
```
%Doriety Lab3_p1

%signal x_t
xt=ones(1,1000);
precede= zeros(1,500);
trail = zeros(1,500);
x=[precede xt trail];

%g_t signal

dt=.001
t=0:dt:.999% time for signal
gt= exp(-10*t);
precede_1= zeros(1,500);
trail_1 = zeros(1,500);
g=[precede_1 gt trail_1];

%signal y1=2gt - xt
y= 2*g -x;

n=length(y);
f=1/(n*dt);
k=0:n/2-1;
f2=k*f;

%graphing y
figure(1)
subplot(2,1,1);
a=fft(y)*dt;
stem(f2,abs(a(1:n/2)));
title('fft Mag ');
ylabel('Magnitude');
xlabel('k');
xlim([0,50]);
hold on

%angle for fft
subplot(2,1,2);
a=fft(y)*dt;
stem(f2,angle(a(1:n/2)));
title('fft Angle ');
ylabel('Angle');
xlabel('k');
xlim([0,50]);
hold off

%Linearity
G=fft(g)*dt;
X=fft(x) *dt;
```

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y1=2 * G-X;

%graphing y1
figure(2)
subplot(2,1,1);
stem(f2,abs(y1(1:n/2)));
title('fft Y1 Mag ');
ylabel('Magnitude');
xlabel('k');
xlim([0,50]);
hold on

%angle for fft
subplot(2,1,2);
stem(f2,angle(y1(1:n/2)));
title('fft/Y1 Angle ');
ylabel('Angle');
xlabel('k');
xlim([0,50]);
hold off

%time shift
ys= ones(1,1000);
precede_2=zeros(1,700);
trail_2 = zeros(1,300);
y2=[precede_2 ys trail_2];

Y2= fft(y2)*dt;
n1=length(y2);
df= 1/(n1*dt);
k=0:n1/2-1;
f2=k*df;

%graphing time shift
figure(3)
subplot(2,1,1);
stem(f2,abs(Y2(1:n1/2)));
title('fft Y1 Mag Time shift ');
ylabel('Magnitude');
xlabel('k');
xlim([0,50]);
hold on

%angle for fft
subplot(2,1,2);
stem(f2,angle(Y2(1:n1/2)));
title('fft/Y1 Angle ');
ylabel('Angle');
xlabel('k');
xlim([0,50]);
hold off

%Frequency shift

```

```

e=exp(1i.*100*pi*t);
precede_4=zeros(1,500);
trail_4=zeros(1,500);
e1=[precede_4 e trail];
E=fft(e1)*dt;
figure(4)
subplot(2,1,1);
stem(f2,abs(E(1:n1/2)));
title('fft Y1 Mag Freq shift ');
ylabel('Magnitude');
xlabel('k');
xlim([0,100]);
hold on

%angle for fft
subplot(2,1,2);
stem(f2+50,angle(E(1:n1/2)));
title('fft Frequency shift Angle ');
ylabel('Angle');
xlabel('k');
xlim([0,100]);
hold off

```

$dt =$

1.0000e-03

$t =$

Columns 1 through 7

0	0.0010	0.0020	0.0030	0.0040	0.0050	0.0060
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Columns 8 through 14

0.0070	0.0080	0.0090	0.0100	0.0110	0.0120	0.0130
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Columns 15 through 21

0.0140	0.0150	0.0160	0.0170	0.0180	0.0190	0.0200
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Columns 22 through 28

0.0210	0.0220	0.0230	0.0240	0.0250	0.0260	0.0270
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Columns 29 through 35

0.0280	0.0290	0.0300	0.0310	0.0320	0.0330	0.0340
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Columns 36 through 42

0.0350	0.0360	0.0370	0.0380	0.0390	0.0400	0.0410
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Columns 43 through 49

0.0420 0.0430 0.0440 0.0450 0.0460 0.0470 0.0480

Columns 50 through 56

0.0490 0.0500 0.0510 0.0520 0.0530 0.0540 0.0550

Columns 57 through 63

0.0560 0.0570 0.0580 0.0590 0.0600 0.0610 0.0620

Columns 64 through 70

0.0630 0.0640 0.0650 0.0660 0.0670 0.0680 0.0690

Columns 71 through 77

0.0700 0.0710 0.0720 0.0730 0.0740 0.0750 0.0760

Columns 78 through 84

0.0770 0.0780 0.0790 0.0800 0.0810 0.0820 0.0830

Columns 85 through 91

0.0840 0.0850 0.0860 0.0870 0.0880 0.0890 0.0900

Columns 92 through 98

0.0910 0.0920 0.0930 0.0940 0.0950 0.0960 0.0970

Columns 99 through 105

0.0980 0.0990 0.1000 0.1010 0.1020 0.1030 0.1040

Columns 106 through 112

0.1050 0.1060 0.1070 0.1080 0.1090 0.1100 0.1110

Columns 113 through 119

0.1120 0.1130 0.1140 0.1150 0.1160 0.1170 0.1180

Columns 120 through 126

0.1190 0.1200 0.1210 0.1220 0.1230 0.1240 0.1250

Columns 127 through 133

0.1260 0.1270 0.1280 0.1290 0.1300 0.1310 0.1320

Columns 134 through 140

0.1330	0.1340	0.1350	0.1360	0.1370	0.1380	0.1390
Columns 141 through 147						
0.1400	0.1410	0.1420	0.1430	0.1440	0.1450	0.1460
Columns 148 through 154						
0.1470	0.1480	0.1490	0.1500	0.1510	0.1520	0.1530
Columns 155 through 161						
0.1540	0.1550	0.1560	0.1570	0.1580	0.1590	0.1600
Columns 162 through 168						
0.1610	0.1620	0.1630	0.1640	0.1650	0.1660	0.1670
Columns 169 through 175						
0.1680	0.1690	0.1700	0.1710	0.1720	0.1730	0.1740
Columns 176 through 182						
0.1750	0.1760	0.1770	0.1780	0.1790	0.1800	0.1810
Columns 183 through 189						
0.1820	0.1830	0.1840	0.1850	0.1860	0.1870	0.1880
Columns 190 through 196						
0.1890	0.1900	0.1910	0.1920	0.1930	0.1940	0.1950
Columns 197 through 203						
0.1960	0.1970	0.1980	0.1990	0.2000	0.2010	0.2020
Columns 204 through 210						
0.2030	0.2040	0.2050	0.2060	0.2070	0.2080	0.2090
Columns 211 through 217						
0.2100	0.2110	0.2120	0.2130	0.2140	0.2150	0.2160
Columns 218 through 224						
0.2170	0.2180	0.2190	0.2200	0.2210	0.2220	0.2230
Columns 225 through 231						
0.2240	0.2250	0.2260	0.2270	0.2280	0.2290	0.2300

Columns 232 through 238

0.2310	0.2320	0.2330	0.2340	0.2350	0.2360	0.2370
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Columns 239 through 245

0.2380	0.2390	0.2400	0.2410	0.2420	0.2430	0.2440
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Columns 246 through 252

0.2450	0.2460	0.2470	0.2480	0.2490	0.2500	0.2510
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Columns 253 through 259

0.2520	0.2530	0.2540	0.2550	0.2560	0.2570	0.2580
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Columns 260 through 266

0.2590	0.2600	0.2610	0.2620	0.2630	0.2640	0.2650
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Columns 267 through 273

0.2660	0.2670	0.2680	0.2690	0.2700	0.2710	0.2720
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Columns 274 through 280

0.2730	0.2740	0.2750	0.2760	0.2770	0.2780	0.2790
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Columns 281 through 287

0.2800	0.2810	0.2820	0.2830	0.2840	0.2850	0.2860
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Columns 288 through 294

0.2870	0.2880	0.2890	0.2900	0.2910	0.2920	0.2930
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Columns 295 through 301

0.2940	0.2950	0.2960	0.2970	0.2980	0.2990	0.3000
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Columns 302 through 308

0.3010	0.3020	0.3030	0.3040	0.3050	0.3060	0.3070
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Columns 309 through 315

0.3080	0.3090	0.3100	0.3110	0.3120	0.3130	0.3140
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Columns 316 through 322

0.3150	0.3160	0.3170	0.3180	0.3190	0.3200	0.3210
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Columns 323 through 329

0.3220	0.3230	0.3240	0.3250	0.3260	0.3270	0.3280
Columns 330 through 336						
0.3290	0.3300	0.3310	0.3320	0.3330	0.3340	0.3350
Columns 337 through 343						
0.3360	0.3370	0.3380	0.3390	0.3400	0.3410	0.3420
Columns 344 through 350						
0.3430	0.3440	0.3450	0.3460	0.3470	0.3480	0.3490
Columns 351 through 357						
0.3500	0.3510	0.3520	0.3530	0.3540	0.3550	0.3560
Columns 358 through 364						
0.3570	0.3580	0.3590	0.3600	0.3610	0.3620	0.3630
Columns 365 through 371						
0.3640	0.3650	0.3660	0.3670	0.3680	0.3690	0.3700
Columns 372 through 378						
0.3710	0.3720	0.3730	0.3740	0.3750	0.3760	0.3770
Columns 379 through 385						
0.3780	0.3790	0.3800	0.3810	0.3820	0.3830	0.3840
Columns 386 through 392						
0.3850	0.3860	0.3870	0.3880	0.3890	0.3900	0.3910
Columns 393 through 399						
0.3920	0.3930	0.3940	0.3950	0.3960	0.3970	0.3980
Columns 400 through 406						
0.3990	0.4000	0.4010	0.4020	0.4030	0.4040	0.4050
Columns 407 through 413						
0.4060	0.4070	0.4080	0.4090	0.4100	0.4110	0.4120
Columns 414 through 420						
0.4130	0.4140	0.4150	0.4160	0.4170	0.4180	0.4190

Columns 421 through 427

0.4200	0.4210	0.4220	0.4230	0.4240	0.4250	0.4260
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Columns 428 through 434

0.4270	0.4280	0.4290	0.4300	0.4310	0.4320	0.4330
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Columns 435 through 441

0.4340	0.4350	0.4360	0.4370	0.4380	0.4390	0.4400
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Columns 442 through 448

0.4410	0.4420	0.4430	0.4440	0.4450	0.4460	0.4470
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Columns 449 through 455

0.4480	0.4490	0.4500	0.4510	0.4520	0.4530	0.4540
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Columns 456 through 462

0.4550	0.4560	0.4570	0.4580	0.4590	0.4600	0.4610
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Columns 463 through 469

0.4620	0.4630	0.4640	0.4650	0.4660	0.4670	0.4680
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Columns 470 through 476

0.4690	0.4700	0.4710	0.4720	0.4730	0.4740	0.4750
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Columns 477 through 483

0.4760	0.4770	0.4780	0.4790	0.4800	0.4810	0.4820
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Columns 484 through 490

0.4830	0.4840	0.4850	0.4860	0.4870	0.4880	0.4890
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Columns 491 through 497

0.4900	0.4910	0.4920	0.4930	0.4940	0.4950	0.4960
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Columns 498 through 504

0.4970	0.4980	0.4990	0.5000	0.5010	0.5020	0.5030
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Columns 505 through 511

0.5040	0.5050	0.5060	0.5070	0.5080	0.5090	0.5100
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Columns 512 through 518

0.5110	0.5120	0.5130	0.5140	0.5150	0.5160	0.5170
Columns 519 through 525						
0.5180	0.5190	0.5200	0.5210	0.5220	0.5230	0.5240
Columns 526 through 532						
0.5250	0.5260	0.5270	0.5280	0.5290	0.5300	0.5310
Columns 533 through 539						
0.5320	0.5330	0.5340	0.5350	0.5360	0.5370	0.5380
Columns 540 through 546						
0.5390	0.5400	0.5410	0.5420	0.5430	0.5440	0.5450
Columns 547 through 553						
0.5460	0.5470	0.5480	0.5490	0.5500	0.5510	0.5520
Columns 554 through 560						
0.5530	0.5540	0.5550	0.5560	0.5570	0.5580	0.5590
Columns 561 through 567						
0.5600	0.5610	0.5620	0.5630	0.5640	0.5650	0.5660
Columns 568 through 574						
0.5670	0.5680	0.5690	0.5700	0.5710	0.5720	0.5730
Columns 575 through 581						
0.5740	0.5750	0.5760	0.5770	0.5780	0.5790	0.5800
Columns 582 through 588						
0.5810	0.5820	0.5830	0.5840	0.5850	0.5860	0.5870
Columns 589 through 595						
0.5880	0.5890	0.5900	0.5910	0.5920	0.5930	0.5940
Columns 596 through 602						
0.5950	0.5960	0.5970	0.5980	0.5990	0.6000	0.6010
Columns 603 through 609						
0.6020	0.6030	0.6040	0.6050	0.6060	0.6070	0.6080

Columns 610 through 616

0.6090	0.6100	0.6110	0.6120	0.6130	0.6140	0.6150
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Columns 617 through 623

0.6160	0.6170	0.6180	0.6190	0.6200	0.6210	0.6220
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Columns 624 through 630

0.6230	0.6240	0.6250	0.6260	0.6270	0.6280	0.6290
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Columns 631 through 637

0.6300	0.6310	0.6320	0.6330	0.6340	0.6350	0.6360
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Columns 638 through 644

0.6370	0.6380	0.6390	0.6400	0.6410	0.6420	0.6430
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Columns 645 through 651

0.6440	0.6450	0.6460	0.6470	0.6480	0.6490	0.6500
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Columns 652 through 658

0.6510	0.6520	0.6530	0.6540	0.6550	0.6560	0.6570
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Columns 659 through 665

0.6580	0.6590	0.6600	0.6610	0.6620	0.6630	0.6640
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Columns 666 through 672

0.6650	0.6660	0.6670	0.6680	0.6690	0.6700	0.6710
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Columns 673 through 679

0.6720	0.6730	0.6740	0.6750	0.6760	0.6770	0.6780
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Columns 680 through 686

0.6790	0.6800	0.6810	0.6820	0.6830	0.6840	0.6850
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Columns 687 through 693

0.6860	0.6870	0.6880	0.6890	0.6900	0.6910	0.6920
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Columns 694 through 700

0.6930	0.6940	0.6950	0.6960	0.6970	0.6980	0.6990
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Columns 701 through 707

0.7000	0.7010	0.7020	0.7030	0.7040	0.7050	0.7060
Columns 708 through 714						
0.7070	0.7080	0.7090	0.7100	0.7110	0.7120	0.7130
Columns 715 through 721						
0.7140	0.7150	0.7160	0.7170	0.7180	0.7190	0.7200
Columns 722 through 728						
0.7210	0.7220	0.7230	0.7240	0.7250	0.7260	0.7270
Columns 729 through 735						
0.7280	0.7290	0.7300	0.7310	0.7320	0.7330	0.7340
Columns 736 through 742						
0.7350	0.7360	0.7370	0.7380	0.7390	0.7400	0.7410
Columns 743 through 749						
0.7420	0.7430	0.7440	0.7450	0.7460	0.7470	0.7480
Columns 750 through 756						
0.7490	0.7500	0.7510	0.7520	0.7530	0.7540	0.7550
Columns 757 through 763						
0.7560	0.7570	0.7580	0.7590	0.7600	0.7610	0.7620
Columns 764 through 770						
0.7630	0.7640	0.7650	0.7660	0.7670	0.7680	0.7690
Columns 771 through 777						
0.7700	0.7710	0.7720	0.7730	0.7740	0.7750	0.7760
Columns 778 through 784						
0.7770	0.7780	0.7790	0.7800	0.7810	0.7820	0.7830
Columns 785 through 791						
0.7840	0.7850	0.7860	0.7870	0.7880	0.7890	0.7900
Columns 792 through 798						
0.7910	0.7920	0.7930	0.7940	0.7950	0.7960	0.7970

Columns 799 through 805

0.7980	0.7990	0.8000	0.8010	0.8020	0.8030	0.8040
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Columns 806 through 812

0.8050	0.8060	0.8070	0.8080	0.8090	0.8100	0.8110
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Columns 813 through 819

0.8120	0.8130	0.8140	0.8150	0.8160	0.8170	0.8180
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Columns 820 through 826

0.8190	0.8200	0.8210	0.8220	0.8230	0.8240	0.8250
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Columns 827 through 833

0.8260	0.8270	0.8280	0.8290	0.8300	0.8310	0.8320
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Columns 834 through 840

0.8330	0.8340	0.8350	0.8360	0.8370	0.8380	0.8390
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Columns 841 through 847

0.8400	0.8410	0.8420	0.8430	0.8440	0.8450	0.8460
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Columns 848 through 854

0.8470	0.8480	0.8490	0.8500	0.8510	0.8520	0.8530
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Columns 855 through 861

0.8540	0.8550	0.8560	0.8570	0.8580	0.8590	0.8600
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Columns 862 through 868

0.8610	0.8620	0.8630	0.8640	0.8650	0.8660	0.8670
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Columns 869 through 875

0.8680	0.8690	0.8700	0.8710	0.8720	0.8730	0.8740
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Columns 876 through 882

0.8750	0.8760	0.8770	0.8780	0.8790	0.8800	0.8810
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Columns 883 through 889

0.8820	0.8830	0.8840	0.8850	0.8860	0.8870	0.8880
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Columns 890 through 896

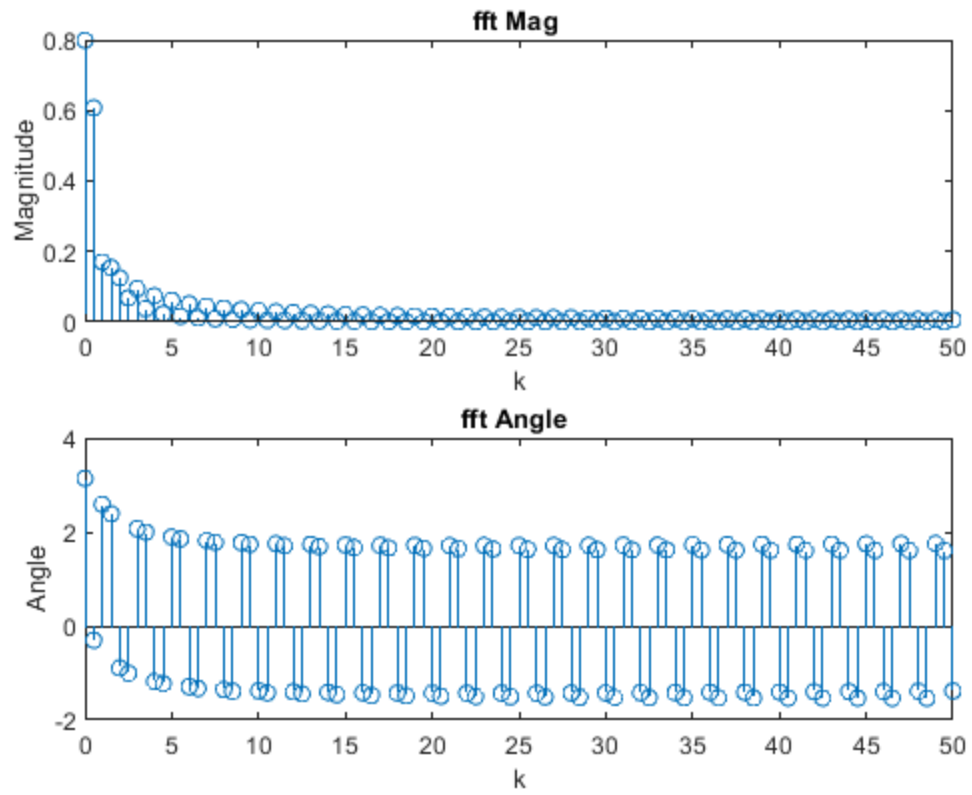
0.8890	0.8900	0.8910	0.8920	0.8930	0.8940	0.8950
Columns 897 through 903						
0.8960	0.8970	0.8980	0.8990	0.9000	0.9010	0.9020
Columns 904 through 910						
0.9030	0.9040	0.9050	0.9060	0.9070	0.9080	0.9090
Columns 911 through 917						
0.9100	0.9110	0.9120	0.9130	0.9140	0.9150	0.9160
Columns 918 through 924						
0.9170	0.9180	0.9190	0.9200	0.9210	0.9220	0.9230
Columns 925 through 931						
0.9240	0.9250	0.9260	0.9270	0.9280	0.9290	0.9300
Columns 932 through 938						
0.9310	0.9320	0.9330	0.9340	0.9350	0.9360	0.9370
Columns 939 through 945						
0.9380	0.9390	0.9400	0.9410	0.9420	0.9430	0.9440
Columns 946 through 952						
0.9450	0.9460	0.9470	0.9480	0.9490	0.9500	0.9510
Columns 953 through 959						
0.9520	0.9530	0.9540	0.9550	0.9560	0.9570	0.9580
Columns 960 through 966						
0.9590	0.9600	0.9610	0.9620	0.9630	0.9640	0.9650
Columns 967 through 973						
0.9660	0.9670	0.9680	0.9690	0.9700	0.9710	0.9720
Columns 974 through 980						
0.9730	0.9740	0.9750	0.9760	0.9770	0.9780	0.9790
Columns 981 through 987						
0.9800	0.9810	0.9820	0.9830	0.9840	0.9850	0.9860

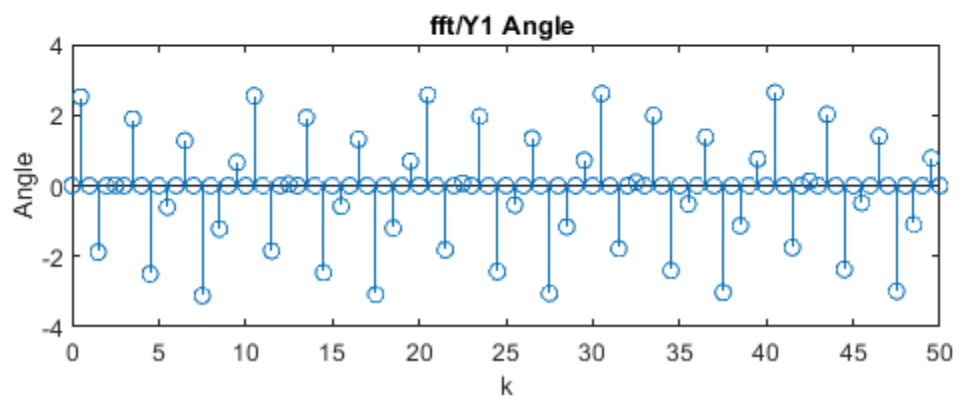
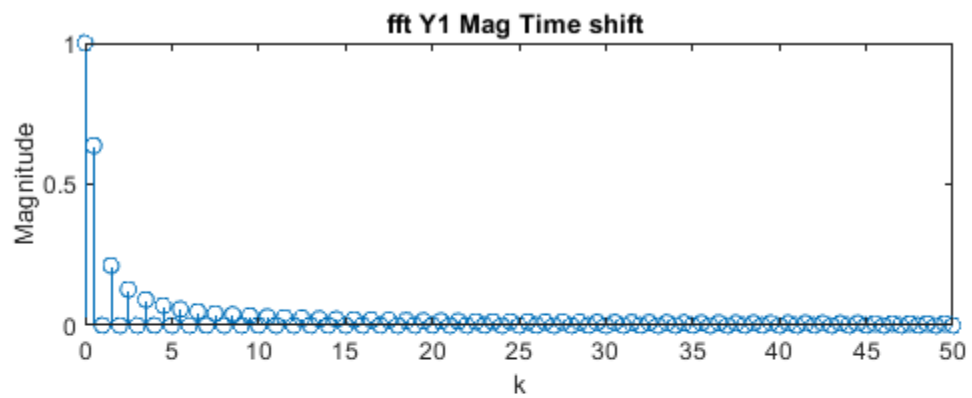
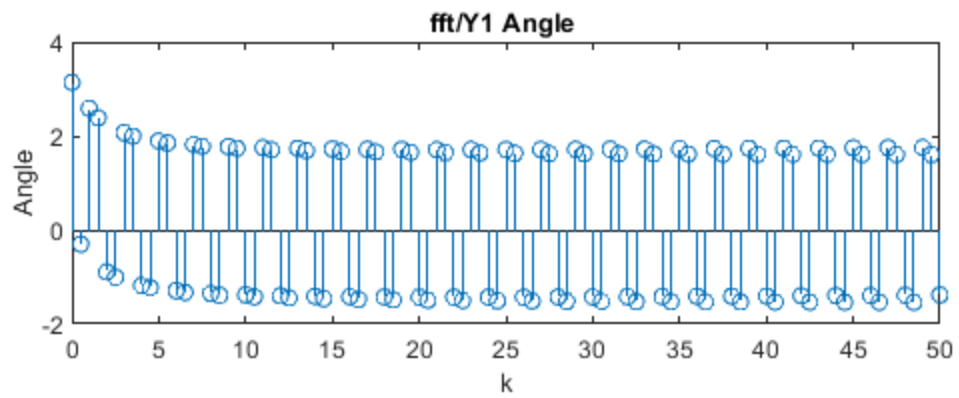
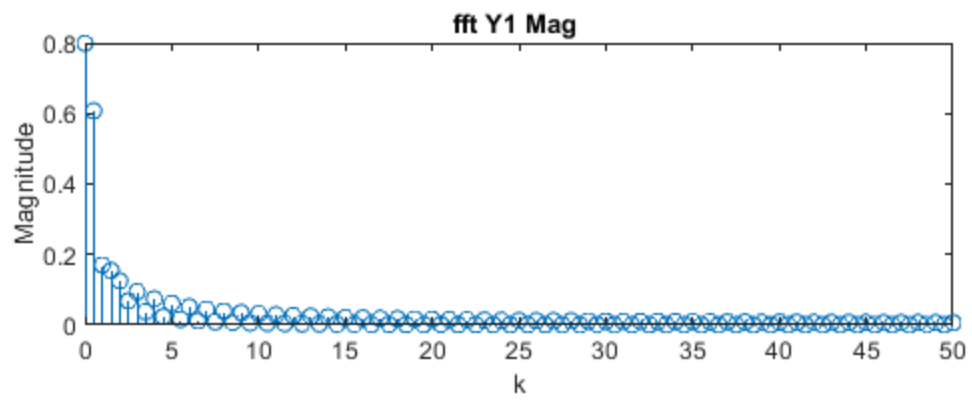
Columns 988 through 994

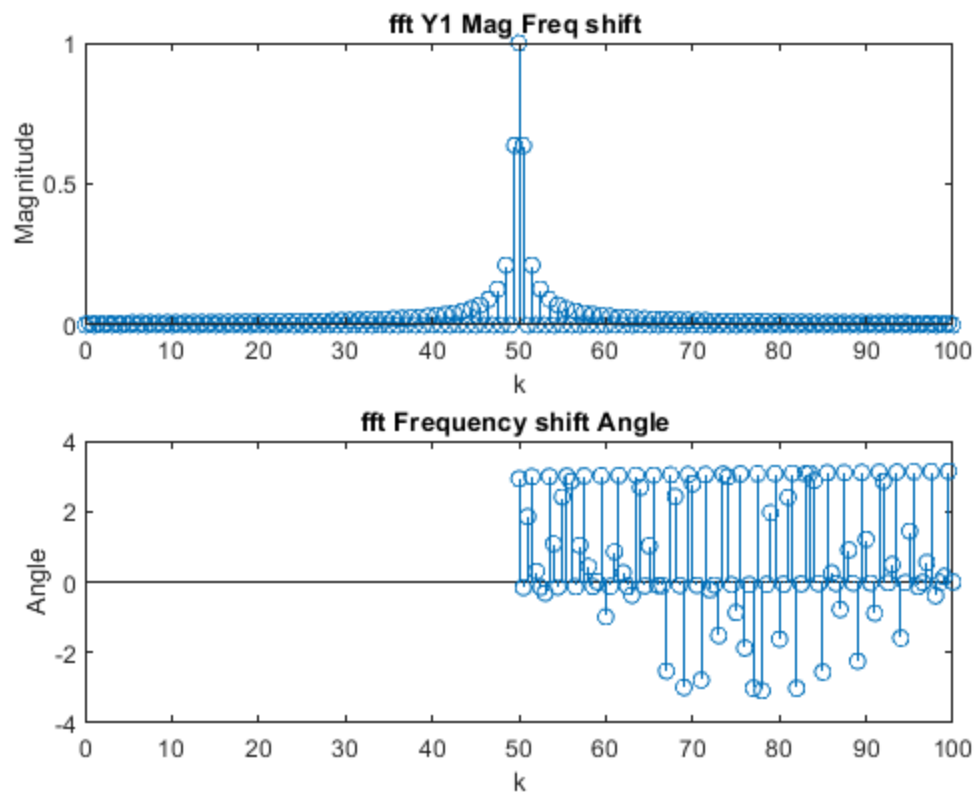
0.9870 0.9880 0.9890 0.9900 0.9910 0.9920 0.9930

Columns 995 through 1000

0.9940 0.9950 0.9960 0.9970 0.9980 0.9990







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