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In [ ]: '''
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Class: TE-EXTC A
Division: A
Year Of Study: TE
Branch: EXTC
Date: 24/08/2023
Time: 14:00
'''
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Problem Statement: Prove 4 DFT Properties

```
In [1]: #Importing inbuilt libraries
import numpy as np
import matplotlib.pyplot as plt
```

Linearity Property

```
In [2]: #Getting user-defined inputs and determining its length
x1 = eval(input("Enter x1(n) = "))
L = len(x1)
print(x1)
print('Length is = ', L, '\n')
x2 = eval(input("Enter x2(n) = "))
print(x2)
M = len(x1)
print('Length is = ', M, '\n')
```

```
Enter x1(n) = [1,2,3,4]
[1, 2, 3, 4]
Length is = 4
```

```
Enter x2(n) = [4,1,2,3]
[4, 1, 2, 3]
Length is = 4
```

```
In [3]: #Defining x3(n)
x3 = np.add(x1,x2)
print(x3)
```

```
[5 3 5 7]
```

```
In [4]: #Verification of Property
X1 = np.fft.fft(x1)
print(X1)
X2 = np.fft.fft(x2)
print(X2)
```

```
[10.+0.j -2.+2.j -2.+0.j -2.-2.j]
[10.+0.j  2.+2.j  2.+0.j  2.-2.j]
```

```
In [5]: X3 = np.add(X1,X2)
```

```
print(X3)
```

```
[20.+0.j  0.+4.j  0.+0.j  0.-4.j]
```

```
In [6]: Xresult = np.fft.ifft(X3)
print(Xresult)
```

```
[5.+0.j  3.+0.j  5.+0.j  7.+0.j]
```

```
In [7]: if x3.all() == Xresult.all():
        print('Verified')
        else:
            print('Not Verified')
```

Verified