```
%verification of the final 10-point DFT algorithm given by equation
 (15)
clc
clear

syms x0 x1 x2 x3 x4 x5 x6 x7 x8 x9
syms X0 X1 X2 X3 X4 X5 X6 X7 X8 X9
syms a0 a1 a2 a3 a4 a5 a6 a7 a8 a9
syms A0 A1 A2 A3 A4 A5 A6 A7 A8 A9

x = [x0; x1; x2; x3; x4; x5; x6; x7; x8; x9];
X = [X0; X1; X2; X3; X4; X5; X6; X7; X8; X9];
a = [a0; a1; a2; a3; a4; a5; a6; a7; a8; a9];
A = [A0; A1; A2; A3; A4; A5; A6; A7; A8; A9];

w10=exp(-j*2*pi/10)

W10=[];
for k=0:9
W10 = [W10; [w10^(k*0) w10^(k*1) w10^(k*2) w10^(k*3) w10^(k*4)
 w10^(k*5) w10^(k*6) w10^(k*7) w10^(k*8) w10^(k*9)]];
end

 V10=[1 0 0 0 0 0 0 0 0 0;
     0 1 0 0 0 0 0 0 0 1;
     0 0 1 0 0 0 0 0 1 0;
     0 0 0 1 0 0 0 1 0 0;
     0 0 0 0 1 0 1 0 0 0;
     0 0 0 0 0 1 0 0 0 0;
     0 0 0 0 1 0 -1 0 0 0;
     0 0 0 1 0 0 0 -1 0 0;
     0 0 1 0 0 0 0 0 -1 0;
     0 1 0 0 0 0 0 0 0 -1]

  V10h=[1 0 0 0 0 1 0 0 0 0;
       0 1 0 0 1 0 0 0 0 0;
       0 0 1 1 0 0 0 0 0 0;
       0 0 1 -1 0 0 0 0 0 0;
       0 1 0 0 -1 0 0 0 0 0;
       1 0 0 0 0 -1 0 0 0 0;
       0 0 0 0 0 0 1 0 0 1;
       0 0 0 0 0 0 0 1 1 0;
       0 0 0 0 0 0 0 1 -1 0;
       0 0 0 0 0 0 1 0 0 -1]

 S10c = diag([1 1 1 -1 -1 1 1 1 1 -1])
 S10r = diag([1 1 -1 1 1 1 1 1 1 1])


T12x10=[1 0 0 0 0 0 0 0 0 0;
      0 0 1 0 1 0 0 0 0 0;
      0 0 1 0 -1 0 0 0 0 0;
```

```
      0 0 0 0 0 1 0 0 0 0;
      0 1 0 1 0 0 0 0 0 0;
      0 1 0 -1 0 0 0 0 0 0;
      0 0 0 0 0 0 0 -1 0 0;
      0 0 0 0 0 0 0 0 0 1;
      0 0 0 0 0 0 0 1 0 1;
      0 0 0 0 0 0 -1 0 0 0;
      0 0 0 0 0 0 0 0 1 0;
      0 0 0 0 0 0 1 0 1 0]

A14x12=[1 0 0 0 0 0 0 0 0 0 0 0;
     0 (a1+a2)/2 0 0 0 0 0 0 0 0 0 0;
     0 0 (a1-a2)/2 0 0 0 0 0 0 0 0 0;
     0 0 1 0 0 0 0 0 0 0 0 0;
     0 0 0 1 0 0 0 0 0 0 0 0;
     0 0 0 0 (a1+a2)/2 0 0 0 0 0 0 0;
     0 0 0 0 0 (a1-a2)/2 0 0 0 0 0 0;
     0 0 0 0 0 1 0 0 0 0 0 0;
     0 0 0 0 0 0 a3+a4 0 0 0 0 0;
     0 0 0 0 0 0 0 a3-a4 0 0 0 0;
     0 0 0 0 0 0 0 0 a4 0 0 0;
     0 0 0 0 0 0 0 0 0 a3+a4 0 0;
     0 0 0 0 0 0 0 0 0 0 a3-a4 0;
     0 0 0 0 0 0 0 0 0 0 0 a4]


T10x14 = [1 0 0 1 0 0 0 0 0 0 0 0 0 0;
       1 1 1 0 0 0 0 0 0 0 0 0 0 0;
      -1 1 -1 0 0 0 0 0 0 0 0 0 0 0;
       0 0 0 0 1 1 1 0 0 0 0 0 0 0;
       0 0 0 0 -1 1 -1 0 0 0 0 0 0 0;
       0 0 0 0 1 0 0 1 0 0 0 0 0 0;
       0 0 0 0 0 0 0 0 1 0 1 0 0 0;
       0 0 0 0 0 0 0 0 0 1 1 0 0 0;
       0 0 0 0 0 0 0 0 0 0 0 1 0 1;
       0 0 0 0 0 0 0 0 0 0 0 0 1 1]

display('verification of the algorithm (15)')
display(W10 - V10*V10h*S10r*T10x14*A14x12*T12x10*S10c*V10)


w10 =

   0.8090 - 0.5878i


V10 =

     1     0     0     0     0     0     0     0     0     0
     0     1     0     0     0     0     0     0     0     1
     0     0     1     0     0     0     0     0     1     0
     0     0     0     1     0     0     0     1     0     0
     0     0     0     0     1     0     1     0     0     0
     0     0     0     0     0     1     0     0     0     0
```

```
     0     0     0     0     1     0    -1     0     0     0
     0     0     0     1     0     0     0    -1     0     0
     0     0     1     0     0     0     0     0    -1     0
     0     1     0     0     0     0     0     0     0    -1
```

V10h =

```
     1     0     0     0     0     1     0     0     0     0
     0     1     0     0     1     0     0     0     0     0
     0     0     1     1     0     0     0     0     0     0
     0     0     1    -1     0     0     0     0     0     0
     0     1     0     0    -1     0     0     0     0     0
     1     0     0     0     0    -1     0     0     0     0
     0     0     0     0     0     0     1     0     0     1
     0     0     0     0     0     0     0     1     1     0
     0     0     0     0     0     0     0     1    -1     0
     0     0     0     0     0     0     1     0     0    -1
```

S10c =

```
     1     0     0     0     0     0     0     0     0     0
     0     1     0     0     0     0     0     0     0     0
     0     0     1     0     0     0     0     0     0     0
     0     0     0    -1     0     0     0     0     0     0
     0     0     0     0    -1     0     0     0     0     0
     0     0     0     0     0     1     0     0     0     0
     0     0     0     0     0     0     1     0     0     0
     0     0     0     0     0     0     0     1     0     0
     0     0     0     0     0     0     0     0     1     0
     0     0     0     0     0     0     0     0     0    -1
```

S10r =

```
     1     0     0     0     0     0     0     0     0     0
     0     1     0     0     0     0     0     0     0     0
     0     0    -1     0     0     0     0     0     0     0
     0     0     0     1     0     0     0     0     0     0
     0     0     0     0     1     0     0     0     0     0
     0     0     0     0     0     1     0     0     0     0
     0     0     0     0     0     0     1     0     0     0
     0     0     0     0     0     0     0     1     0     0
     0     0     0     0     0     0     0     0     1     0
     0     0     0     0     0     0     0     0     0     1
```

T12x10 =

```
     1     0     0     0     0     0     0     0     0     0
     0     0     1     0     1     0     0     0     0     0
     0     0     1     0    -1     0     0     0     0     0
     0     0     0     0     0     1     0     0     0     0
```

```
     0     1     0     1     0     0     0     0     0     0
     0     1     0    -1     0     0     0     0     0     0
     0     0     0     0     0     0     0    -1     0     0
     0     0     0     0     0     0     0     0     0     1
     0     0     0     0     0     0     0     1     0     1
     0     0     0     0     0     0    -1     0     0     0
     0     0     0     0     0     0     0     0     1     0
     0     0     0     0     0     0     1     0     1     0
```

A14x12 =

```
[ 1,           0,           0, 0,           0,           0,       0,
     0,  0,       0,       0,  0]
[ 0, a1/2 + a2/2,           0, 0,           0,           0,       0,
     0,  0,       0,       0,  0]
[ 0,           0, a1/2 - a2/2, 0,           0,           0,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           1, 0,           0,           0,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 1,           0,           0,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 0, a1/2 + a2/2,           0,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 0,           0, a1/2 - a2/2,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 0,           0,           1,       0,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 0,           0,           0, a3 + a4,
     0,  0,       0,       0,  0]
[ 0,           0,           0, 0,           0,           0,       0,
 a3 - a4,  0,       0,       0,  0]
[ 0,           0,           0, 0,           0,           0,       0,
     0, a4,       0,       0,  0]
[ 0,           0,           0, 0,           0,           0,       0,
     0,  0, a3 + a4,       0,  0]
[ 0,           0,           0, 0,           0,           0,       0,
     0,  0,       0, a3 - a4,  0]
[ 0,           0,           0, 0,           0,           0,       0,
     0,  0,       0,       0, a4]
```

T10x14 =

```
  Columns 1 through 13

     1     0     0     1     0     0     0     0     0     0     0
 0     0
     1     1     1     0     0     0     0     0     0     0     0
 0     0
    -1     1    -1     0     0     0     0     0     0     0     0
 0     0
     0     0     0     0     1     1     1     0     0     0     0
 0     0
```

```
     0     0     0     0    -1     1    -1     0     0     0     0
 0     0
     0     0     0     0     1     0     0     1     0     0     0
 0     0
     0     0     0     0     0     0     0     0     1     0     1
 0     0
     0     0     0     0     0     0     0     0     0     1     1
 0     0
     0     0     0     0     0     0     0     0     0     0     0
 1     0
     0     0     0     0     0     0     0     0     0     0     0
 0     1

  Column 14

     0
     0
     0
     0
     0
     0
     0
     0
     1
     1

verification of the algorithm (15)

ans =

[ 0,
                0,
                              0,
                                            0,
                                                          0,
          0,
                        0,
                                      0,
                                                    0,
                                                                  0]
[ 0, a4 - a2 + (910872158600853/1125899906842624
 - 2647149443198255i/4503599627370496),
 a3 - a1 + (347922205179541/1125899906842624 -
 334623263468 37i/35184372088832),      a1 + a3 -
 5566755282872655/18014398509481984 - 334623263468 37i/35184372088832,
   a2 + a4 - 7286977268806825/9007199254740992 -
 5294298886396511i/9007199254740992,
    0,    a2 - a4 - 3643488634403413/4503599627370496
 + 5294298886396511i/9007199254740992,
 a1 - a3 - 2783377641436329/9007199254740992
 + 8566355544790273i/9007199254740992,
 5566755282872657/18014398509481984 - a3 -
 a1 + 8566355544790275i/9007199254740992,
```

```
 3643488634403413/4503599627370496 - a4 - a2 +
 5294298886396513i/9007199254740992]
[ 0,     a3 - a1 + (347922205179541/1125899906842624
 - 33462326346837i/35184372088832),   a2 +
 a4 - 7286977268806825/9007199254740992 -
 5294298886396511i/9007199254740992,   a2
 - a4 - 3643488634403413/4503599627370496
 + 529429886396511i/9007199254740992,
 5566755282872657/18014398509481984 - a3 - a1 +
 8566355544790275i/9007199254740992,  1i/18014398509481984,
  a3 - a1 + (1391688820718165/4503599627370496
 - 21415888861975691/2251799813685248),
 a2 + a4 - 1821744317201707/2251799813685248
 - 2647149443198257i/4503599627370496,   a2
 - a4 - 3643488634403415/4503599627370496
 + 2647149443198257i/4503599627370496,
 1391688820718165/4503599627370496 - a3 - a1 +
 8566355544790279i/9007199254740992]
[ 0,     a1 + a3 - 5566755282872655/18014398509481984
 - 33462326346837i/35184372088832,   a2
 - a4 - 3643488634403413/4503599627370496
 + 529429886396511i/9007199254740992,
 3643488634403413/4503599627370496 - a4 - a2
 + 5294298886396513i/9007199254740992, a3 -
 a1 + (1391688820718165/4503599627370496 -
 21415888861975691/2251799813685248), -3i/18014398509481984,
    1391688820718165/4503599627370496 - a3 -
 a1 + 8566355544790279i/9007199254740992,
 a4 - a2 + (455436079300427/562949953421312 -
 5294298886396515i/9007199254740992),     a2 + a4 -
 455436079300427/562949953421312 - 2647149443198259i/4503599627370496,
  a1 - a3 - 5566755282872665/18014398509481984 +
 4283177772395141i/4503599627370496]
[ 0,  a2 + a4 - 7286977268806825/9007199254740992
 - 529429886396511i/9007199254740992,
 5566755282872657/18014398509481984 - a3 -
 a1 + 8566355544790275i/9007199254740992, a3
 - a1 + (1391688820718165/4503599627370496
 - 21415888861975691/2251799813685248),   a2
 - a4 - 3643488634403415/4503599627370496 +
 2647149443198257i/4503599627370496,  1i/18014398509481984,
      a2 + a4 - 455436079300427/562949953421312
 - 2647149443198259i/4503599627370496,
 5566755282872661/18014398509481984 - a3 -
 a1 + 8566355544790283i/9007199254740992, a3
 - a1 + (2783377641436333/9007199254740992
 - 8566355544790285i/9007199254740992),   a2
 - a4 - 3643488634403419/4503599627370496 +
 5294298886396519i/9007199254740992]
[ 0,
                0,
              1i/18014398509481984,
                            -3i/18014398509481984,
                                                1i/18014398509481984,
```

```
 -3i/18014398509481984,
                        1i/9007199254740992,
                                             -1i/9007199254740992,

 1i/9007199254740992,
                -1i/9007199254740992]
[ 0,  a2 - a4 - 3643488634403413/4503599627370496
 + 5294298886396511i/9007199254740992, a3
 - a1 + (1391688820718165/4503599627370496
 - 21415888861975691/2251799813685248),
 1391688820718165/4503599627370496 - a3 - a1 +
 85663555447902791/9007199254740992,     a2 + a4 -
 455436079300427/562949953421312 - 26471494431982591/4503599627370496,
   1i/9007199254740992,    a2 - a4 - 3643488634403419/4503599627370496
 + 5294298886396519i/9007199254740992, a3
 - a1 + (5566755282872669/18014398509481984
 - 85663555447902891/9007199254740992),
 1391688820718167/4503599627370496 - a3 - a1
 + 85663555447902931/9007199254740992,   a2
 + a4 - 3643488634403421/4503599627370496 -
 26471494431982631/4503599627370496]
[ 0,  a1 - a3 - 2783377641436329/9007199254740992
 + 85663555447902731/9007199254740992,   a2
 + a4 - 1821744317201707/2251799813685248
 - 26471494431982571/4503599627370496,
 a4 - a2 + (455436079300427/562949953421312
 - 52942988863965151/9007199254740992),
 5566755282872661/18014398509481984 - a3 - a1 +
 85663555447902831/9007199254740992,  -1i/9007199254740992,
 a3 - a1 + (5566755282872669/18014398509481984
 - 85663555447902891/9007199254740992),
 910872158600855/1125899906842624 - a4 - a2
 + 13235747215991311/2251799813685248,   a2
 - a4 - 3643488634403423/4503599627370496
 + 1323574721599131i/2251799813685248,   a1
 + a3 - 1391688820718167/4503599627370496 -
 85663555447902991/9007199254740992]
[ 0, 5566755282872657/18014398509481984 - a3
 - a1 + 85663555447902751/9007199254740992,
 a2 - a4 - 3643488634403415/4503599627370496 +
 26471494431982571/4503599627370496,     a2 + a4 -
 455436079300427/562949953421312 - 26471494431982591/4503599627370496,
 a3 - a1 + (2783377641436333/9007199254740992 -
 85663555447902851/9007199254740992),   1i/9007199254740992,
    1391688820718167/4503599627370496 - a3 -
 a1 + 85663555447902931/9007199254740992,
 a2 - a4 - 3643488634403423/4503599627370496 +
 1323574721599131i/2251799813685248,     a2 + a4 -
 7286977268806847/9007199254740992 - 3308936803997831/562949953421312,
 a3 - a1 + (2783377641436339/9007199254740992 -
 85663555447903031/9007199254740992)]
[ 0,  3643488634403413/4503599627370496 - a4
 - a2 + 5294298886396513i/9007199254740992,
   1391688820718165/4503599627370496 - a3 -
```

```
 a1 + 8566355544790279i/9007199254740992,  a1
 - a3 - 5566755282872665/18014398509481984
 + 4283177772395141i/4503599627370496,   a2
 - a4 - 3643488634403419/4503599627370496 +
 52942988863965l9i/9007199254740992,  -1i/9007199254740992,
    a2 + a4 - 3643488634403421/4503599627370496
 - 2647149443198263i/4503599627370496,
 a1 + a3 - 1391688820718167/4503599627370496
 - 8566355544790299i/9007199254740992, a3 -
 a1 + (2783377641436339/9007199254740992 -
 8566355544790303i/9007199254740992), a4 -
 a2 + (3643488634403427/4503599627370496 -
 2647149443198265i/4503599627370496)]


imag=1i
a1=cos(2*pi/5)
a2 = cos(pi/5)
a3 = imag*sin(2*pi/5)
a4 = imag*sin(pi/5)

A14x12=[1 0 0 0 0 0 0 0 0 0 0 0;
     0 (a1+a2)/2 0 0 0 0 0 0 0 0 0 0;
     0 0 (a1-a2)/2 0 0 0 0 0 0 0 0 0;
     0 0 1 0 0 0 0 0 0 0 0 0;
     0 0 0 1 0 0 0 0 0 0 0 0;
     0 0 0 0 (a1+a2)/2 0 0 0 0 0 0 0;
     0 0 0 0 0 (a1-a2)/2 0 0 0 0 0 0;
     0 0 0 0 0 1 0 0 0 0 0 0;
     0 0 0 0 0 0 a3+a4 0 0 0 0 0;
     0 0 0 0 0 0 0 a3-a4 0 0 0 0;
     0 0 0 0 0 0 0 0 a4 0 0 0;
     0 0 0 0 0 0 0 0 0 a3+a4 0 0;
     0 0 0 0 0 0 0 0 0 0 a3-a4 0;
     0 0 0 0 0 0 0 0 0 0 0 a4]

display('verification of the algorithm (15) for real values')
display(W10 - V10*V10h*S10r*T10x14*A14x12*T12x10*S10c*V10)


imag =

   0.0000 + 1.0000i


a1 =

    0.3090


a2 =

    0.8090
```

```
a3 =

   0.0000 + 0.9511i


a4 =

   0.0000 + 0.5878i


A14x12 =

  Columns 1 through 4

   1.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.5590 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i  -0.2500 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   1.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   1.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i

  Columns 5 through 8

   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
 0.0000i
```

```
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.5590 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i  -0.2500 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   1.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 1.5388i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.3633i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i

 Columns 9 through 12

  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.5878i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 1.5388i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.3633i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.5878i

verification of the algorithm (15) for real values
  1.0e-14 *
```

```
 Columns 1 through 4

  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 - 0.0111i   0.0056 -
0.0222i
  0.0000 + 0.0000i   0.0000 - 0.0111i  -0.0111 - 0.0111i  -0.0222 +
0.0111i
  0.0000 + 0.0000i   0.0056 - 0.0111i  -0.0222 + 0.0111i   0.0222 +
0.0333i
  0.0000 + 0.0000i  -0.0111 - 0.0111i   0.0056 + 0.0444i   0.0222 -
0.0666i
  0.0000 + 0.0000i  -0.0222 + 0.0000i   0.0444 + 0.0056i  -0.0666 -
0.0167i
  0.0000 + 0.0000i  -0.0222 + 0.0111i   0.0222 - 0.0555i   0.0222 +
0.0999i
  0.0000 + 0.0000i  -0.0111 + 0.0222i  -0.0444 - 0.0444i   0.0888 -
0.0555i
  0.0000 + 0.0000i   0.0056 + 0.0444i  -0.0666 + 0.0444i  -0.0888 -
0.0888i
  0.0000 + 0.0000i   0.0222 + 0.0333i   0.0222 + 0.0888i  -0.0500 +
0.1332i

 Columns 5 through 8

  0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 +
0.0000i
 -0.0111 - 0.0111i  -0.0222 + 0.0000i  -0.0222 + 0.0111i  -0.0111 +
0.0333i
  0.0056 + 0.0555i   0.0444 + 0.0056i   0.0222 - 0.0666i  -0.0444 -
0.0444i
  0.0222 - 0.0666i  -0.0666 - 0.0167i   0.0222 + 0.0999i   0.0888 -
0.0555i
 -0.0666 + 0.0444i   0.0888 + 0.0056i  -0.0888 - 0.0888i   0.0278 +
0.1443i
  0.0888 + 0.0056i  -0.1332 - 0.0167i   0.1332 + 0.0111i  -0.1554 -
0.0111i
 -0.0888 - 0.0888i   0.1332 + 0.0111i  -0.1554 + 0.0999i   0.0722 -
0.2109i
  0.0278 + 0.1443i  -0.1554 - 0.0111i   0.0722 - 0.2109i   0.1776 +
0.1554i
  0.0555 - 0.1665i   0.1998 + 0.0111i   0.0666 + 0.2554i  -0.2442 +
0.1554i
 -0.1554 + 0.0999i  -0.2220 - 0.0111i  -0.1998 - 0.1776i  -0.0666 -
0.3220i

 Columns 9 through 10

  0.0000 + 0.0000i   0.0000 + 0.0000i
  0.0056 + 0.0444i   0.0222 + 0.0333i
 -0.0666 + 0.0444i   0.0222 + 0.0888i
 -0.0888 - 0.0888i  -0.0500 + 0.1221i
  0.0555 - 0.1554i  -0.1554 + 0.0999i
```

```
   0.1998 + 0.0111i  -0.2220 - 0.0111i
   0.0666 + 0.2442i  -0.1998 - 0.1776i
  -0.2442 + 0.1554i  -0.0666 - 0.3109i
  -0.2554 - 0.1998i   0.1221 - 0.3553i
   0.1221 - 0.3553i   0.3331 - 0.2220i
```

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