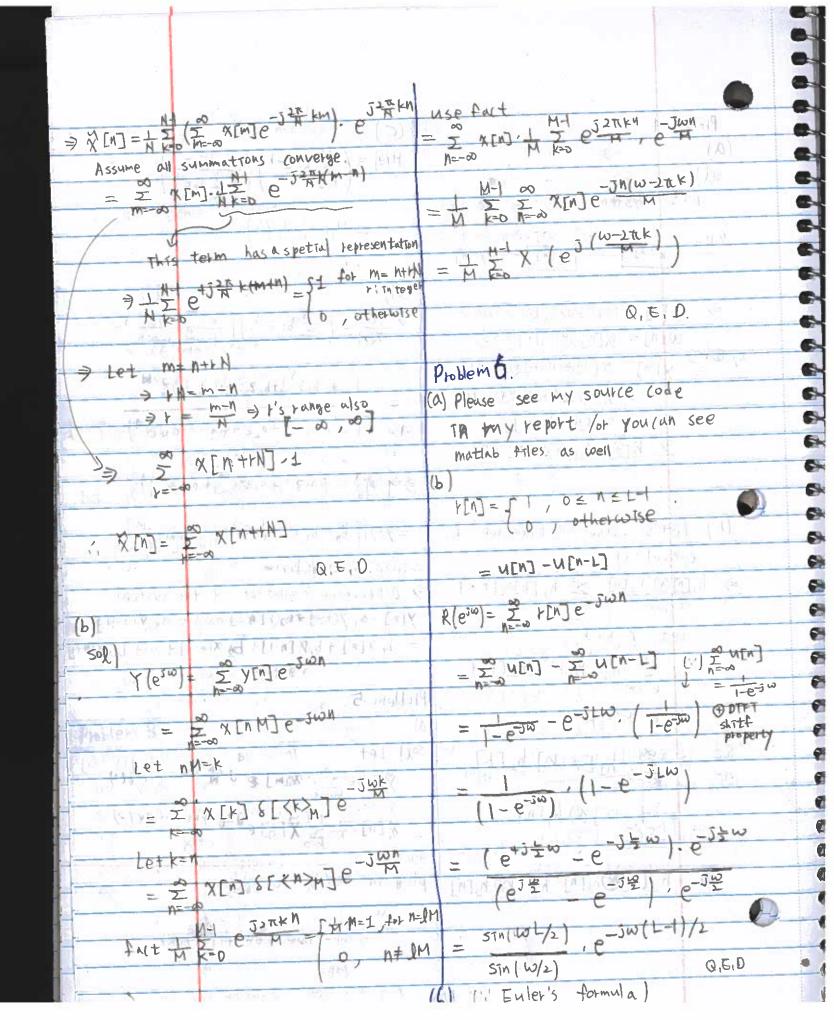
40	=	3	Let's reach case O kD below
04) 04) 04) 04)	A Home	work 1 EE519.	satisfy causality.
- 04	Problem 1.		OIF NEW = for NCK
44	(a) sol:	1-07	=> Y[n] is determined regardless x[n]
		Hala Didden Later	for N <k< th=""></k<>
60	Time		=> meaning it is causa
60		1 = = nk[n] (x[k] e+(1)	[N-4 14 14 14 15 15 15 15 15 15 15 15 15 15 15 15 15
64	> 1/5%	l kand	2) It (ausu)
a.	Now, a	SSUME X[N] & BX < 00, AN	=) YEN] Is independent on X[H]
-		XEN] is a bounded input.	for nck
- CO	(10.2)	The second secon	= medning hk[n] for n < k has
	=) eq(1)	can be represented as 40 lows	to be zero.
- Car	\\ra\	- E / K[] X[k]	E - MAIL PRO PROPERTY WIFE C.
440	[\lambda \tau \tau]	Z hkm W [kg]	> By Ole to case,
		≤ 8 x = 0 h_[h] e4(2)	the system is causal It and only
C		- 0 x k-0 F (d)	1 + hk[n] = 0 for n <k< th=""></k<>
-	270	20 thent (20	Trivite suite and the second of
040		[y[n]] < 0	Q, E.D.
6 40	The	BOSTAbley > I he[n] < 0 Fn?	
-	(3) (1 T) (1 T)	[1] TOO IN then non BIBO Stable	Problem 2.
- 49	7 1+2 DK	[N]=1 > NON BIBO Stable	(a) $y[n] = STN(2\pi x[n])$
10	11-11-11-11-11-11-11-11-11-11-11-11-11-	on n exists	301)
049		OD Statements	(i) linear?
0 tg		stem ISBIBO Stable	Let X,[N] \$ y,[N]
0	The sy	stem 15 BT BO 3 MADE TO 15 MADE T	
	1+	and only it I lhk[n] <00	
	A 1/		A TANK THE PARTY OF THE PARTY O
	ć, O	ED	Y3[n] Should be equal to Y,[n]+Y2[n]
		V A Principle To Princip	ASTUT SHOWLD DE AANT AL TONIE
	417		> YIEN] = STN (2TX XIEN]
	(6)	t is worth reminding	1/2[n] = STN (2TX2[n])
		meaning of causality	
00	() Cav	(sality; For VK>11, YEA] is	
000	_1	ndependent on xcn]	
00	ラ	tor K>N N[N-K]=0=HKI	
00			

de soy	
Callet Wild Control of Fred	
Le sur sur la su	Plans to thought of
(TT) Time invariant?	⇒YIEN] = Z XIEK SE (SE) & BOLLANT
Stelet NEN] TYEN]	
XIEWJY XIEWJY	Y_[n] = X XY[K]
Where X [n]= X[n-no]	$\lambda^{2}[u] = \sum_{u \neq u^{0}} \lambda^{2}[k]$
> see it y, cn]= 4 y[n-no]	K=N-N0
D Y [N-N] = STN (2TL X[N-NO])	$=\sum_{k=0}^{\infty}\left(X^{1}[k]+X^{2}[k]\right)$
@ Y, [N] STN (2tl x, [N])	COTT V. COTT
= STN (2TR XEN-NO])	= >1 [1,1] -1 12 [1.1]
and the second and delights the second for	> Linear System
⇒ \[\(\mathbb{L} \mathbb{N} - \mathbb{N} \) = \(\mathbb{L} \mathbb{L} \mathbb{N} \) = \(\mathbb{N} \mathbb{L} \mathbb{N} \) = \(\mathbb{N} \mathbb{L} \mathbb{N} \) = \(\mathbb{N} \mathbb{L} \mathbb{N} \mathbb{N} \) = \(\mathbb{N} \mathbb{L} \mathbb{N} \mathbb{N} \mathbb{N} \mathbb{N} \)	Steffe of Steffe of the Steffe of St
: Time Invariant system.	(Ti) Time invariant
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Let X[n] - Y [n]
(TTT) Causal?	$x^{1} [u] = x [u-u] \rightarrow \lambda^{1} [u]$
YEN] = STN (2TX XCM) TS Not	<08 11 V[N]= V[N-N;]
depending on future value of X(n)	300 (7 7/11/1- 7/11/13
⇒ (au sal system	= NEW-WO K=W-W-WO K=W-W-WO MEK] > NEW-WO MEK]
	K-11-11-12
(IV) BIBO Stable?	@YIEN]= XIEL
For all possible real values for X[n]	nthe Ark-N-7
> yen is within -121	= TAND YEK-NIJ
= 3 BIBO Stable System	
THE REPORT OF THE PARTY.	ULE WE CHANNEY
Mt No Francisco	There fore
(P) NEW = X[K]	Y,[n]= Y[n-n,]
Market Control of the	> Time - Invariant System
(1) Linear?	
let xi[n] > yilmi	(TTT) (ausul
WELD 3 X ENJ X	YEN] is dependent on
X3CNJ= X, CNJ +X2CNJ -> X3CNJ	future value of x [n] for
See It y [n] = Y [n] + Y [n]	P.J. Y L'I Meiterniked by
I VIOLENTAL PROPERTY OF	X [M+ No] where No >0
ि । चित्रक के कि स्टूबर्ग (- mail	=> Non (au su)
	(a)

6		V V	•	
(6)	(TV)	BI BO Stable?	(TTT) Causal?	7 - WALLE
6	411	XIDF] < BK < 00	YEN Only " Hependist on cu	rient value
	-5 Y	ENT - THO M TK?	[n] x 10	
6	9 Maria	$\chi_{[D]} \leq B_{K} < \infty$	=) (ausul	18 11 E
6	222	= Z BK THE		
13		bérouse sum of trite	(1V) BIBO stable?	-
13	3/ =7/	terms. Hers		Mark II III
	⇒ 8	IBO Stable system	Nana Ox F[v] x & Ox V	
	The state of the s	Property seekant	→ Non BIBO stuble.	30.14.1
3		The second of th	510 tem.	1 10 21 1
3	The state of the s	J = NX[N]	(d) y[n] = 0,5 m-11 x[n-1]	
3	(1) Irneat	? The and the	50);	
3	Let	X,[n] + YIEN I : I I I I I I I I I I I I I I I I I	(I) Irneat?	
9		1/2 [n] \$ 1/2 [n]	let x, [n] -> y, [n] = 0,5 1 -11 x, [N-13 Pay Hall
3	(A) X	[n]=x,[n]+x,[n] + /3[n]	X2[N] → X2[N] = 0.5 N-11 X2[[h-1]
3		क्षेत्रिके ए क्षेत्र उपराक्षणकर छन्। । पूर्ण नामक	X3[N] = X1[N]+X2[N] → X3[N] = 01€	IN-11 (X3 [N-1])
		Y3[N]=Y1[N]+Y2[N]	= 0,5	1n+1 (x,[n-1]+ 3[n-1]
8	⇒ Y. En]= N X3[n] = N (X1[n]+X[n]) 110	· · ·	D
9		Para legist	What is y,[n]+y,[n]	8 = -
•		X=[N] = N X1[N]+NX_[N] @	> y,[n]+x[n]-0.511-11x,[n-	1)
9	> 0 =	D => Y3[7]=Y1[N]+Y2[N]	+ 0,5 1 n-11 x [n-	H NELS =
1		nt system	= 0,5 m-11 (x,[n-1]+x	[n-1]
		er Lindall vyanam =	= 0	1 (8 Wellan
3	(TT) Time	In var Tant?	> /3[n]= y,[n]+ /2[n]	
D	let	KEN] H YEN]	> Ineat System.	y \ sat
3	χ	[n] = x[n-n,] -> y,[n]	And the state of the state of	
9	See Tt	Y, [N] = Y[N-N.]	[1] Time in variant?	
3			Let X[n] + y[n] = 015 [n-1]	X [N-1]
1	1/[n-No].	(N-No) X [N-No] /11 ()	XI[N] > YI[N] = OIZIN- XI[1-1]
	[h] 1 K	Lu3,xx	= X[n-16] = 0,5 n-1 x [N-No-1]
		N V [N-40] ()	= 1 xo 1 4-9 xy 3M ==	1805
g.	(1) \$ (5)	> Non time invariant	15 Y, [n] = Y [n-n]?	

•	
- 11-10-11 N [10-10-10]	(15) Mammum p hase system
115	We can tall a system
+ y [N] oct the share of the first	a minimum phase system
East of the	The all zeros & poles of system are
⇒ Hon time Invariant.	
E	The the same
	a three seconds and the first three seconds
(TTT) (ausu)?	A STATE OF THE STA
	(b) Causal III
value of X[n] add so	(1+0,221) (1-92-2)
=) (ausal system	H(2) = 1+0,812-2
a little Walled a little of the little of th	Charles the first first to the second
(TV) BIBO stable?	
DELIN-11 KB < D FOR YM	= (H0,122) (1-32-) (1+32)
Bounded Not W N Bounded	(1-0,922) (1+0,922)
[1]	4.7 (3/4) 3.7 (4/4) 4.7 (4/4) 4.7 (4/4) 4.7 (4/4)
> Y[n]= 0:5[n-1] x [n-1]	can be decomposed as follows
≤ 0,51n-1 X[n-1] < B.Bx <0	
2 015 [NL: .3]	= (1+0,22+) (1+32+)(1-32-)
⇒ Bounded Dutput	$= \frac{(1-0.922)(1+0.922)}{(1-0.922)}$
A CALL STATE OF A CALL OF THE A CALL	X (11351)(1-351)
=> BIBO Studle system.	X (1132)111-32 30=0 c
Tara aria ang ambanca	(1+====================================
Problem 3,	= Hern(>) X Hap(2)
(a) (i) All - pass system	= HYMIXIV 11961=1
a system is	
an all-pass system by checking	(1-01927) (170000
14 all poles & zeros are	
conjugate rectprocal to each other	Han (t) =
(ONJUGATE TRETIFICATION CONTRACTOR CONTRACTO	(1+ = = =) (1-=====)
(X) 1 (2) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	
Re[2]	WE WANT TO THE WAY TO THE TAIL
DA COS SOS OCT	
all pass filter's zero pole plot	(AL)

(0)		8
**		grant to the state of the state
0	Problem 4 117814 1-M	(C) the second s
0	(a)	H(2) = / H 6,2-1 / 101 /
10	· Sol) a darar	(1-0) (1-3 ax2
10	LTI system	11 (2)
0	X[N] TI W[N] TI	$= H_1(2) H_2(2)$
19	-> NENJ -> 1/2[N] -> Y[N]	confluence and the confluence
10	The second secon	501)
G	> y[n] = w[n] + h_[n] 0	=> Y(Z) = (IM br 2-r) (I B 0.2-k)
9	win] = xin] &h, in](2)	X(2) (1-0 / 1-2 arz /
2	LY ORD X [N] = X[N] W h.[N] h.[N] h.[N]	bo + b, 2-1+b, 2-2+111+ bm 2-M.
63 63 63 63 63 63 63 63 63 63 63 63 63 6	$=\chi[n]\oplus(h_1[n]\oplus h_2[n])$	= = 1/
-33	$= \chi[n] \Theta h[n]$	(b) 1-(a,2-1+a,2-2++a,2-4)
49	h[n]=h,[n]@h,[n]	1. 120 W 145 P
3	The Court of the C	=> Y(Z) { 1- (a, Z-1 + 0, Z-2+ + a, N Z-N) }
43	A MINISTER OF THE STATE OF THE	1
123	(b) Let's use definition of	=X(5){ po +p1 5 +p2 5 +1 +pM5-M}
3	CONVOLUTION	Inverse 2-thinsform
-	> h. [m] A h. [m] = > h. [k]h. [n-k]	> Difference equation of the system.
2	TO STATE OF THE STATE OF THE	λ[ν] - σ1 λ[ν-1] - σ7 λ[ν-5] QH λ[ν-H]
100	Merchet N-k=k	= 60x[n] + 61x[n-1] + 62x[n-2] + 111+ 64xD
10	=> = h,[n-k'] h_[k']	3/4 3 124/4
1	K'5-00	Problem 5.
4	Let k'=k	(A)
3	graden action	501) 10+
19	by hi[n-k] hi[k]	X[k]= Z X[m] e-J N km mer(1)
-		NJ 7 722 km 04(2)
7	= h_[n] @ h_[n]	$\chi[k] = \sum_{N=1}^{N-1} \chi[k] e^{-j\frac{2\pi}{N}} km met(1)$ $\chi[n] = \frac{1}{N} \sum_{k=0}^{N-1} \chi[k] e^{-j\frac{2\pi}{N}} km met(2)$
10	59 (F 92 (STATE) .	
	> h, [n] & h, [n] = h, [n] & h, [n]	plug to eq(=) +0 (+)
IP		Manust a plant the sea using
10	The second of th) continue on the next
	Staff Staff	PAGE.
		5)



N M	
Deplotting part is in my report.	> do[n] = STN (271 '941 ' 1000 ' N)
	+ STN (2TL. 1336, 1000 11)
(C)	= SIN (0,7391))
when L=31, height of the mainlabe	+ SIN (1,04937)
Increases & number of position of	
the points where the magnitude	d_[N] = STN (2T. 697 - 6000 N)
is equal to 0 increases	+ STN (270. 1336 . 1000 M)
as well.	= STN (015474 N)
	+5TM (1,04937)
In theory, as I were how,	
maximum of R(esw) is L	(b) please theck my answer in the
As we observe, max R(e; 0) = 24,	re port.
with # L=24	
& max [K [e j w)] = 3 with L=3].	(c) ~ (e)
Also, as Lincreases	please check my report.
term WL/2 TN(reuses	
meaning frequency of zero	
THE EUSES.	
Therefore, pattern we could find	
in (C) & (b) agrees with	
theory.	
problem 7.	
(a) sol)	
$d(t) = stn(w_1t) + stn(w_2t)$	
$= \sin(2\pi t_1 t) + \sin(2\pi t_1 t)$	THE REPORT OF THE PERSON AND PARTY OF THE PERSON AND P
(! W= IRF [rnd/sec]).	
	オグラン 人 一 二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二
> d[n] = d(nTs) (: t=nTs)	
where Ts = 8000 / ts = 8000 Hz	
(1	n)

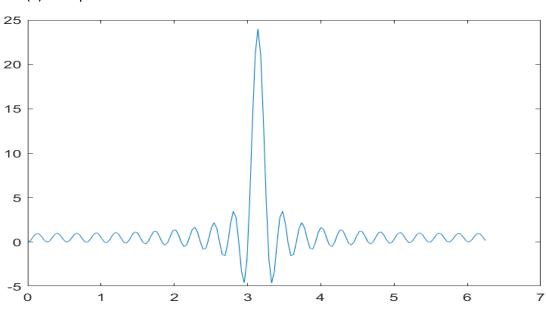
EE519 Homework #1 January 30, 2020

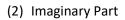
Problem6

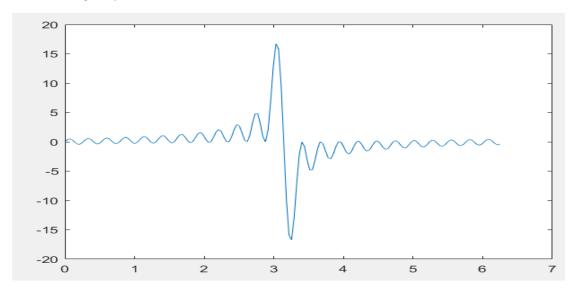
(b)

L = 24, N = 7 x L

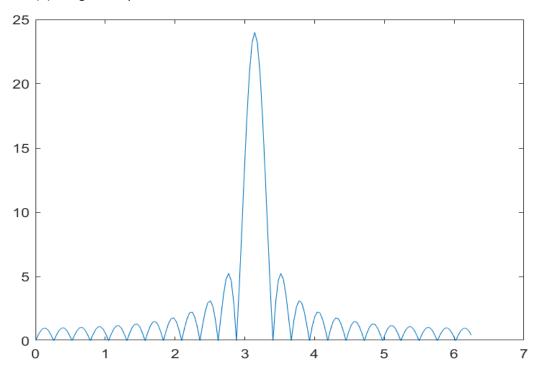
(1) Real part of R





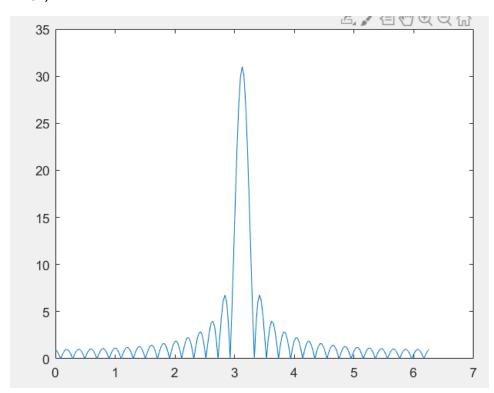


(3) Magnitude part



(c)

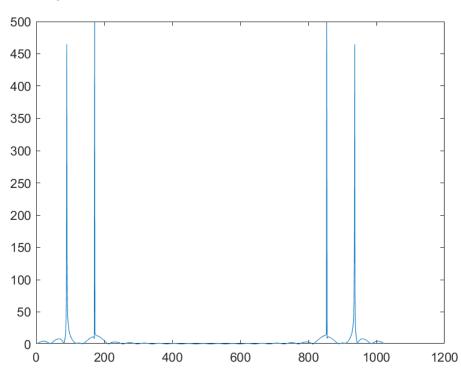
L = 31, N = 7 x L



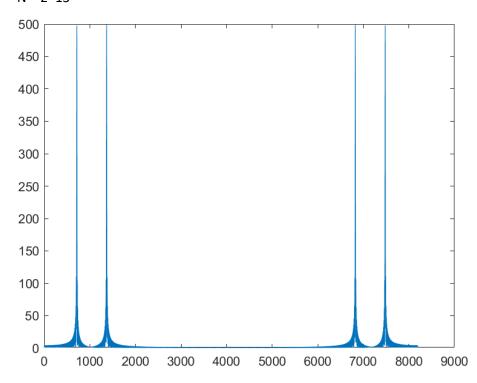


(b)









As we can observe, the case $N = 2^13$ has fine resolution. Two peaks become closer with $N = 2^13$. Also, the results seem 4 Dirac pulses for each N, but not exactly the same. This is because length of N is finite.

(d)

USC ID: 7953613766

Please check my audio file, USCID.wav

(e)

Decoded numbers (Sig1) = 584730

Decoded numbers (Sig2) = 66874129

Decoded numbers (Sig3) = 50037