정보통신 수학 및 실습
Lab assignment

학번 :	2016110056	2012112130
이름 :	박승원	노희승
편성 :	20조	2017년 3월 22일

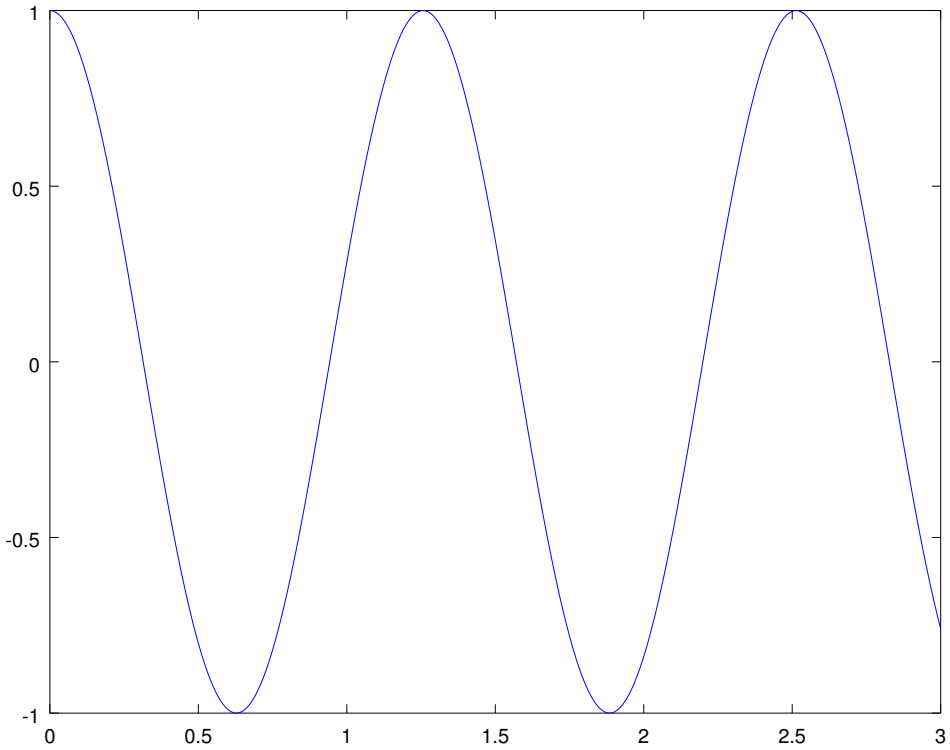
dongguk UNIVERSITY

Chapter 3. Lab Assignment

1. Plot the following cosine functions using MATLAB and write down their frequencies. You must define the boundaries and the intervals of variable t properly to obtain at least one cycle of the function. [Hint: use t such that $wt > 2\pi \times n$, where n is the number of cycles in the plot.]

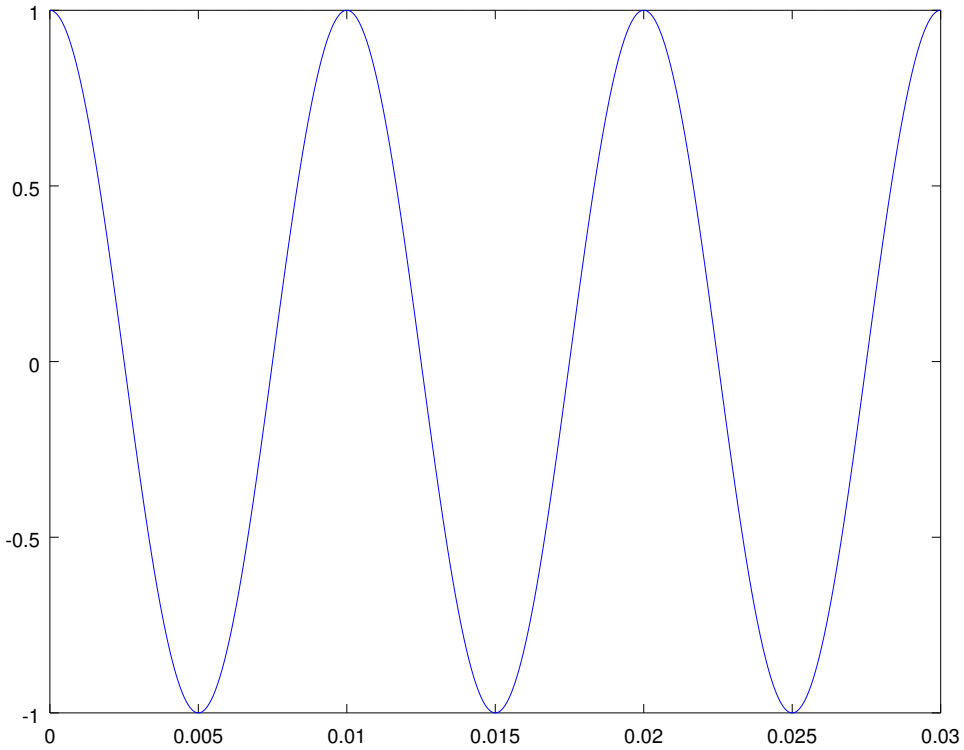
a) $\cos(5t)$

$2\pi f = 5$
$\therefore f = \dfrac{5}{2\pi}$



b) $\cos(2\pi 100t)$

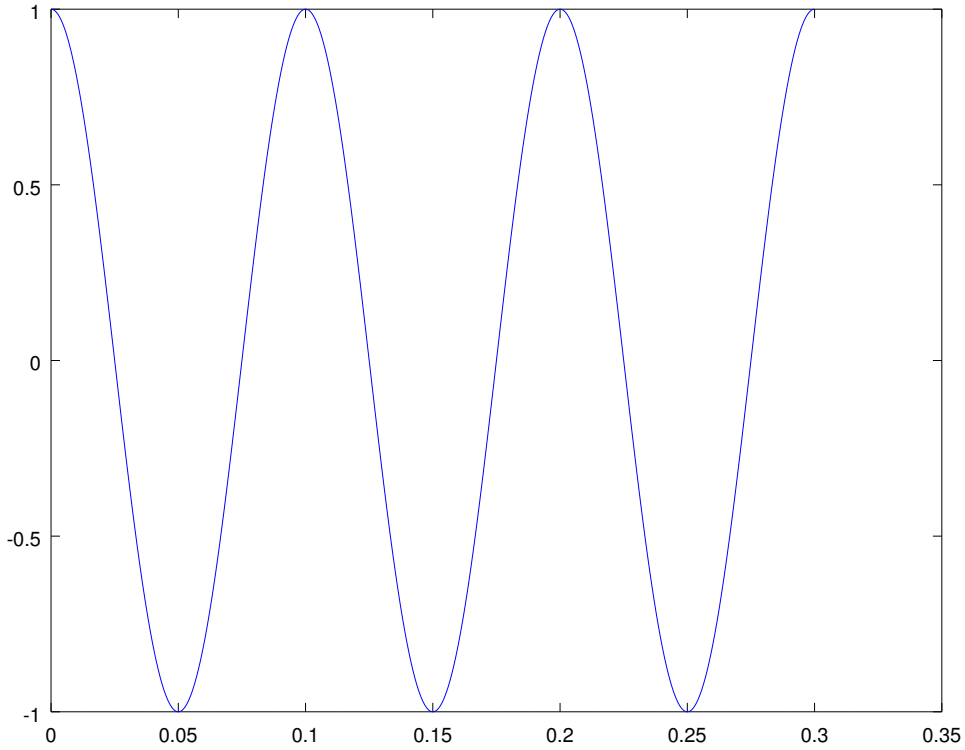
$2\pi f = 2\pi 100$
$\therefore f = 100$



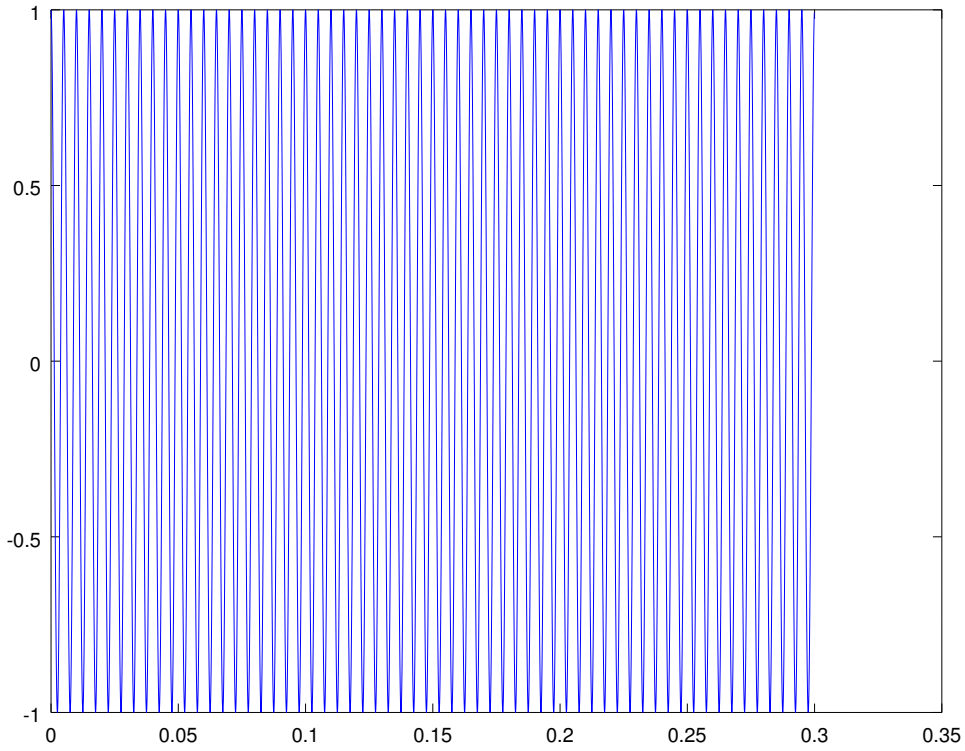
2. If the sound signal is defined as $m(t) = \cos(2\pi(10)t)$ and the carrier signals is $\cos(2\pi(300)t)$, answer the following questions: (Hint: use t=[0:0.0001:1])

```
>> t = [0:0.0001:1];
>> ct = cos(2*pi*200*t);
>> mt = cos(2*pi*10*t);
>> plot(t(1:3000),mt(1:3000))
>> print -depsc 2a.eps
>> plot(t(1:3000), ct (1:3000) )
>> print -depsc 2b.eps
>> xc = mt.*ct;
>> plot(t(1:3000),xc (1:3000) )
```

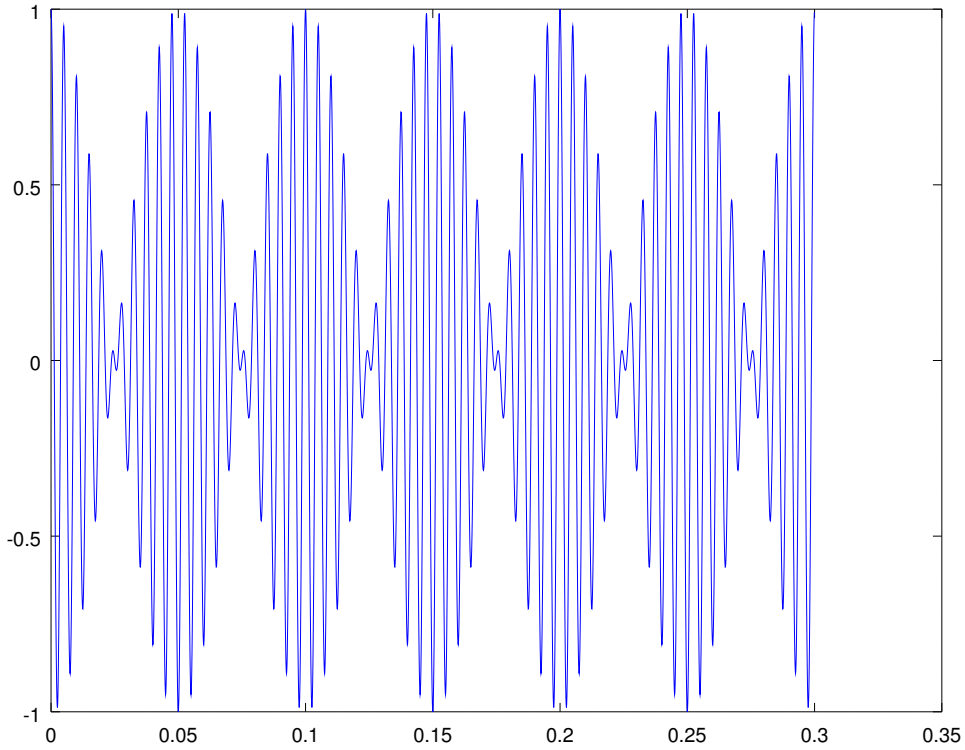
a) Plot mt(1:3000)



b) Plot ct(1:3000)



c) Plot xc = mt * ct for xc(1:3000)

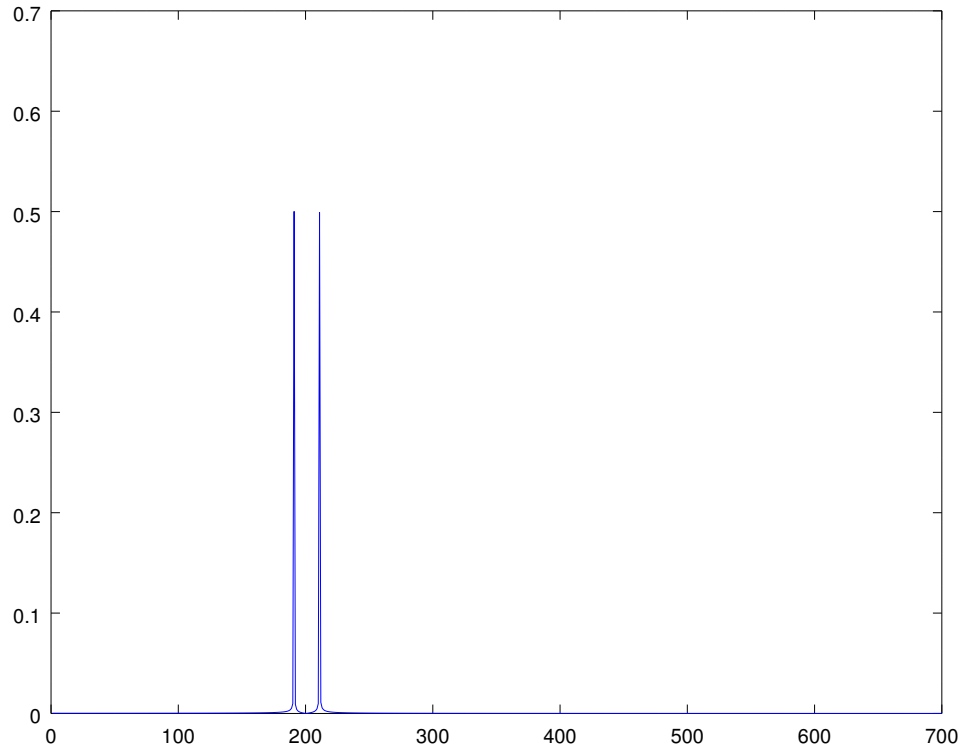


d) Plot the spectrum of signal xc using the following commands:

spec=abs(fft(xc));

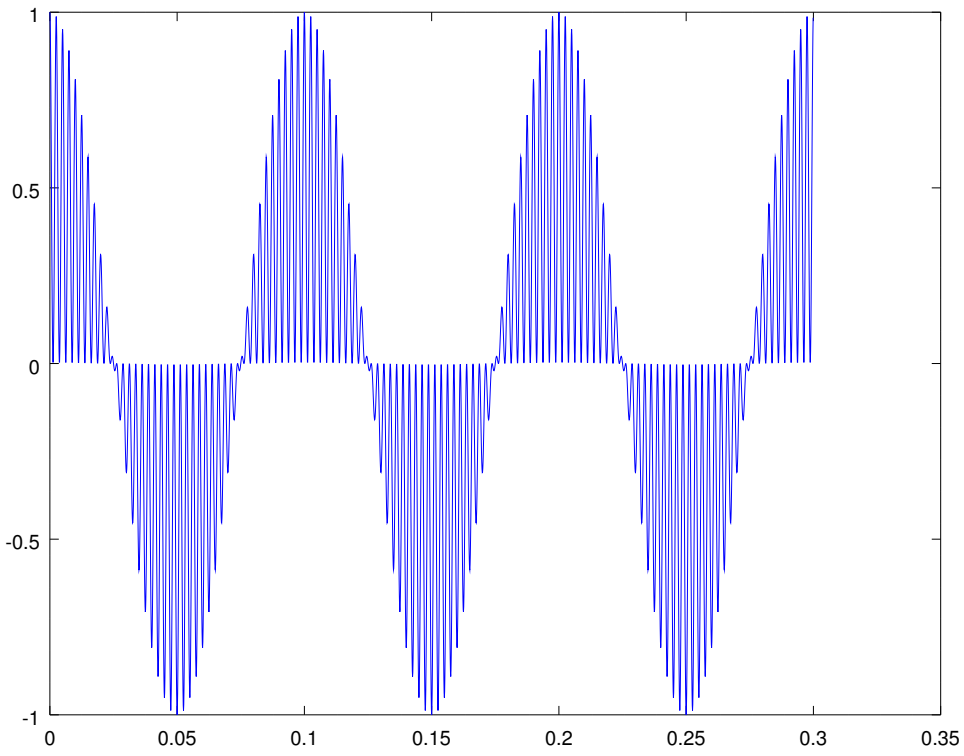
N=length(spec)/2;

plot(spec(1:700)/N)



e) Plot xi=xc*ct for xi(1:3000).

```
>> xi = xc  .*  ct ;
>> plot(t (1:3000) ,  xi (1:3000) )
```

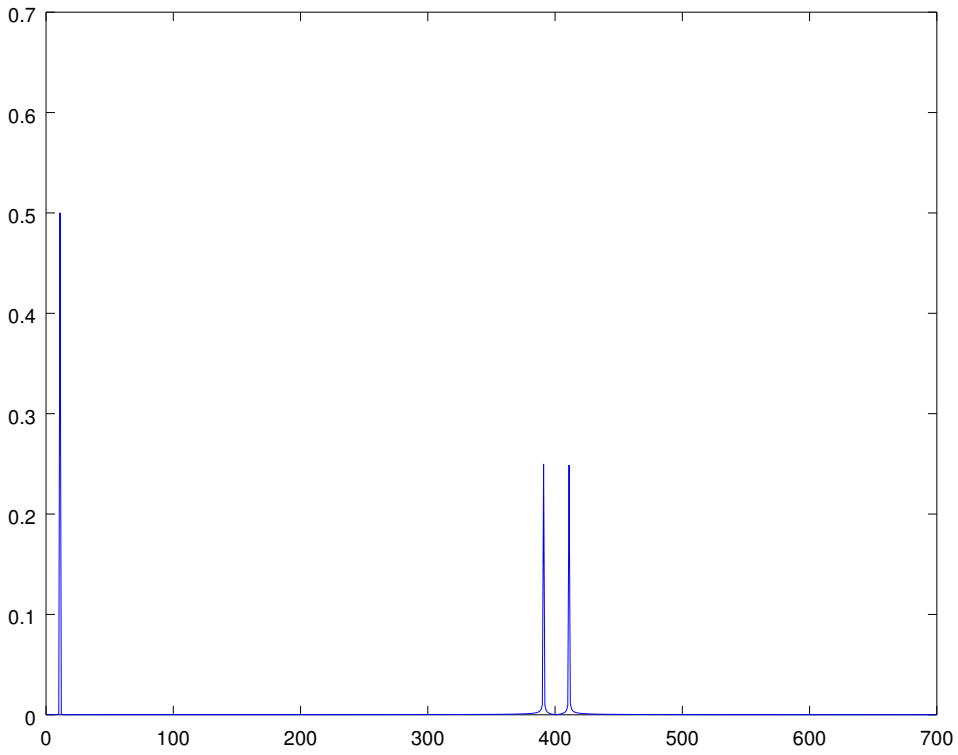


f) Plot the spectrum of signal xi using the following commands:

spec2=abs(fft(xi));

N=length(spec2)/2;

plot(spec2(1:700)/N)



g) What must be the cutoff frequency of LPF to recover mt from xi?

10보다 커야 한다.