Nombres: Miguel Fernando Becerra Rodríguez Código: 2200888

Karen Sarat Anaya Verdugo 2200813

Taller operadores lineales

Sección 4.1.4

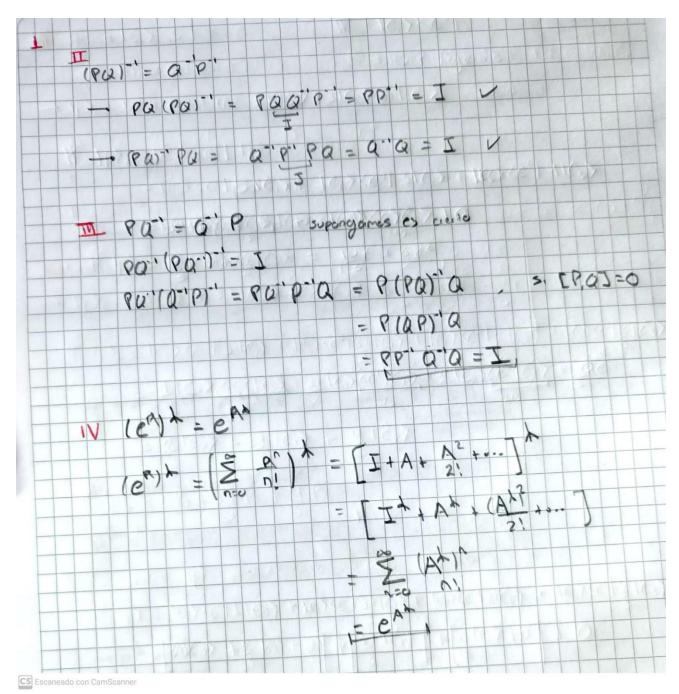
Punto 4 & 5.

```
4. Suponga que AB=BA, demuestre:
                                (A+B)3 = A3+3A2B+3AB3+B3
 (A+B)2 = A2 +2AB + B2
                                 (A+B) (A+B)(A+B)
 (A+B) (A+B)
                                 A2+AB+BA+B2 (A+B)
 AT + AB+BA+B2
                                 = A2 + A2B+ BA2+B2A+ A2B+AB+B
   Como AB=BA enfonces,
   A2 + 2 AB + B2 H
                                 COMO AB: BA, A=A 4 B=B,
A B=BA 4 B A ABE.
                                 = A3+3A2B+3AB2+B3
5. [L., L+] = I L: L.L+
     lix>= > 1x> 1y>= L+1x>
                                     Demostrai:
                                      L14> = 12+1) 14>
OI=L-L,-Lal-
   L-L4 = I + L + L -
                         1, LIX> = 1x ix> -> 2 puede conmutar
                          1+11x>= 71+1x>
  1117>7=11,1X>0
                         Reemplazamos: 14>=1+1x>
 Reemplazamoj ( en ()
                         L+11x> = 214> 2
 LIN>= (]+[,[,)[,]x>
 LIY> = L+1X>+L+1. L+1X>
 LIY>: L+ IX> + L+ LIX>
 114>=1+1x>+214>
 [1.1.]=I
             1=1.1+
   [1x>= \(\chi \) | 1>=[-1x> [1z>= (\lambda - 1) | 1z> (1z>= \(\lambda \) | 1z> -1z>
   1.1. - L.1. = I
    1+1.=1.1+ID
                           De: Lix> = > 1x>
                           [-1[1x>]=1 [][x]
L 12>= L (L-(+) L) (x>

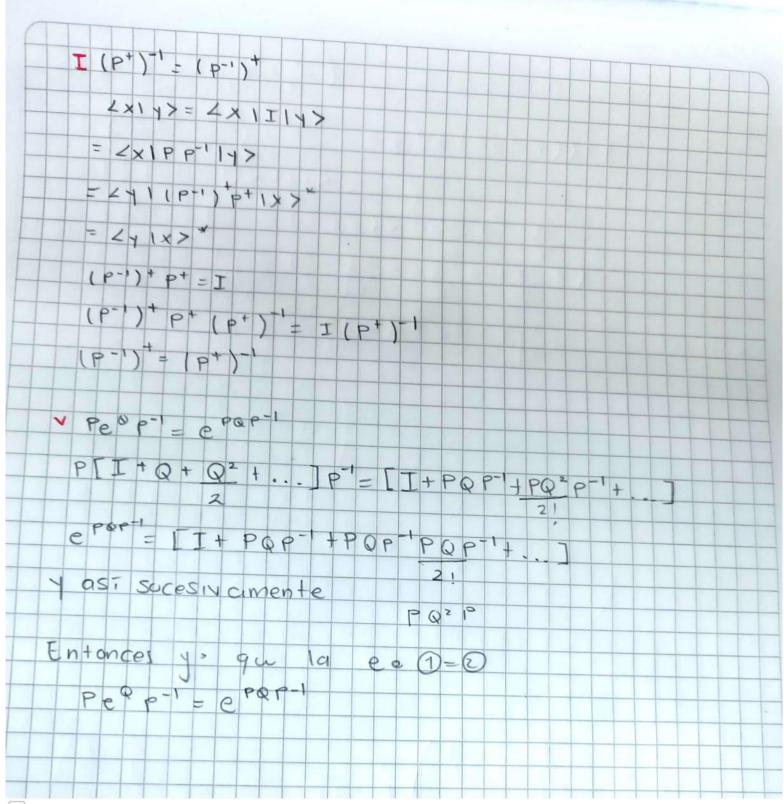
L 12>= L (L-(+) L) (x>
                          1.LIX>= > L.IX>
                            L-LIX>= NIZ>
```

Sección 4.2.9

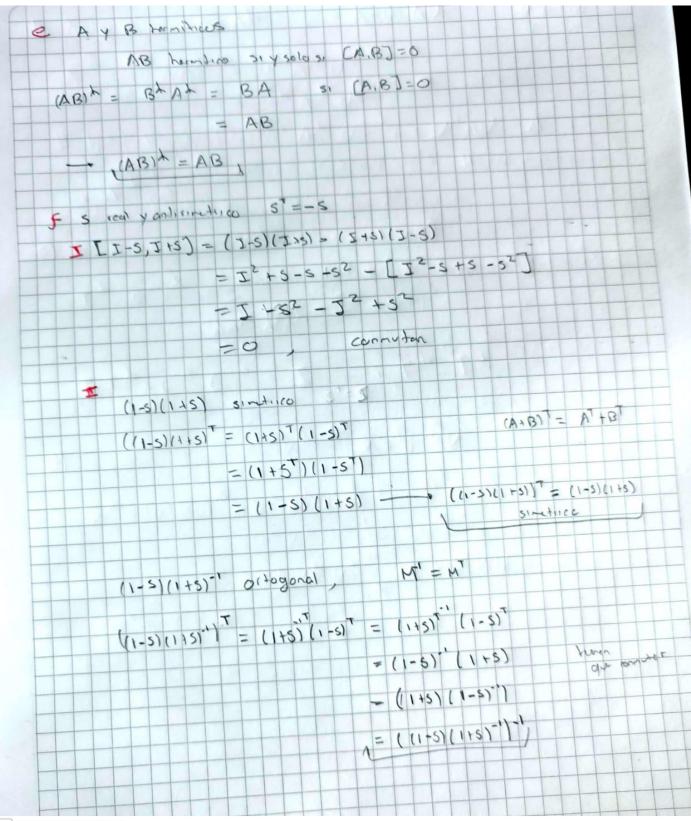
Punto 1



= U'AU = A A L A A=AA, Sea T=ccA (3 $T^{\lambda} = (e^{i\alpha})^{\lambda} = e^{(i\alpha)^{\lambda}} = e^{-i\alpha^{\lambda}}$ $(\lambda A^{\lambda} = \lambda^{\mu} A^{\lambda})$ TTX=ein ein = I Unitario U uniture = U-, Ky n. = -UNU = -X -KX --K



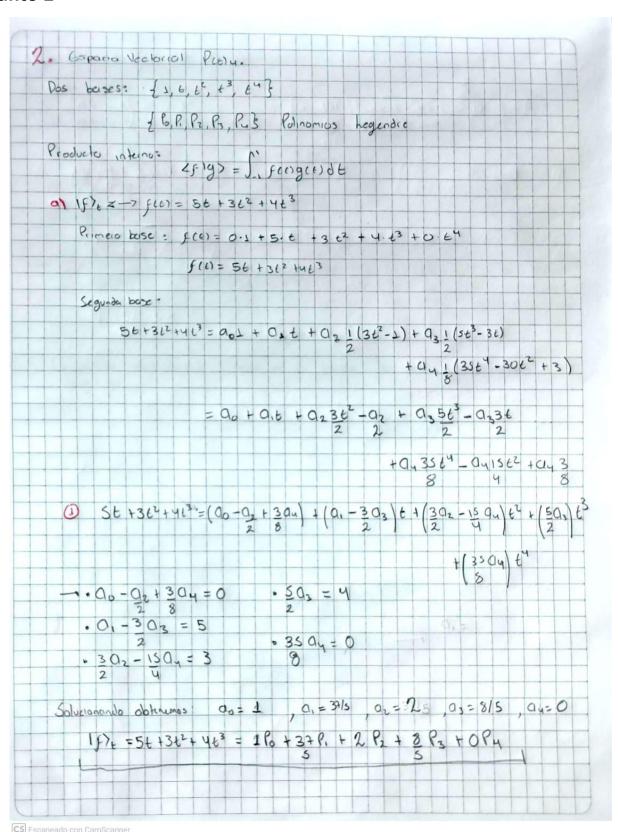
CS Escaneado con CamScanner



Seno 9. Sea R - (coso COSE R=(I-S)(T+S)-R(I+S)=(I+S) $\begin{pmatrix} \cos\theta & \sin\theta \end{pmatrix} \begin{pmatrix} 1+S_{11} & S_{12} \\ -Sen\theta & \cos\theta \end{pmatrix} \begin{pmatrix} S_{21} & 1+S_{22} \\ \end{pmatrix} = \begin{pmatrix} 1-S_{11} & -S_{12} \\ -S_{21} & 1-S_{22} \end{pmatrix}$ Cose+coses, + senes, coses, + sene+senes, - seno - senos, + cosos, - senos, + coso + cosos, COSO + COSOS 11 + S 11 - 1 + SenO Sz, = 0 0 [s, [cose+1] + s, [sen0] = 1-cose @ S12 [1+ COSO] + S22 Sen0 = - Sen0 3) - ser@ \$,, + \$, [1+cos@] = Sen@ (9 - Sens, 2 + Szz [1+cos 0] = 1-cos cosett o seno o 1 SII 6 1+ coso o seno -SenO 512 -sen0 0 1+cos0 0 521 -seno o 1+ coso entences: Su=0 Sz=0 Con S12 = - S21 = -2SINO 512 = - 2 Sin 0 Sin 20 + cos2 0 +2 cos0+1 2 (1+ COSO) € 512 = - SINO (1+cose) = 2SINO Sz1 = 2 5 mg 2 [1+ (cso) Sin 20+ (cus 20+ (coo+1) 05217 \$198 11+(cs6)

Sección 4.3.8

Punto 2



Para hellar la madriz de	transcourage	do.								
sea 19> = a 0 1 + a t + a	e2 + chat?	tand	4 = 0	20 80	19, P.	+ 92 P2	+ 03 P3 + QuPy			
					-4-1					
La ratación entre las coordena	des la haller	105 €	N I	(000	gine a	nderior)				
				-						
ao=ao -az +39,	a3 =	30	2		-					
		T								
a, = a, - 303	0	35	9.1							
an = 3015 a.	ay =	6								
az=30z-1504			6							
- ai = dxi ai	Dx =	1	0	-1/2	0	3/8	de polinonies			
224	9×2	0	7	0	-3/2	0	de polinonies			
		0	0	3/2	0	-13/4				
		10	0			0	a lo otro bose			
		Lo	0	0	0	35/8				
				1	N - 1	14				
La inversa nos permite	posar d	CC	a base "contesiona" a base							

CS Escaneado con CamScanner

b P2 = 10,> (e) R2 = Ver/ Ker/2 Para la base P. Leguendre - 15%= 56 + 362 + 463 = 510,7 + 3102) + 4103) R2 1876 = 101> <ec | 182 , c-0,1,2 = 1exxec151ex+ 1exxec131ex+ 1exxec141ex = 518,76 18.7 + 31827621827 +0 (and qu 4018) +8; - 1 FTE = 11 EST + 37 1 E 17 + 21 E 27 + 8 1 E 37 Politie = 100 / (01) 100 + 100 / (01 3+10) + 10, / (01 210) + 10, / (01 810) 11807, 400 1801 + 37 187 46 18,7 + 21827 420 - 215 = 21ê0> + 37 1ê1> + 41ê2> P2/F/t = 2P0 + 37 P, + 4 P2 182 boloic 147 pero expresado en base Legendre R2187 = 1817 (81 1 180) + 1817 (81 37 181) + 1817 (81 81 83) =[2180) + 2 1827 + 0] + [37 18.7] + 81827 +0] + 0 R21F7-21e07 + 371e,7 + 61e,7

) Sear	211	1> 1	t>,	11													
En bo	10	de 1	0		00040)		a da da da da	(1) 1 t · · · · · · · · · · · · · · · · · ·	>= 1	31	> t 2 ;	>	de	og ev		
	3t 1		000000000000000000000000000000000000000	1 0 0 0	0 2 0 0 0	0 0 3 0 0	000040	1	0000			0 0 0 12)=	12	£3;		
e	E Z	o hi	- =	<u>T</u> +	D+	0	1	C C	1 0	4	+ 11	20	+ -				
		1 0 0 0	1 0 0 0	-	1 3 3 1 0	1 4 6 4 1	1	+ (0 0 0	0000	0000			0 1			
	11 =	e (=	2	hi	=/	1 0 0	1 0 0	1 2 1 0 0	1 3 3 1 0	1 4 6 4 1		4.				
			se = 1		poli		d 1	1 (3t	gen -1	dre	3t	7	3	(t>		
dt	lt:	7 =	1 =	11:	>		1	1.2	(5)	2_	3t	1>	= 1	15	t"-	3	-

