Lab1   dfang1   1520925   ECE 340   Sept 2020
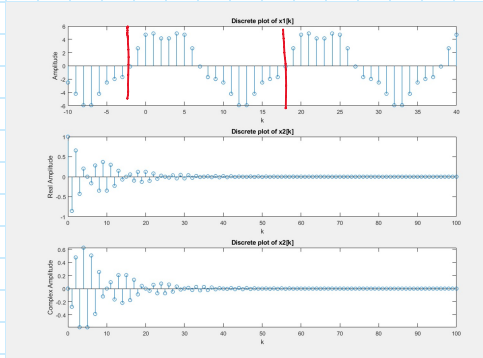
Results
Part 1)
a)

b) $x1$ is periodic   • Mark of period

$0.1 \pi k = 2\pi$ $k = 20$
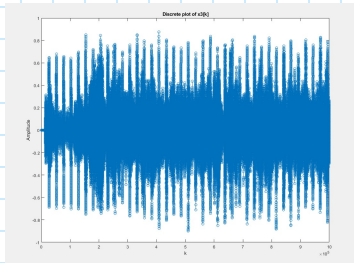
$x2$ is not periodic

c) Total Energy was found using MATLAB

$E_{x_1} = 699$

$E_{x_2} = 5.26$

Part 2
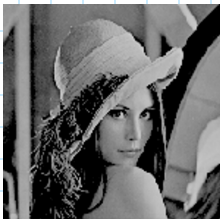(a) song words

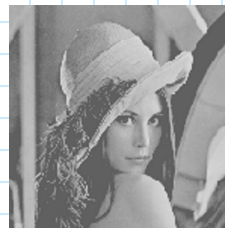(c) number of samples was one million,

(d) Total Energy of $x3$ is 80423
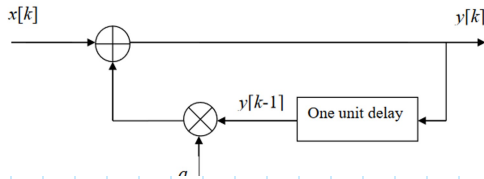
Part 3   New lena

(a)   (e)

(b) The picture is $512 \times 512 = $ row × col
    The max pixel value is 165

Part 4)

(a) $y(k) = x(k) + y(k-1)$

$x(k) = \begin{cases} 1 & k=0 \\ 0 & k<0 \end{cases}$

x[k] ———→⊕———————————→ y[k]

y[k-1] ⊗ ←— [One unit delay] ←—

a

(b) $a = 0.5$

$y(0) = x(0) + 0.5\, y(-1) = 1$
$y(1) = x(1) + 0.5\, y(0) = 1.5$
$y(2) = x(2) + 0.5\, y(1) = 1.75$
$y(3) = x(3) + 0.5\, y(2) = 1.875$
$y(4) = x(4) + 0.5\, y(3) = 1.9375$
$y(5) = x(5) + 0.5\, y(4) = 1.96875$

$a = 2$

$y(0) = x(0) + 2\, y(-1) = 1$
$y(1) = x(1) + 2\, y(0) = 3$
$y(2) = x(2) + 2\, y(1) = 7$
$y(3) = x(3) + 2\, y(2) = 15$
$y(4) = x(4) + 2\, y(3) = 31$
$y(5) = x(5) + 2\, y(4) = 63$

Discussion.

1). As stated, x_1 is periodic with a period of 20, and x_2 is not periodic. Energy can be found in results

2) The lyrics words are "Baila Baila conningo" In the converted sample, the sample is halfed, quality is the same energy can be found in results

3). When converting the lena.jpg to the new one, the quality of the picture is brighter, no pixels were lost since the matrix is the same. The values in the matrix are increased.

4) When $|a| \geq 1$, the system is not stable,

if $|a| < 1$, then the system is stable, since the output is not amplified