————————1————————

C[m] = 1/N $\sum_{n=0}^{N-1} x[n] * exp(-2 * PI * m * n * j/N) C[0] = 1/5 * \sum_{n=0}^{4} x[n] * exp(-2 * PI * 0 * n * j/5) = 1/5 * 11 * (cos(-2 * PI * 0 * 0/5) +$
$j * sin(-2 * PI * 0 * 0/5)) +$
$1/5 * 11 * (cos(-2 * PI * 0 * 1/5) + j * sin(-2 * PI * 0 * 1/5)) + 1/5 * 11 * (cos(-2 * PI * 0 * 2/5) + j * sin(-2 * PI * 0 * 2/5)) +$
$1/5 * 11 * (cos(-2 * PI * 0 * 3/5) + j * sin(-2 * PI * 0 * 3/5)) + 1/5 * 11 * (cos(-2 * PI * 0 * 4/5) + j * sin(-2 * PI * 0 * 4/5)) = 1.6 + j * 0.0 = 1.6 * e^{0.0}$

A[0]=$\sqrt{REAL(C[0])^2 + IM(C[0)^2} = \sqrt{2.56 + 0.0} = 1.6$

PHI[0]=arctgIM(C[0])/REAL(C[0) = arctg0.0/1.6 = 0.0

C[1] = 1/5*$\sum_{n=0}^{4} x[n] * exp(-2 * PI * 1 * n * j/5) = 1/5 * -8 * (cos(-2 * PI * 1 * 0/5) + j * sin(-2 * PI * 1 * 0/5)) +$
$1/5 * -8 * (cos(-2 * PI * 1 * 1/5) + j * sin(-2 * PI * 1 * 1/5)) + 1/5 * -8 * (cos(-2 * PI * 1 * 2/5) + j * sin(-2 * PI * 1 * 2/5)) + 1/5 * -$
$8 * (cos(-2 * PI * 1 * 3/5) + j * sin(-2 * PI * 1 * 3/5)) + 1/5 * -8 * (cos(-2 * PI * 1 * 4/5) + j * sin(-2 * PI * 1 * 4/5)) = 2.91 + j * 4.4 = 5.28 * e^{0.99}$

A[1]=$\sqrt{REAL(C[1])^2 + IM(C[1)^2} = \sqrt{8.4681 + 19.36} = 5.28$

$PHI[1] = arctgIM(C[1])/REAL(C[1) = arctg4.4/2.91 = 0.99$

C[2] = 1/5*$\sum_{n=0}^{4} x[n] * exp(-2 * PI * 2 * n * j/5) = 1/5 * -7 * (cos(-2 * PI * 2 * 0/5) + j * sin(-2 * PI * 2 * 0/5)) +$
$1/5 * -7 * (cos(-2 * PI * 2 * 1/5) + j * sin(-2 * PI * 2 * 1/5)) + 1/5 * -7 * (cos(-2 * PI * 2 * 2/5) + j * sin(-2 * PI * 2 * 2/5)) + 1/5 * -7 * (cos(-2 * PI * 2 * 3/5) +$
$j * sin(-2 * PI * 2 * 3/5)) + 1/5 * -7 * (cos(-2 * PI * 2 * 4/5) + j * sin(-2 * PI * 2 * 4/5)) = 1.79 + j * 0.1 = 1.79 * e^{0.06}$

A[2]=$\sqrt{REAL(C[2])^2 + IM(C[2)^2} = \sqrt{3.2041 + 0.01} = 1.79$

$PHI[2] = arctgIM(C[2])/REAL(C[2) = arctg0.1/1.79 = 0.06$

C[3] = 1/5*$\sum_{n=0}^{4} x[n] * exp(-2 * PI * 3 * n * j/5) = 1/5 * 3 * (cos(-2 * PI * 3 * 0/5) + j * sin(-2 * PI * 3 * 0/5)) +$
$1/5 * 3 * (cos(-2 * PI * 3 * 1/5) + j * sin(-2 * PI * 3 * 1/5)) + 1/5 * 3 * (cos(-2 * PI * 3 * 2/5) + j * sin(-2 * PI * 3 * 2/5)) + 1/5 * 3 * (cos(-2 * PI * 3 * 3/5) +$
$j * sin(-2 * PI * 3 * 3/5)) + 1/5 * 3 * (cos(-2 * PI * 3 * 4/5) + j * sin(-2 * PI * 3 * 4/5)) = 1.79 + j * -0.1 = 1.79 * e^{-0.06}$

A[3]=$\sqrt{REAL(C[3])^2 + IM(C[3)^2} = \sqrt{3.2041 + 0.01} = 1.79 PHI[3] = arctgIM(C[3])/REAL(C[3) = arctg-0.1/1.79 = -0.06$

C[4] = 1/5*$\sum_{n=0}^{4} x[n] * exp(-2 * PI * 4 * n * j/5) = 1/5 * 9 * (cos(-2 * PI * 4 * 0/5) + j * sin(-2 * PI * 4 * 0/5)) +$
$1/5 * 9 * (cos(-2 * PI * 4 * 1/5) + j * sin(-2 * PI * 4 * 1/5)) + 1/5 * 9 * (cos(-2 * PI * 4 * 2/5) + j * sin(-2 * PI * 4 * 2/5)) + 1/5 * 9 * (cos(-2 * PI * 4 * 3/5) +$
$j * sin(-2 * PI * 4 * 3/5)) + 1/5 * 9 * (cos(-2 * PI * 4 * 4/5) + j * sin(-2 * PI * 4 * 4/5)) = 2.91 + j * -4.4 = 5.28 * e^{-0.99}$

A[4]=$\sqrt{REAL(C[4])^2 + IM(C[4)^2} = \sqrt{8.4681 + 19.36} = 5.28 PHI[4] = arctgIM(C[4])/REAL(C[4) = arctg-4.4/2.91 = -0.99$

————————2————————

X[0] = $\sum_{n=0}^{4} C[n] * exp(-2 * PI * 0 * n * j/5) = (1.6 + j * 0.0) * (cos(-2 * PI * 0 * 0/5) + j * sin(-2 * PI * 0 * 0/5)) + (2.91 + j * 4.4) *$
$(cos(-2 * PI * 0 * 1/5) + j * sin(-2 * PI * 0 * 1/5)) + (1.79 + j * 0.1) * (cos(-2 * PI * 0 * 2/5) + j * sin(-2 * PI * 0 * 2/5)) +$
$(1.79 + j * -0.1) * (cos(-2 * PI * 0 * 3/5) + j * sin(-2 * PI * 0 * 3/5)) + (2.91 + j * -4.4) * (cos(-2 * PI * 0 * 4/5) + j * sin(-2 * PI * 0 *$

$4/5)) = (1.6+j*0.0)*(1.0+j*0.0)+(2.91+j*4.4)*(1.0+j*0.0)+$
$(1.79+j*0.1)*(1.0+j*0.0)+(1.79+j*-0.1)*(1.0+j*0.0)+(2.91+j*-4.4)*(1.0+j*0.0) = 11.0+j*0.0$

X[1] = $\sum_{n=0}^{4} C[n] * exp(-2 * PI * 1 * n * j/5) = (1.6 + j * 0.0) * (cos(-2 * PI * 1 * 0/5) + j * sin(-2 * PI * 1 * 0/5)) + (2.91 + j * 4.4)$
$(cos(-2 * PI * 1 * 1/5) + j * sin(-2 * PI * 1 * 1/5)) + (1.79 + j * 0.1) * (cos(-2 * PI * 1 * 2/5) + j * sin(-2 * PI * 1 * 2/5)) +$
$(1.79 + j * -0.1) * (cos(-2 * PI * 1 * 3/5) + j * sin(-2 * PI * 1 * 3/5)) + (2.91 + j * -4.4)$
$(cos(-2 * PI * 1 * 4/5) + j * sin(-2 * PI * 1 *$

4/5)) = (1.6+j*0.0)*(1.0+j*0.0)+(2.91+j*4.4)*(0.31+j*0.95)+
(1.79+j*0.1)*(-0.81+j*0.59)+(1.79+j*-0.1)*(-0.81+j*-0.59)
+(2.91+j*-4.4)*(0.31+j*-0.95) =-7.9736+j*0.0

X[2] = $\sum_{n=0}^{4} C[n] * exp(-2 * PI * 2 * n * j/5) = 1.6 + j * 0.0) * (cos(-2 * PI * 2 * 0/5) + j * sin(-2 * PI * 2 * 0/5)) + (2.91 + j * 4.4)$
$(cos(-2 * PI * 2 * 1/5) + j * sin(-2 * PI * 2 * 1/5)) + ($

1.79+j*0.1)*(cos(-2*PI*2*2/5)+
j*sin(-2*PI*2*2/5))+(1.79+j*-0.1)*(cos(-2*PI*2*3/5)+j*sin(-2*PI*2*3/5))+(2.91+j*-4.4)
(cos(-2*PI*2*4/5)+j*sin(-2*PI*2*

4/5)) = (1.6+j*0.0)*(1.0+j*0.0)+
(2.91+j*4.4)*(-0.81+j*0.59)+(1.79+j*0.1)*(0.31+j*-0.95)+(1.79+j*-0.1)*(0.31+j*0.95)+(2.91+j*-4.4)*(-0.81+j*-0.59) = -7.0064+j*0.0

X[3] = $\sum_{n=0}^{4} C[n] * exp(-2 * PI * 3 * n * j/5) = (1.6 + j * 0.0) * (cos(-2 * PI * 3 * 0/5) + j * sin(-2 * PI * 3 * 0/5))$
$+ (2.91 + j * 4.4) * (cos(-2 * PI * 3 * 1/5) + j * sin(-2 * PI * 3 * 1/5)) + (1.79 + j * 0.1) * (cos(-2 * PI * 3 * 2/5) + j * sin(-2 * PI * 3 * 2/5))$
$+ (1.79 + j * -0.1) * (cos(-2 * PI * 3 * 3/5) + j * sin(-2 * PI * 3 * 3/5)) + (2.91 + j * -4.4) * (cos(-2 * PI * 3 * 4/5)$
$+ j * sin(-2 * PI * 3 * 4/5)) =$
$(1.6 + j * 0.0) * (1.0 + j * 0.0) + (2.91 + j * 4.4) * (-0.81 + j * -0.59) +$
$(1.79 + j * 0.1) * (0.31 + j * 0.95) + (1.79 + j * -0.1) * (0.31 + j * -0.95) + (2.91 + j * -4.4) * (-0.81 + j * 0.59) = 2.9976 + j * 0.0$

X[4] = $\sum_{n=0}^{4} C[n] * exp(-2 * PI * 4 * n * j/5) = (1.6 + j * 0.0) * (cos(-2 * PI * 4 * 0/5) + j * sin(-2 * PI * 4 * 0/5))$
$+ (2.91 + j * 4.4) * (cos(-2 * PI * 4 * 1/5) + j * sin(-2 * PI * 4 * 1/5)) + (1.79 + j * 0.1) * (cos(-2 * PI * 4 * 2/5)$
$+ j * sin(-2 * PI * 4 * 2/5)) + (1.79 + j * -0.1) * (cos(-2 * PI * 4 * 3/5)$
$+ j * sin(-2 * PI * 4 * 3/5)) + (2.91 + j * -4.4) * (cos(-2 * PI * 4 * 4/5) + j * sin(-2 * PI * 4 * 4/5))$
$= (1.6 + j * 0.0) * (1.0 + j * 0.0) + (2.91 + j * 4.4) * (0.31 + j * -0.95) + (1.79 + j * 0.1) * (-0.81 + j * -0.59)$
$+ (1.79 + j * -0.1) * (-0.81 + j * 0.59) + (2.91 + j * -4.4) * (0.31 + j * 0.95) = 8.9824 + j * 0.0$

SIGMA = $\sqrt{1/N * \sum_{n=0}^{N-1} x[n] - X[n]^2} = \sqrt{1/5 * \sum_{n=0}^{4} x[n] - X[n]^2}$
$= \sqrt{1/5 * ((11 - 11.0)^2 + (-8 - -7.9736)^2 + (-7 - -7.0064)^2 + (3 - 2.9976)^2 + (9 - 8.9824)^2)} = \sqrt{1/5 * (0.0^2 + -0.0264^2 + 0.0064^2 + 0.0024^2 + 0.0}$
0.0145150955905

————————3————————————

11+-8+-7+3+9+0+0+0
11+8+-7+-3+9+0+0+0
11+-8+7+-3+9+0+0+0
11+8+7+3+9+0+0+0
11+-8+-7+3+-9+0+0+0
11+8+-7+-3+-9+0+0+0
11+-8+7+-3+-9+0+0+0
11+8+7+3+-9+0+0+0

[1.0, 2.25, 2.0, 4.75, -1.25, 0.0, -0.25, 2.5]

————————4————————

1.0+2.25+2.0+4.75+-1.25+0.0+-0.25+2.5
1.0+-2.25+2.0+-4.75+-1.25+-0.0+-0.25+-2.5
1.0+2.25+-2.0+-4.75+-1.25+0.0+0.25+-2.5
1.0+-2.25+-2.0+4.75+-1.25+-0.0+0.25+2.5
1.0+2.25+2.0+4.75+1.25+-0.0+0.25+-2.5
1.0+-2.25+2.0+-4.75+1.25+0.0+0.25+2.5
1.0+2.25+-2.0+-4.75+1.25+-0.0+-0.25+2.5
1.0+-2.25+-2.0+4.75+1.25+0.0+-0.25+-2.5

————————5————————

$Z = 1/N * \sqrt{\sum_{n=0}^{N-1} x_1[n] * \sum_{n=0}^{N-1} x_2[n]}$
$= 1/5 * \sqrt{\sum_{n=0}^{4} x_1[n] * \sum_{n=0}^{4} x_2[n]} = 1/5\sqrt{(11^2 + -8^2 + -7^2 + 3^2 + 9^2)^2} = 1/5 * (121 + 64 + 49 + 9 + 81) = 64.8$
$r12[0] = 1/N * \sum_{n=0}^{N-1} x[n] * x[n-1] = 1/5 * (x[0] * x[0] + x[1] * x[1] + x[2] * x[2] + x[3] * x[3] + x[4] * x[4]) =$
$1/5 * (11 * 11 + -8 * -8 + -7 * -7 + 3 * 3 + 9 * 9) = 1/5 * (11 * 11 + -8 * -8 + -7 * -7 + 3 * 3 + 9 * 9) = 64.8$

$r12[1] = 1/N * \sum_{n=0}^{N-1} x[n] * x[n-1] = 1/5 * (x[0] * x[-1] + x[1] * x[0] + x[2] * x[1] + x[3] * x[2] + x[4] * x[3]) =$
$1/5 * (11 * 0 + -8 * 11 + -7 * -8 + 3 * -7 + 9 * 3) = 1/5 * (11 * 0 + -8 * 11 + -7 * -8 + 3 * -7 + 9 * 3) = -5.2$

$r12[2] = 1/N * \sum_{n=0}^{N-1} x[n] * x[n-1] = 1/5 * (x[0] * x[-2] + x[1] * x[-1] + x[2] * x[0] + x[3] * x[1] + x[4] * x[2]) =$
$1/5 * (11 * 0 + -8 * 0 + -7 * 11 + 3 * -8 + 9 * -7) = 1/5 * (11 * 0 + -8 * 0 + -7 * 11 + 3 * -8 + 9 * -7) = -32.8$

$r12[3] = 1/N * \sum_{n=0}^{N-1} x[n] * x[n-1] = 1/5 * (x[0] * x[-3] + x[1] * x[-2] + x[2] * x[-1] + x[3] * x[0] + x[4] * x[1]) =$
$1/5 * (11 * 0 + -8 * 0 + -7 * 0 + 3 * 11 + 9 * -8) = 1/5 * (11 * 0 + -8 * 0 + -7 * 0 + 3 * 11 + 9 * -8) = -7.8$

$r12[4] = 1/N * \sum_{n=0}^{N-1} x[n] * x[n-1] = 1/5 * (x[0] * x[-4] + x[1] * x[-3] + x[2] * x[-2] + x[3] * x[-1] + x[4] * x[0]) =$
$1/5 * (11 * 0 + -8 * 0 + -7 * 0 + 3 * 0 + 9 * 11) = 1/5 * (11 * 0 + -8 * 0 + -7 * 0 + 3 * 0 + 9 * 11) = 19.8$

B12[0] = r12[0]/Z = 64.8/64.8 = 1.0
B12[1] = r12[1]/Z = -5.2/64.8 = -0.0802469135802
B12[2] = r12[2]/Z = -32.8/64.8 = -0.506172839506
B12[3] = r12[3]/Z = -7.8/64.8 = -0.12037037037
B12[4] = r12[4]/Z = 19.8/64.8 = 0.305555555556