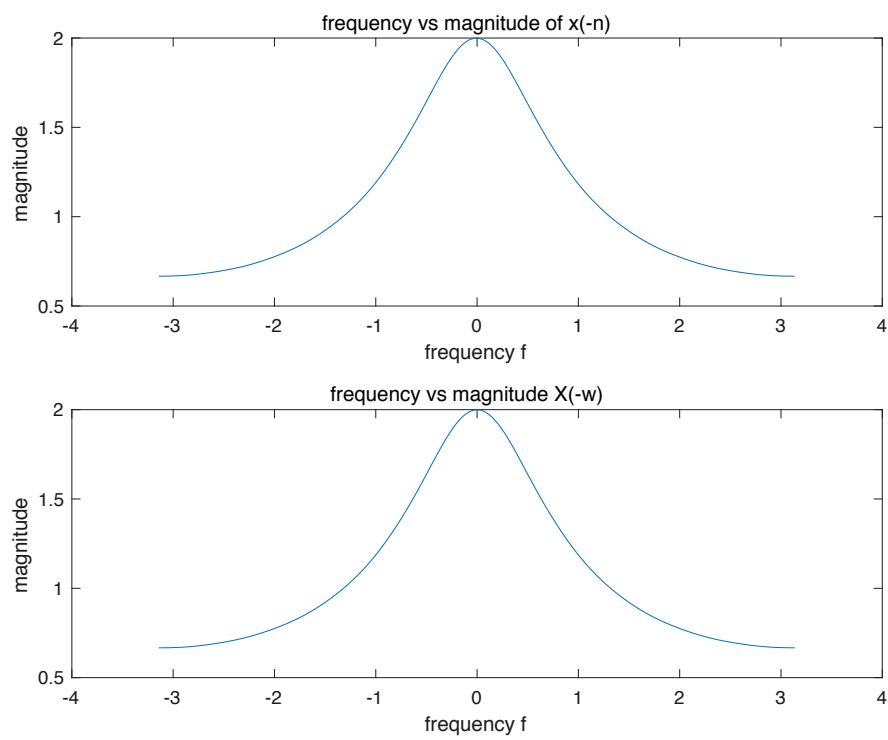


Figure 6: Proof of the time reversal property of DTFT

1.5 Convolution

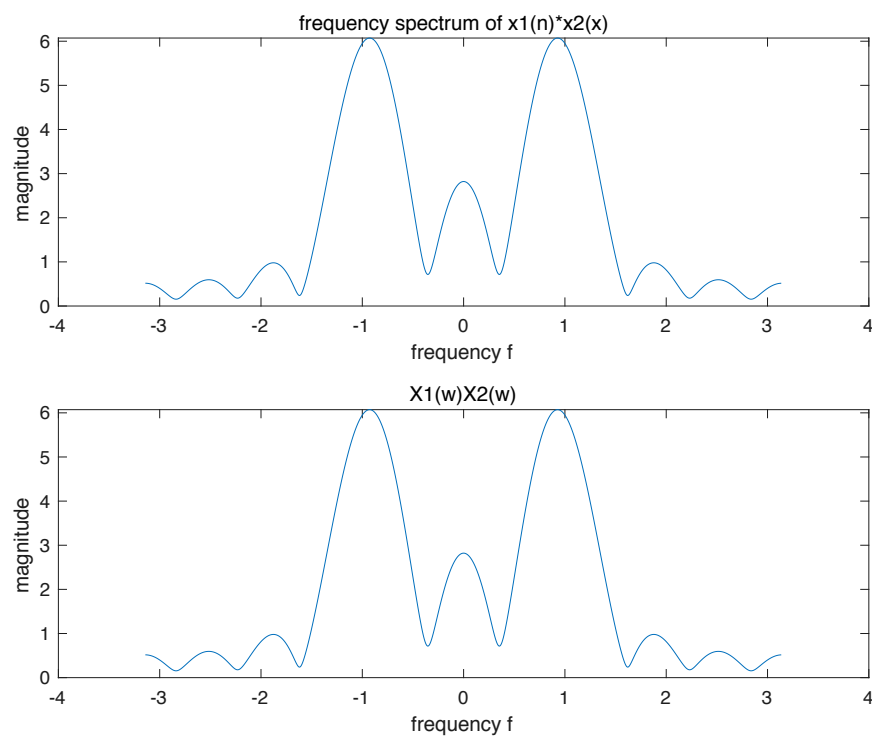


Figure 7: Proof of the convolution property of DTFT

1.6 Frequency Shifting

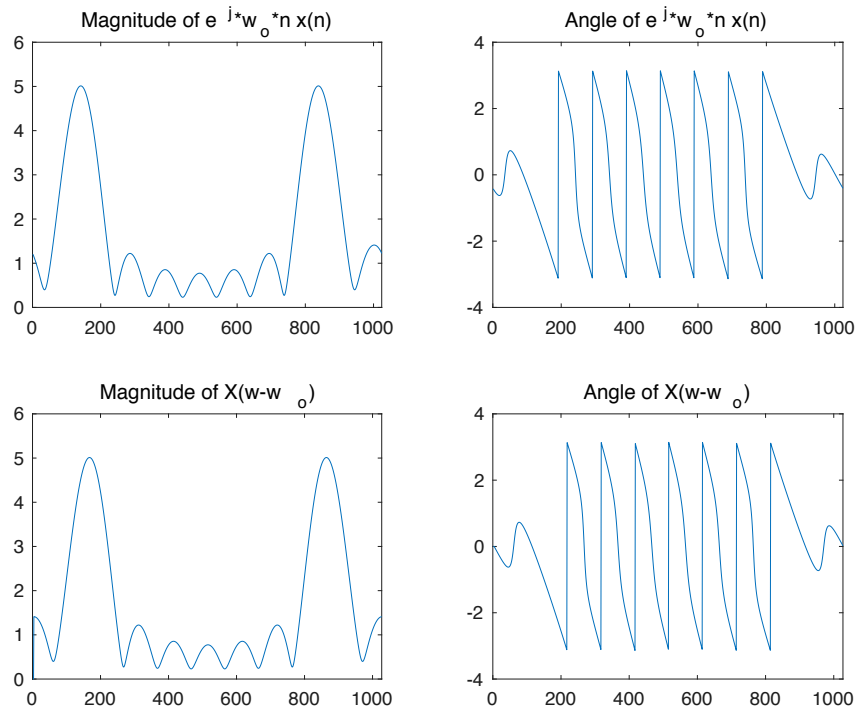


Figure 8: Proof of the frequency shifting property of DTFT

1.7 Conjugation

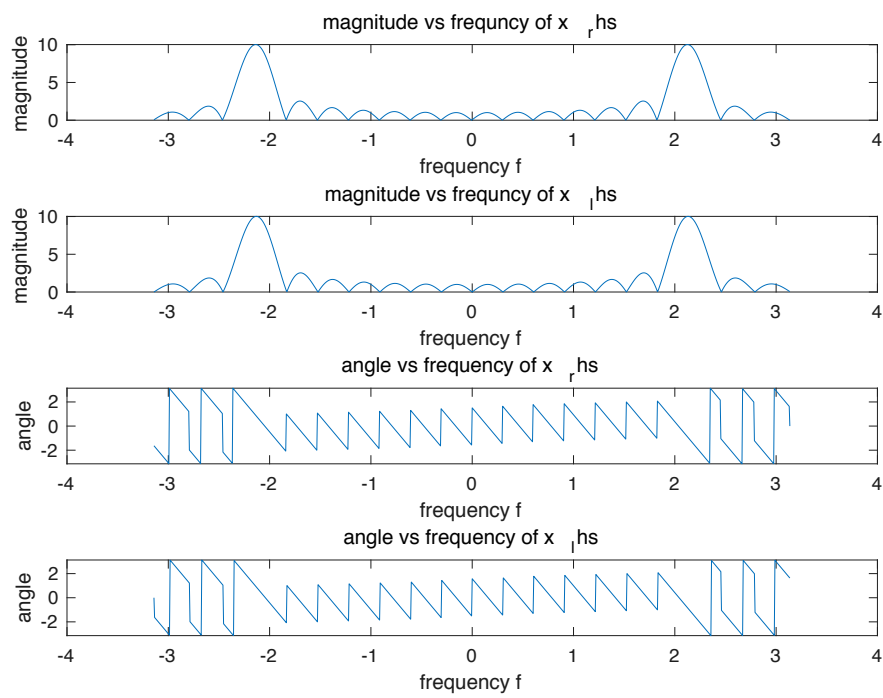


Figure 9: Proof of the conjugation property of DTFT

1.8 Differentiation in the freq domain

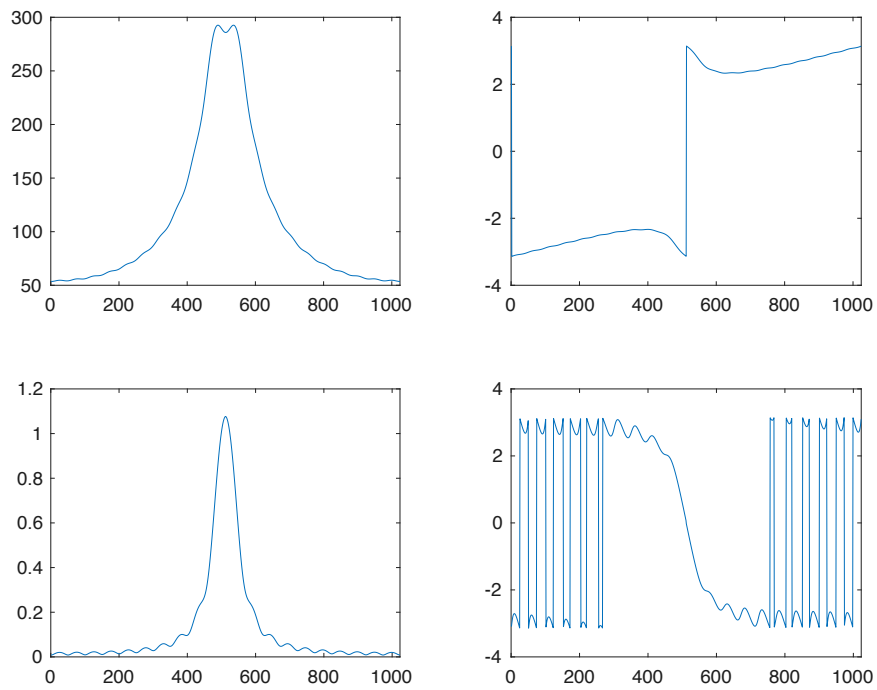


Figure 10: Proof of the diff property of DTFT