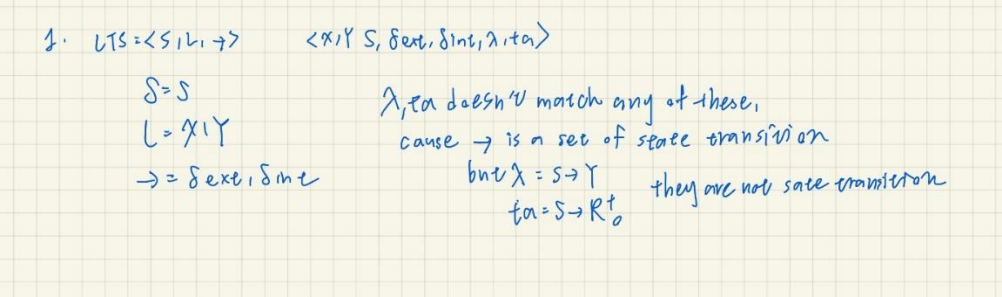
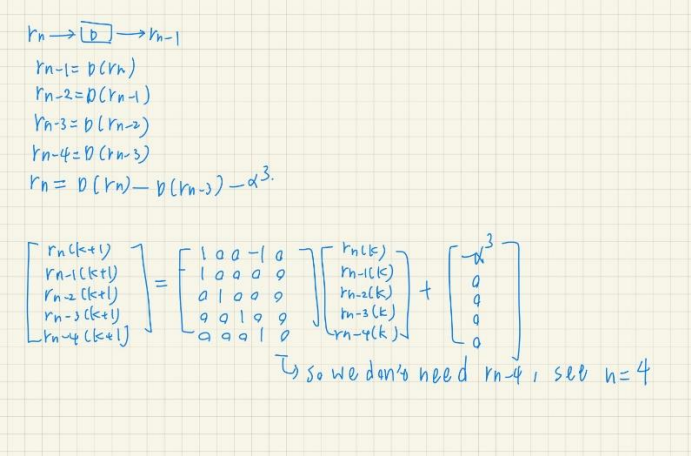
Exercise 1:



Exercise 2: (a)



Exercise 2: (b)

k	r1	r2	r3	r4
0	1	2	-2	1
1	2	-2	1	$-\alpha^3$
2	-2	1	$-\alpha^3$	$-2\alpha^3-2$
3	1	$-\alpha^3$	$-2\alpha^3-2$	$-3\alpha^3$
4	$-\alpha^3$	$-2\alpha^3-2$	$-3\alpha^3$	$-4\alpha^3-1$
5	$-2\alpha^3-2$	$-3\alpha^3$	$-4\alpha^3-1$	$-4\alpha^3-1$

Exercise 3(a):

Primary States:

phase: passive, active, respond

sigma: any positive real number including positive infinity

Secondary States:

count: any positive integer less than or equal to seven

Parameters:

stepTime: time unit for every single step

Initialization:

Phase = passive

Sigma = infinity

Count = 0

stepTime = 1

External Transition Function:

If (input == 1) set Phase = active

Else if (input == 0) set Phase = respond

Internal Transition Function:

If (Phase == active) count = count+1

Output Function:

If (Phase == respond) print out the output

Exercise 3(b)

Time	Input	State	Output
0	1	(active,1.0,0)	∅
1--	∅	(active,1.0,1)	∅
1-	∅	(passive,∞,1)	∅
1	0	(respond,1.0,1)	∅
2--	∅	(respond,1.0,1)	∅
2-	∅	(passive, ∞,1)	1
2	1	(active,1.0,1)	∅
3--	∅	(active,1.0,2)	∅
3-	∅	(passive, ∞,2)	∅
3	1	(active,1.0,2)	∅
4--	∅	(active,1.0,3)	∅
4-	∅	(passive, ∞,3)	∅
4	0	(respond,1.0,3)	∅
5--	∅	(respond,1.0,3)	∅
5-	∅	(passive, ∞,3)	3

Exercise 5

Zcounter = <SZ,IZ,OZ,NZ,RZ>

SZ : {active,passive,respond}

IZ : {1,-1,2,0}

OZ : {0,1,2,3,4,5,6,7}

NZ : internal state transition deltint()

RZ : output function message out( )