Lab 01 : To generate Discrete Time Signal

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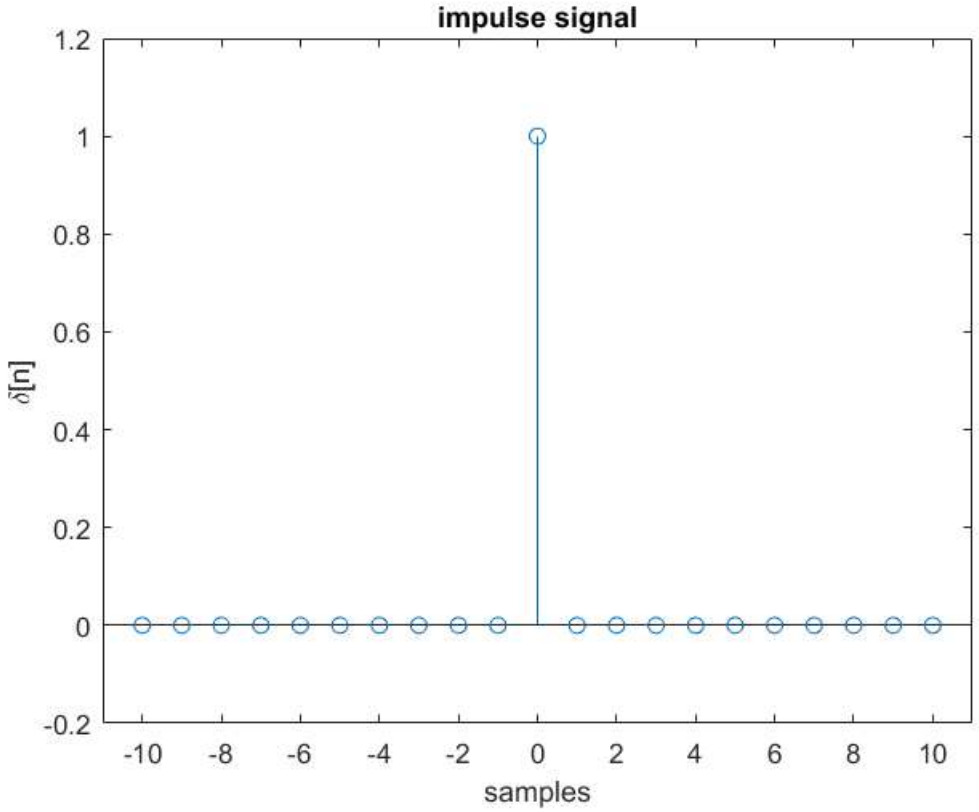
Contents

Impulse Signal

```
n0 = 0;
n1 = -10;
n2 = 10;
[x,n]= impulseSeq(n0, n1, n2);
figure(1)
stem(n,x);
axis([min(n)-1, max(n)+1, min(x)-0.2, max(x)+0.2])
title('impulse signal')
xlabel('samples')
ylabel('\delta[n]')
% function [x,n] = impulseSeq(n0, n1, n2)
%
% if n0<n1 || n0>n2
%     error('The Value of reference point is wrong')
% end
%
% n = n1:n2;
% x = (n == n0);
% end
```

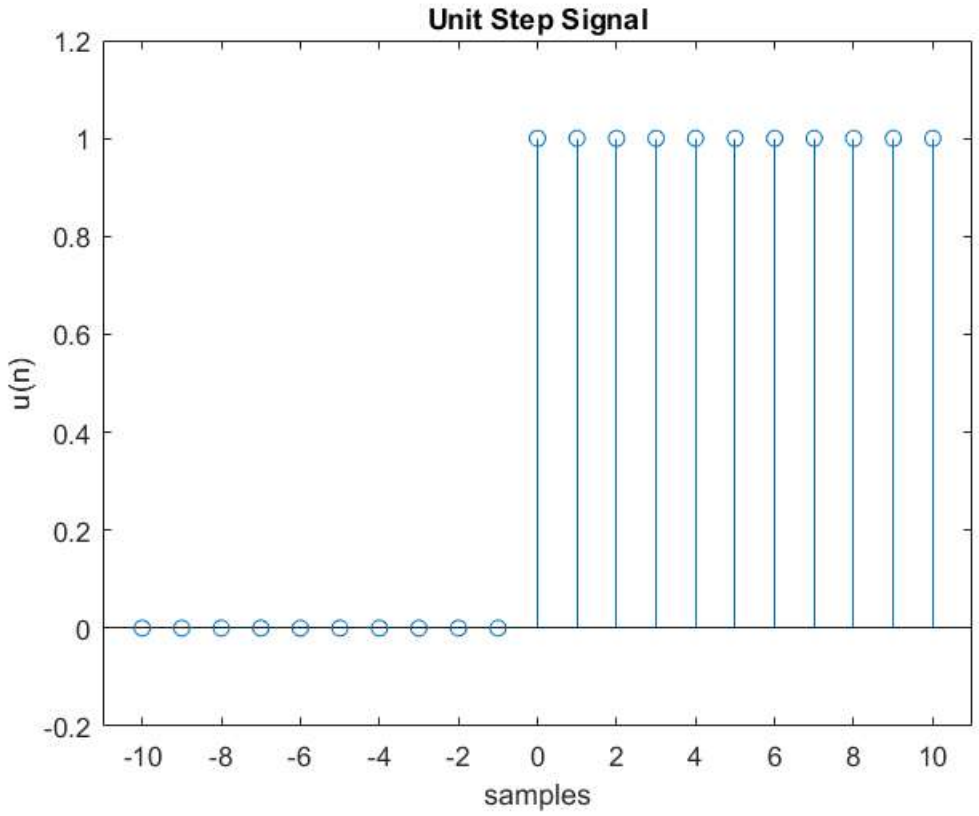


Unit Step Signal

```
n0 = 0;
n1 = -10;
n2 = 10;
[x,n]= UnitStepSeq(n0, n1, n2);
figure(2)
stem(n,x);
axis([min(n)-1, max(n)+1, min(x)-0.2, max(x)+0.2])
title('Unit Step Signal')
xlabel('samples')
ylabel('u(n)')
% function [x,n] = UnitStepSeq(n0, n1, n2)
% if n0<n1 || n0>n2
%     error('The Value of reference is wrong')
% end
% n = n1:n2
% x = (n >= n0)
% end
```

```
n =

  Columns 1 through 13

   -10    -9    -8    -7    -6    -5    -4    -3    -2    -1     0     1     2

  Columns 14 through 21

     3     4     5     6     7     8     9    10


x =

  1×21 logical array
```

```
Columns 1 through 19

 0   0   0   0   0   0   0   0   0   0   1   1   1   1   1   1   1   1   1

Columns 20 through 21

 1   1
```

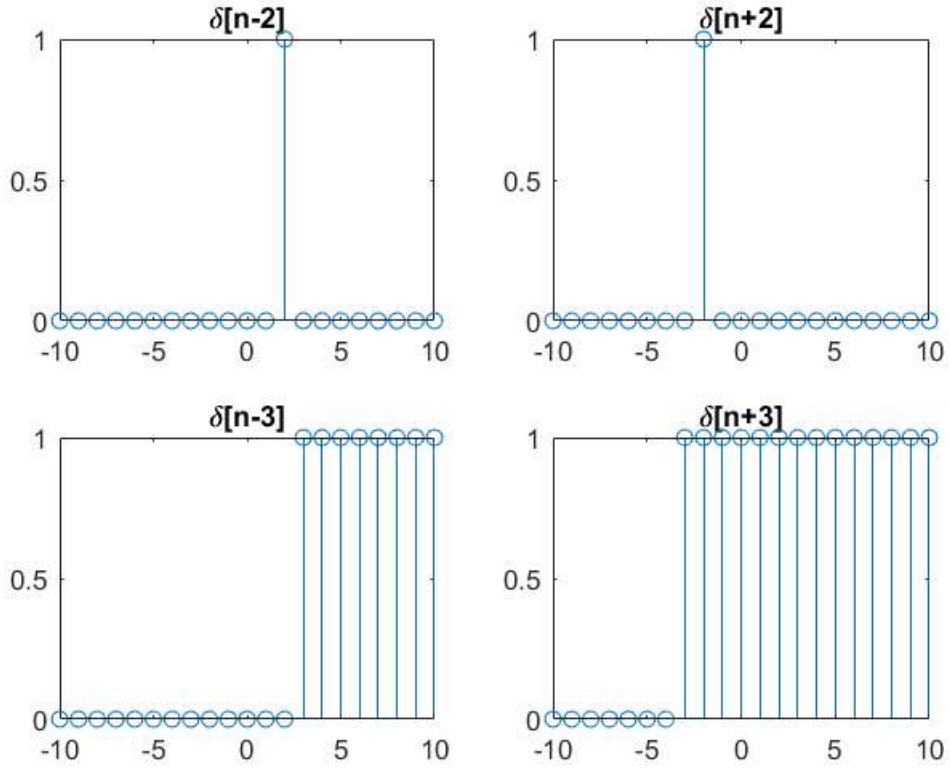


Exercise - 1

```
[x1,n]= impulseSeq(2, n1, n2);
[x2,n]= impulseSeq(-2, n1, n2);
[x3,n]= UnitStepSeq(3, n1, n2);
[x4,n]= UnitStepSeq(-3, n1, n2);
figure(3)
subplot(2,2,1)
stem(n,x1)
title('\delta[n-2]')
subplot(2,2,2)
stem(n,x2)
title('\delta[n+2]')
subplot(2,2,3)
stem(n,x3)
title('\delta[n-3]')
subplot(2,2,4)
stem(n,x4)
title('\delta[n+3]')
```

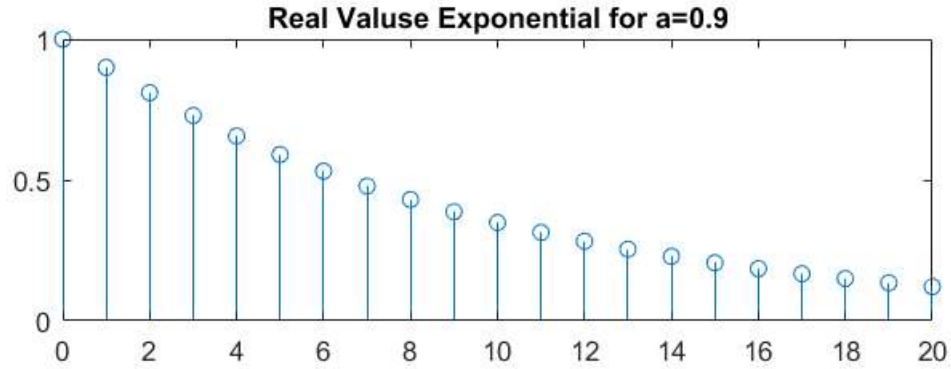
```
n =

  Columns 1 through 13
```

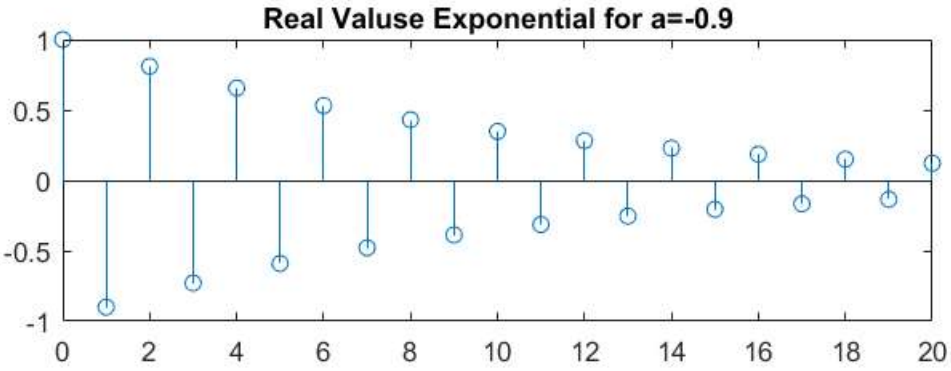
```
    -10    -9    -8    -7    -6    -5    -4    -3    -2    -1     0     1     2

  Columns 14 through 21

     3     4     5     6     7     8     9    10


x =

  1×21 logical array

  Columns 1 through 19

   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   1   1   1   1

  Columns 20 through 21

   1   1


n =

  Columns 1 through 13

    -10    -9    -8    -7    -6    -5    -4    -3    -2    -1     0     1     2

  Columns 14 through 21

     3     4     5     6     7     8     9    10


x =

  1×21 logical array

  Columns 1 through 19

   0   0   0   0   0   0   0   1   1   1   1   1   1   1   1   1   1   1   1

  Columns 20 through 21

   1   1
```



Real Value Exponential Signal

```
n = 0:20;
x5 = 0.9.^n;
x6 = (-0.9).^n;
figure(4)
subplot(2,1,1)
stem(n,x5)
title('Real Valuse Exponential for a=0.9')
subplot(2,1,2)
stem(n,x6)
title('Real Valuse Exponential for a=-0.9')
```



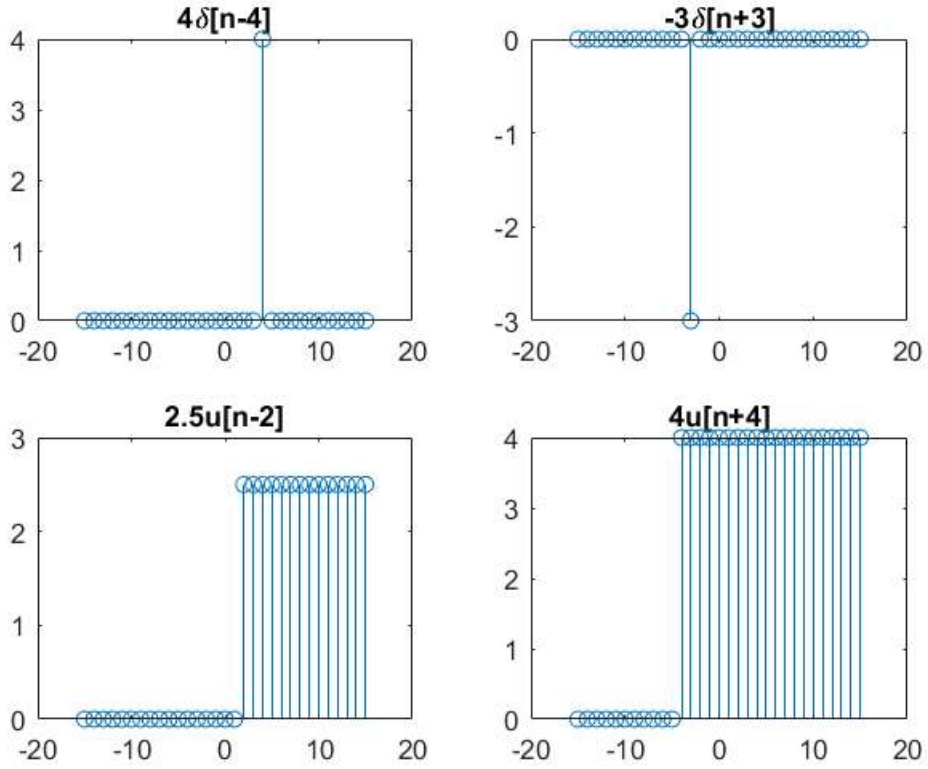


Home Assignment - 1

```
n1 = -15;
n2 = 15;
[x7,n] = impulseSeq(4, n1, n2);
figure(5)
subplot(2,2,1)
stem(n,4*x7);
title('4\delta[n-4]')
[x8,n] = impulseSeq(-3, n1, n2);
figure(5)
subplot(2,2,2)
stem(n,-3*x8);
title('-3\delta[n+3]')
n0=2
[x9,n]= UnitStepSeq(2, n1, n2);
figure(5)
subplot(2,2,3)
stem(n,2.5*x9);
title('2.5u[n-2]')
[x10,n]= UnitStepSeq(-4, n1, n2);
figure(5)
subplot(2,2,4)
stem(n,4*x10);
title('4u[n+4]')
```

```
n0 =

     2


n =

  Columns 1 through 13
```

```
    -15   -14   -13   -12   -11   -10    -9    -8    -7    -6    -5    -4    -3

  Columns 14 through 26

     -2    -1     0     1     2     3     4     5     6     7     8     9    10

  Columns 27 through 31

     11    12    13    14    15


x =

  1×31 logical array

  Columns 1 through 19

    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1

  Columns 20 through 31

    1   1   1   1   1   1   1   1   1   1   1   1

n =

  Columns 1 through 13

    -15   -14   -13   -12   -11   -10    -9    -8    -7    -6    -5    -4    -3

  Columns 14 through 26

     -2    -1     0     1     2     3     4     5     6     7     8     9    10

  Columns 27 through 31

     11    12    13    14    15


x =

  1×31 logical array

  Columns 1 through 19

    0   0   0   0   0   0   0   0   0   0   0   1   1   1   1   1   1   1   1

  Columns 20 through 31

    1   1   1   1   1   1   1   1   1   1   1   1
```



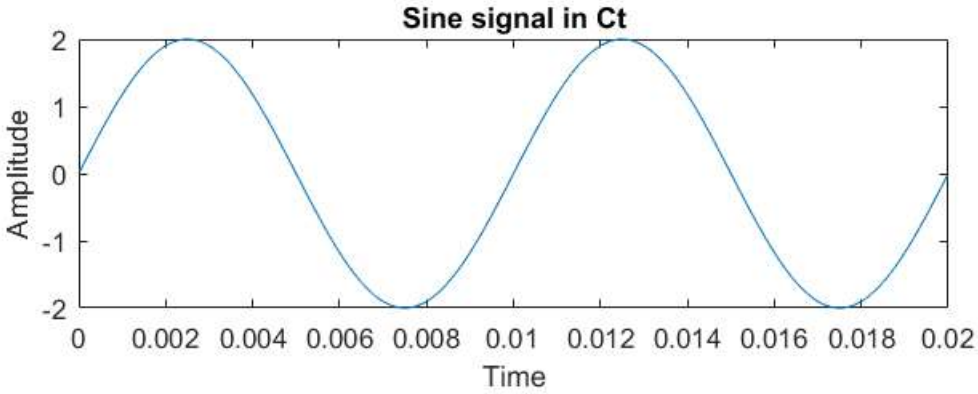
Sine Signal

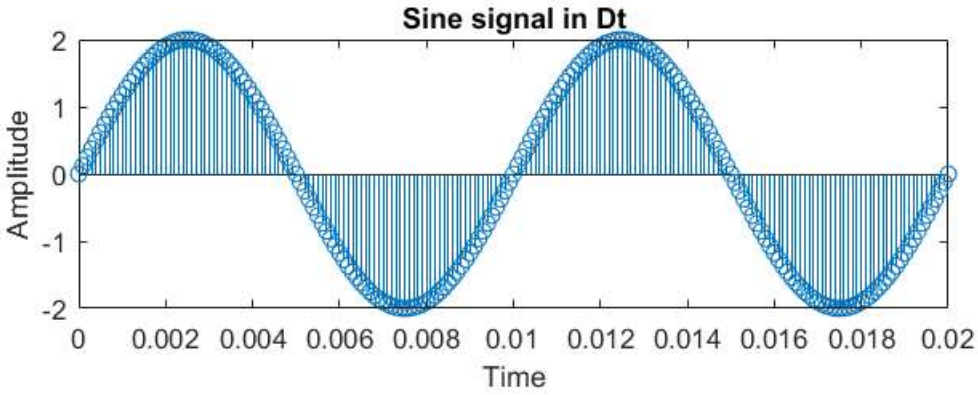
```
F = 100;
t = 0:0.01*1/F:2/F;
x = 2*sin(2*pi*F*t)
figure(7)
subplot(2,1,1)
plot(t,x)
xlabel('Time')
ylabel('Amplitude')
title('Sine signal in Ct')
subplot(2,1,2)
stem(t,x)
xlabel('Time')
ylabel('Amplitude')
title('Sine signal in Dt')
```

```
x =

  Columns 1 through 7

         0    0.1256    0.2507    0.3748    0.4974    0.6180    0.7362

  Columns 8 through 14

    0.8516    0.9635    1.0717    1.1756    1.2748    1.3691    1.4579

  Columns 15 through 21

    1.5410    1.6180    1.6887    1.7526    1.8097    1.8596    1.9021

  Columns 22 through 28

    1.9372    1.9646    1.9842    1.9961    2.0000    1.9961    1.9842
```

```
Columns 29 through 35

  1.9646    1.9372    1.9021    1.8596    1.8097    1.7526    1.6887

Columns 36 through 42

  1.6180    1.5410    1.4579    1.3691    1.2748    1.1756    1.0717

Columns 43 through 49

  0.9635    0.8516    0.7362    0.6180    0.4974    0.3748    0.2507

Columns 50 through 56

  0.1256    0.0000   -0.1256   -0.2507   -0.3748   -0.4974   -0.6180

Columns 57 through 63

 -0.7362   -0.8516   -0.9635   -1.0717   -1.1756   -1.2748   -1.3691

Columns 64 through 70

 -1.4579   -1.5410   -1.6180   -1.6887   -1.7526   -1.8097   -1.8596

Columns 71 through 77

 -1.9021   -1.9372   -1.9646   -1.9842   -1.9961   -2.0000   -1.9961

Columns 78 through 84

 -1.9842   -1.9646   -1.9372   -1.9021   -1.8596   -1.8097   -1.7526

Columns 85 through 91

 -1.6887   -1.6180   -1.5410   -1.4579   -1.3691   -1.2748   -1.1756

Columns 92 through 98

 -1.0717   -0.9635   -0.8516   -0.7362   -0.6180   -0.4974   -0.3748

Columns 99 through 105

 -0.2507   -0.1256   -0.0000    0.1256    0.2507    0.3748    0.4974

Columns 106 through 112

  0.6180    0.7362    0.8516    0.9635    1.0717    1.1756    1.2748

Columns 113 through 119

  1.3691    1.4579    1.5410    1.6180    1.6887    1.7526    1.8097

Columns 120 through 126

  1.8596    1.9021    1.9372    1.9646    1.9842    1.9961    2.0000

Columns 127 through 133

  1.9961    1.9842    1.9646    1.9372    1.9021    1.8596    1.8097

Columns 134 through 140
```

```
  1.7526    1.6887    1.6180    1.5410    1.4579    1.3691    1.2748

Columns 141 through 147

  1.1756    1.0717    0.9635    0.8516    0.7362    0.6180    0.4974

Columns 148 through 154

  0.3748    0.2507    0.1256    0.0000   -0.1256   -0.2507   -0.3748

Columns 155 through 161

 -0.4974   -0.6180   -0.7362   -0.8516   -0.9635   -1.0717   -1.1756

Columns 162 through 168

 -1.2748   -1.3691   -1.4579   -1.5410   -1.6180   -1.6887   -1.7526

Columns 169 through 175

 -1.8097   -1.8596   -1.9021   -1.9372   -1.9646   -1.9842   -1.9961

Columns 176 through 182

 -2.0000   -1.9961   -1.9842   -1.9646   -1.9372   -1.9021   -1.8596

Columns 183 through 189

 -1.8097   -1.7526   -1.6887   -1.6180   -1.5410   -1.4579   -1.3691

Columns 190 through 196

 -1.2748   -1.1756   -1.0717   -0.9635   -0.8516   -0.7362   -0.6180

Columns 197 through 201

 -0.4974   -0.3748   -0.2507   -0.1256   -0.0000
```





Cosine Signal

```
F = 300;
t = 0:0.003*1/F:2/F;
x = 2*cos(2*pi*F*t)
figure(8)
subplot(2,1,1)
plot(t,x)
xlabel('Time')
ylabel('2*cos(2*pi*F*t)')
title('Cosine Signal in CT')
subplot(2,1,2)
stem(t,x)
xlabel('Time')
ylabel('2*cos(2*pi*F*t)')
title('Cosine Signal in DT')
```

```
x =

  Columns 1 through 7

    2.0000    1.9996    1.9986    1.9968    1.9943    1.9911    1.9872

  Columns 8 through 14

    1.9826    1.9773    1.9713    1.9646    1.9572    1.9491    1.9403

  Columns 15 through 21

    1.9308    1.9206    1.9097    1.8982    1.8860    1.8731    1.8596

  Columns 22 through 28

    1.8453    1.8305    1.8150    1.7988    1.7820    1.7646    1.7465
```

```
Columns 29 through 35

  1.7278    1.7086    1.6887    1.6682    1.6471    1.6254    1.6031

Columns 36 through 42

  1.5803    1.5569    1.5330    1.5085    1.4835    1.4579    1.4319

Columns 43 through 49

  1.4053    1.3782    1.3507    1.3226    1.2941    1.2651    1.2357

Columns 50 through 56

  1.2059    1.1756    1.1449    1.1138    1.0822    1.0503    1.0181

Columns 57 through 63

  0.9855    0.9525    0.9192    0.8855    0.8516    0.8173    0.7827

Columns 64 through 70

  0.7479    0.7128    0.6775    0.6419    0.6061    0.5700    0.5338

Columns 71 through 77

  0.4974    0.4608    0.4240    0.3871    0.3500    0.3129    0.2756

Columns 78 through 84

  0.2382    0.2007    0.1632    0.1256    0.0879    0.0503    0.0126

Columns 85 through 91

 -0.0251   -0.0628   -0.1005   -0.1381   -0.1757   -0.2132   -0.2507

Columns 92 through 98

 -0.2880   -0.3253   -0.3624   -0.3994   -0.4363   -0.4730   -0.5095

Columns 99 through 105

 -0.5459   -0.5821   -0.6180   -0.6538   -0.6893   -0.7246   -0.7596

Columns 106 through 112

 -0.7943   -0.8288   -0.8629   -0.8968   -0.9303   -0.9635   -0.9964

Columns 113 through 119

 -1.0289   -1.0610   -1.0928   -1.1242   -1.1551   -1.1857   -1.2159

Columns 120 through 126

 -1.2456   -1.2748   -1.3037   -1.3320   -1.3599   -1.3873   -1.4142

Columns 127 through 133

 -1.4406   -1.4665   -1.4919   -1.5167   -1.5410   -1.5648   -1.5880

Columns 134 through 140
```

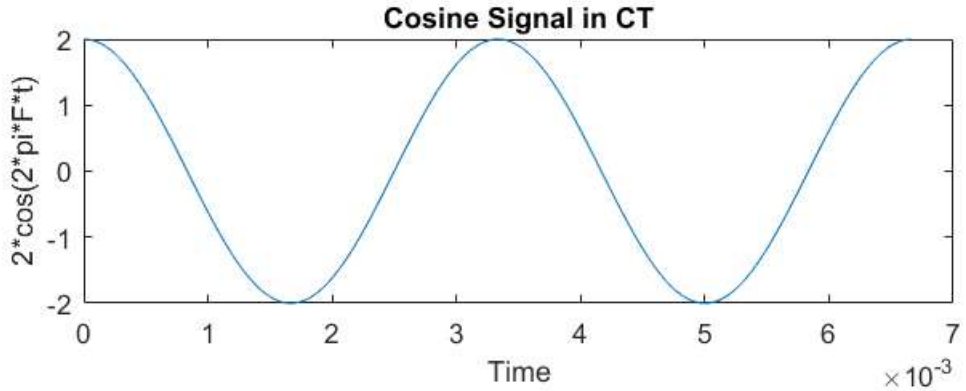
```
 -1.6106   -1.6327   -1.6542   -1.6751   -1.6954   -1.7151   -1.7341

Columns 141 through 147

 -1.7526   -1.7705   -1.7877   -1.8043   -1.8202   -1.8355   -1.8502

Columns 148 through 154

 -1.8641   -1.8775   -1.8901   -1.9021   -1.9134   -1.9241   -1.9340

Columns 155 through 161

 -1.9433   -1.9518   -1.9597   -1.9669   -1.9734   -1.9792   -1.9842

Columns 162 through 168

 -1.9886   -1.9923   -1.9952   -1.9975   -1.9990   -1.9998   -2.0000

Columns 169 through 175

 -1.9994   -1.9981   -1.9961   -1.9933   -1.9899   -1.9858   -1.9809

Columns 176 through 182

 -1.9754   -1.9691   -1.9622   -1.9545   -1.9462   -1.9372   -1.9274

Columns 183 through 189

 -1.9170   -1.9060   -1.8942   -1.8818   -1.8687   -1.8549   -1.8405

Columns 190 through 196

 -1.8254   -1.8097   -1.7933   -1.7763   -1.7586   -1.7404   -1.7215

Columns 197 through 203

 -1.7020   -1.6819   -1.6612   -1.6399   -1.6180   -1.5956   -1.5726

Columns 204 through 210

 -1.5490   -1.5249   -1.5002   -1.4750   -1.4493   -1.4231   -1.3963

Columns 211 through 217

 -1.3691   -1.3414   -1.3132   -1.2845   -1.2554   -1.2258   -1.1958

Columns 218 through 224

 -1.1654   -1.1345   -1.1033   -1.0717   -1.0396   -1.0072   -0.9745

Columns 225 through 231

 -0.9414   -0.9080   -0.8742   -0.8402   -0.8058   -0.7712   -0.7362

Columns 232 through 238

 -0.7011   -0.6656   -0.6300   -0.5941   -0.5580   -0.5217   -0.4852

Columns 239 through 245

 -0.4485   -0.4117   -0.3748   -0.3377   -0.3005   -0.2631   -0.2257
```

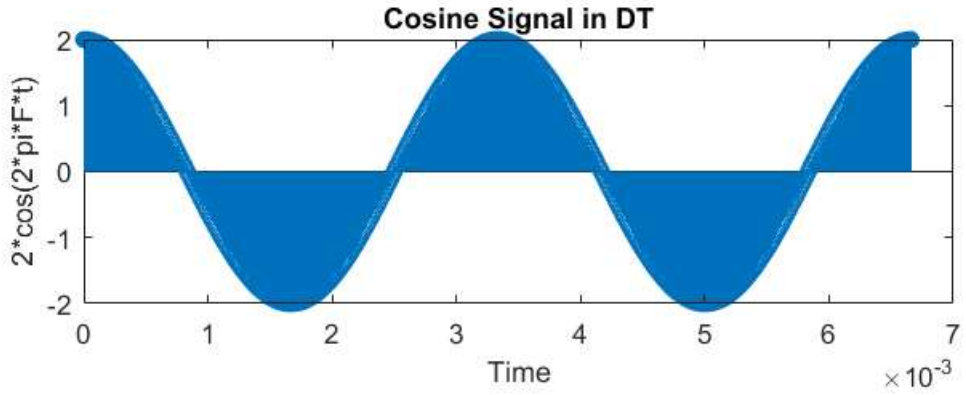
```
Columns 246 through 252

 -0.1882   -0.1507   -0.1130   -0.0754   -0.0377   -0.0000    0.0377

Columns 253 through 259

  0.0754    0.1130    0.1507    0.1882    0.2257    0.2631    0.3005

Columns 260 through 266

  0.3377    0.3748    0.4117    0.4485    0.4852    0.5217    0.5580

Columns 267 through 273

  0.5941    0.6300    0.6656    0.7011    0.7362    0.7712    0.8058

Columns 274 through 280

  0.8402    0.8742    0.9080    0.9414    0.9745    1.0072    1.0396

Columns 281 through 287

  1.0717    1.1033    1.1345    1.1654    1.1958    1.2258    1.2554

Columns 288 through 294

  1.2845    1.3132    1.3414    1.3691    1.3963    1.4231    1.4493

Columns 295 through 301

  1.4750    1.5002    1.5249    1.5490    1.5726    1.5956    1.6180

Columns 302 through 308

  1.6399    1.6612    1.6819    1.7020    1.7215    1.7404    1.7586

Columns 309 through 315

  1.7763    1.7933    1.8097    1.8254    1.8405    1.8549    1.8687

Columns 316 through 322

  1.8818    1.8942    1.9060    1.9170    1.9274    1.9372    1.9462

Columns 323 through 329

  1.9545    1.9622    1.9691    1.9754    1.9809    1.9858    1.9899

Columns 330 through 336

  1.9933    1.9961    1.9981    1.9994    2.0000    1.9998    1.9990

Columns 337 through 343

  1.9975    1.9952    1.9923    1.9886    1.9842    1.9792    1.9734

Columns 344 through 350

  1.9669    1.9597    1.9518    1.9433    1.9340    1.9241    1.9134

Columns 351 through 357
```

```
  1.9021    1.8901    1.8775    1.8641    1.8502    1.8355    1.8202

Columns 358 through 364

  1.8043    1.7877    1.7705    1.7526    1.7341    1.7151    1.6954

Columns 365 through 371

  1.6751    1.6542    1.6327    1.6106    1.5880    1.5648    1.5410

Columns 372 through 378

  1.5167    1.4919    1.4665    1.4406    1.4142    1.3873    1.3599

Columns 379 through 385

  1.3320    1.3037    1.2748    1.2456    1.2159    1.1857    1.1551

Columns 386 through 392

  1.1242    1.0928    1.0610    1.0289    0.9964    0.9635    0.9303

Columns 393 through 399

  0.8968    0.8629    0.8288    0.7943    0.7596    0.7246    0.6893

Columns 400 through 406

  0.6538    0.6180    0.5821    0.5459    0.5095    0.4730    0.4363

Columns 407 through 413

  0.3994    0.3624    0.3253    0.2880    0.2507    0.2132    0.1757

Columns 414 through 420

  0.1381    0.1005    0.0628    0.0251   -0.0126   -0.0503   -0.0879

Columns 421 through 427

 -0.1256   -0.1632   -0.2007   -0.2382   -0.2756   -0.3129   -0.3500

Columns 428 through 434

 -0.3871   -0.4240   -0.4608   -0.4974   -0.5338   -0.5700   -0.6061

Columns 435 through 441

 -0.6419   -0.6775   -0.7128   -0.7479   -0.7827   -0.8173   -0.8516

Columns 442 through 448

 -0.8855   -0.9192   -0.9525   -0.9855   -1.0181   -1.0503   -1.0822

Columns 449 through 455

 -1.1138   -1.1449   -1.1756   -1.2059   -1.2357   -1.2651   -1.2941

Columns 456 through 462

 -1.3226   -1.3507   -1.3782   -1.4053   -1.4319   -1.4579   -1.4835
```

```
Columns 463 through 469

 -1.5085   -1.5330   -1.5569   -1.5803   -1.6031   -1.6254   -1.6471

Columns 470 through 476

 -1.6682   -1.6887   -1.7086   -1.7278   -1.7465   -1.7646   -1.7820

Columns 477 through 483

 -1.7988   -1.8150   -1.8305   -1.8453   -1.8596   -1.8731   -1.8860

Columns 484 through 490

 -1.8982   -1.9097   -1.9206   -1.9308   -1.9403   -1.9491   -1.9572

Columns 491 through 497

 -1.9646   -1.9713   -1.9773   -1.9826   -1.9872   -1.9911   -1.9943

Columns 498 through 504

 -1.9968   -1.9986   -1.9996   -2.0000   -1.9996   -1.9986   -1.9968

Columns 505 through 511

 -1.9943   -1.9911   -1.9872   -1.9826   -1.9773   -1.9713   -1.9646

Columns 512 through 518

 -1.9572   -1.9491   -1.9403   -1.9308   -1.9206   -1.9097   -1.8982

Columns 519 through 525

 -1.8860   -1.8731   -1.8596   -1.8453   -1.8305   -1.8150   -1.7988

Columns 526 through 532

 -1.7820   -1.7646   -1.7465   -1.7278   -1.7086   -1.6887   -1.6682

Columns 533 through 539

 -1.6471   -1.6254   -1.6031   -1.5803   -1.5569   -1.5330   -1.5085

Columns 540 through 546

 -1.4835   -1.4579   -1.4319   -1.4053   -1.3782   -1.3507   -1.3226

Columns 547 through 553

 -1.2941   -1.2651   -1.2357   -1.2059   -1.1756   -1.1449   -1.1138

Columns 554 through 560

 -1.0822   -1.0503   -1.0181   -0.9855   -0.9525   -0.9192   -0.8855

Columns 561 through 567

 -0.8516   -0.8173   -0.7827   -0.7479   -0.7128   -0.6775   -0.6419

Columns 568 through 574
```

```
 -0.6061   -0.5700   -0.5338   -0.4974   -0.4608   -0.4240   -0.3871

Columns 575 through 581

 -0.3500   -0.3129   -0.2756   -0.2382   -0.2007   -0.1632   -0.1256

Columns 582 through 588

 -0.0879   -0.0503   -0.0126    0.0251    0.0628    0.1005    0.1381

Columns 589 through 595

  0.1757    0.2132    0.2507    0.2880    0.3253    0.3624    0.3994

Columns 596 through 602

  0.4363    0.4730    0.5095    0.5459    0.5821    0.6180    0.6538

Columns 603 through 609

  0.6893    0.7246    0.7596    0.7943    0.8288    0.8629    0.8968

Columns 610 through 616

  0.9303    0.9635    0.9964    1.0289    1.0610    1.0928    1.1242

Columns 617 through 623

  1.1551    1.1857    1.2159    1.2456    1.2748    1.3037    1.3320

Columns 624 through 630

  1.3599    1.3873    1.4142    1.4406    1.4665    1.4919    1.5167

Columns 631 through 637

  1.5410    1.5648    1.5880    1.6106    1.6327    1.6542    1.6751

Columns 638 through 644

  1.6954    1.7151    1.7341    1.7526    1.7705    1.7877    1.8043

Columns 645 through 651

  1.8202    1.8355    1.8502    1.8641    1.8775    1.8901    1.9021

Columns 652 through 658

  1.9134    1.9241    1.9340    1.9433    1.9518    1.9597    1.9669

Columns 659 through 665

  1.9734    1.9792    1.9842    1.9886    1.9923    1.9952    1.9975

Columns 666 through 667

  1.9990    1.9998
```





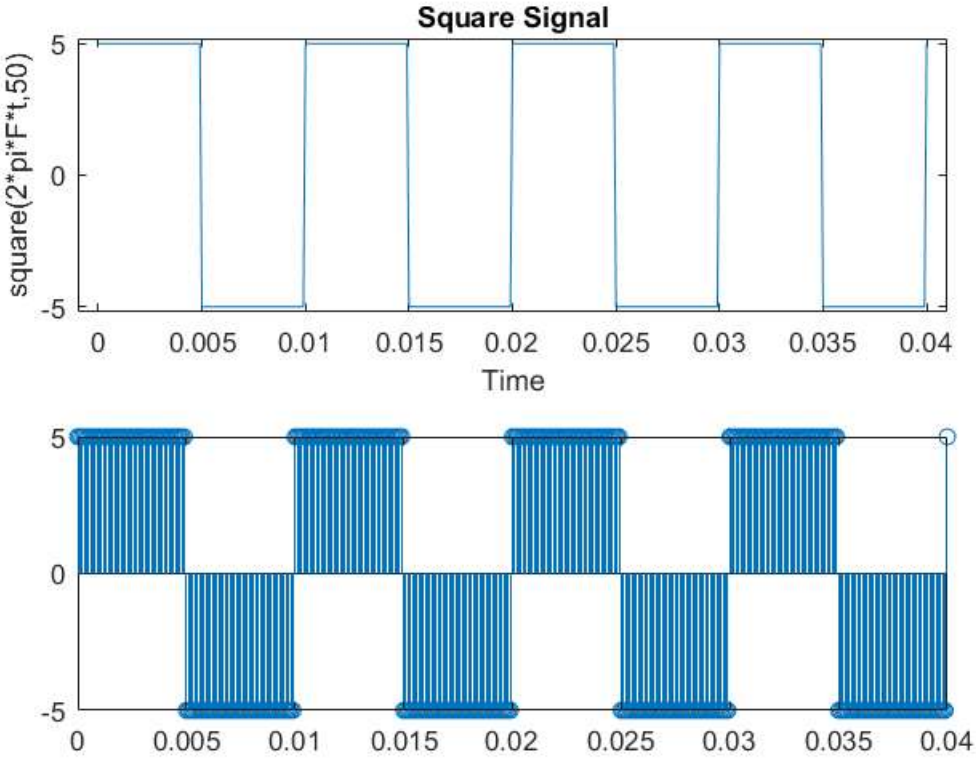
Square Waveform

```
F = 100; % Frequency of Square Wave
t = 0:0.01/F:4/F;
x = 5*square(2*pi*F*t,50)
figure(9)
subplot(2,1,1)
plot(t,x)
axis([min(t)-0.001, max(t)+0.001, min(x)-0.2, max(x)+0.2])
xlabel('Time')
ylabel('square(2*pi*F*t,50)')
title('Square Signal')
subplot(2,1,2)
stem(t,x)
```

```
x =

  Columns 1 through 13

     5     5     5     5     5     5     5     5     5     5     5     5     5

  Columns 14 through 26

     5     5     5     5     5     5     5     5     5     5     5     5     5

  Columns 27 through 39

     5     5     5     5     5     5     5     5     5     5     5     5     5

  Columns 40 through 52

     5     5     5     5     5     5     5     5     5     5     5    -5    -5

  Columns 53 through 65
```

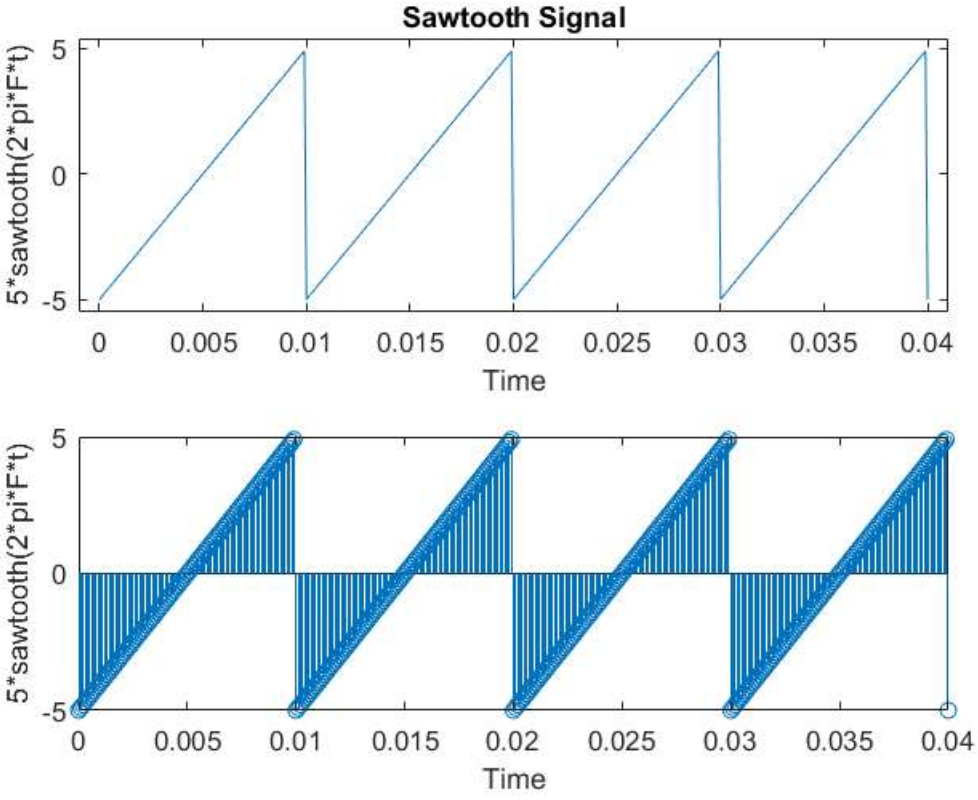
```
  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 66 through 78

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 79 through 91

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 92 through 104

  -5    -5    -5    -5    -5    -5    -5    -5    -5     5     5     5     5

Columns 105 through 117

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 118 through 130

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 131 through 143

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 144 through 156

   5     5     5     5     5     5     5    -5    -5    -5    -5    -5    -5

Columns 157 through 169

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 170 through 182

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 183 through 195

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 196 through 208

  -5    -5    -5    -5    -5     5     5     5     5     5     5     5     5

Columns 209 through 221

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 222 through 234

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 235 through 247

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 248 through 260

   5     5     5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5
```

```
Columns 261 through 273

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 274 through 286

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 287 through 299

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 300 through 312

  -5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 313 through 325

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 326 through 338

   5     5     5     5     5     5     5     5     5     5     5     5     5

Columns 339 through 351

   5     5     5     5     5     5     5     5     5     5     5     5    -5

Columns 352 through 364

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 365 through 377

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 378 through 390

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5    -5

Columns 391 through 401

  -5    -5    -5    -5    -5    -5    -5    -5    -5    -5     5
```



Sawtooth Waveform

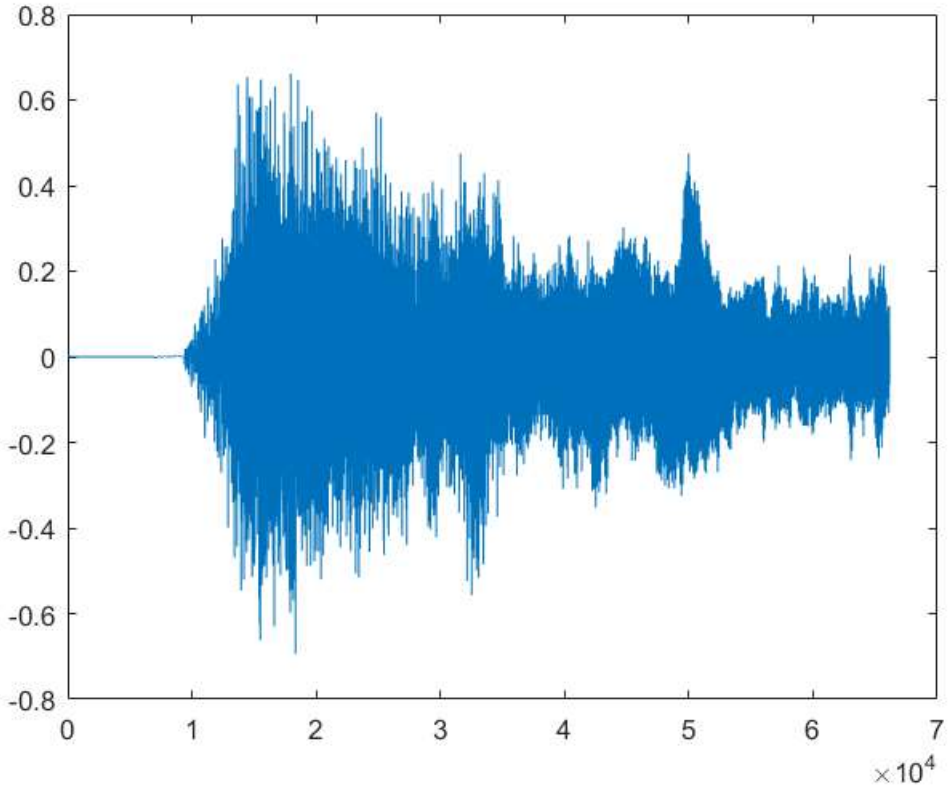
```
F = 100;
t = 0:0.01/F:4/F;
x = 5*sawtooth(2*pi*F*t);
figure(10)
subplot(2,1,1)
plot(t,x)
axis([min(t)-0.001, max(t)+0.001, min(x)-0.5, max(x)+0.5])
xlabel('Time')
ylabel('5*sawtooth(2*pi*F*t)')
title('Sawtooth Signal')
subplot(2,1,2)
stem(t,x)
xlabel('Time')
ylabel('5*sawtooth(2*pi*F*t)')
```



Audioread

```
[y,Fs] = audioread('StarWars3.wav');
StarWars = audioplayer(y,Fs);
play(StarWars);
figure(11)
plot(y)
```

```
Warning: Unable to play audio because no audio outputs were found.
Warning: Unable to play audio because no audio outputs were found.
```



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