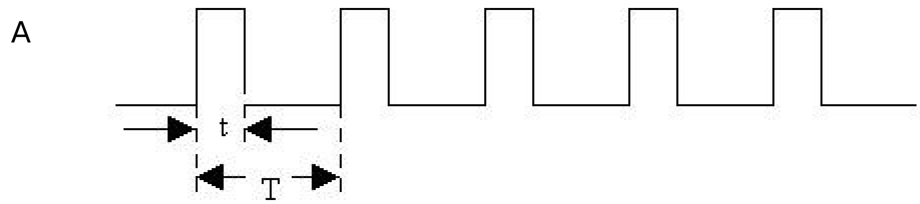
Nombre: Eguiarte Morett Luis Andrés.

Titulo Tarea: Espectro en amplitud y fase y Respuesta en frecuencia en MATLAB.

Tarea No. 6

Para la siguiente señal:



t=Δ

T=2Δ

A=1

a) Obtener los primeros 100 coeficientes A_n y Θ_n
   i) Δ=0.1[uS]; T=0.2 [uS]
   ii) Δ=0.05[uS]; T=0.05 [uS]
   iii) Δ=0.01[uS]; T=0.01 [uS]

i) Δ=0.1[uS]; T=0.2 [uS]

<u>Para la entrada</u>

n	Anx	thetan
0	0.5	0
1	0.63662	1.5708
2	0	3.1416
3	0.21221	1.5708
4	0	3.1416
5	0.12732	1.5708
6	0	3.1416
7	0.090946	1.5708
8	0	3.1416
9	0.070736	1.5708
10	0	3.1416
11	0.057875	1.5708
12	0	3.1416
13	0.048971	1.5708
14	0	3.1416

15	0.042441	1.5708
16	0	3.1416
17	0.037448	1.5708
18	0	3.1416
19	0.033506	1.5708
20	0	3.1416
21	0.030315	1.5708
22	0	3.1416
23	0.027679	1.5708
24	0	3.1416
25	0.025465	1.5708
26	0	0
27	0.023579	1.5708
28	0	3.1416
29	0.021952	1.5708
30	0	3.1416
31	0.020536	1.5708
32	0	3.1416
33	0.019292	1.5708
34	0	0
35	0.018189	1.5708
36	0	3.1416
37	0.017206	1.5708
38	0	3.1416
39	0.016324	1.5708
40	0	3.1416
41	0.015527	1.5708
42	0	0
43	0.014805	1.5708
44	0	3.1416
45	0.014147	1.5708
46	0	3.1416
47	0.013545	1.5708
48	0	3.1416
49	0.012992	1.5708
50	0	0
51	0.012483	1.5708
52	0	0
53	0.012012	1.5708
54	0	3.1416
55	0.011575	1.5708
56	0	3.1416
57	0.011169	1.5708
58	0	0
59	0.01079	1.5708
60	0	3.1416
61	0.010436	1.5708
62	0	3.1416
63	0.010105	1.5708
64	0	3.1416
65	0.0097942	1.5708
66	0	3.1416

67	0.0095018	1.5708
68	0	0
69	0.0092264	1.5708
70	0	3.1416
71	0.0089665	1.5708
72	0	3.1416
73	0.0087208	1.5708
74	0	3.1416
75	0.0084883	1.5708
76	0	3.1416
77	0.0082678	1.5708
78	0	3.1416
79	0.0080585	1.5708
80	0	3.1416
81	0.0078595	1.5708
82	0	3.1416
83	0.0076701	1.5708
84	0	0
85	0.0074896	1.5708
86	0	3.1416
87	0.0073175	1.5708
88	0	3.1416
89	0.007153	1.5708
90	0	3.1416
91	0.0069958	1.5708
92	0	3.1416
93	0.0068454	1.5708
94	0	0
95	0.0067013	1.5708
96	0	3.1416
97	0.0065631	1.5708
98	0	3.1416
99	0.0064305	1.5708

Para la respuesta en frecuencia

n	**Hn**	**theta_h**
0	1	0
1	0.99803	-0.062749
2	0.9922	-0.12501
3	0.98269	-0.18631
4	0.96984	-0.24623
5	0.95403	-0.3044
6	0.93572	-0.36052
7	0.91537	-0.41436
8	0.89348	-0.46577
9	0.87046	-0.51466
10	0.84673	-0.56098
11	0.82264	-0.60476
12	0.79847	-0.64604

13	0.77448	-0.68491
14	0.75085	-0.72146
15	0.72773	-0.75579
16	0.70523	-0.78805
17	0.68344	-0.81833
18	0.6624	-0.84678
19	0.64214	-0.87351
20	0.62268	-0.89864
21	0.60401	-0.92227
22	0.58613	-0.94452
23	0.56903	-0.96547
24	0.55267	-0.98524
25	0.53703	-1.0039
26	0.52209	-1.0215
27	0.50781	-1.0382
28	0.49416	-1.0539
29	0.48112	-1.0689
30	0.46865	-1.083
31	0.45673	-1.0965
32	0.44532	-1.1093
33	0.43441	-1.1214
34	0.42395	-1.133
35	0.41394	-1.144
36	0.40434	-1.1545
37	0.39514	-1.1646
38	0.38631	-1.1742
39	0.37784	-1.1833
40	0.3697	-1.1921
41	0.36187	-1.2005
42	0.35435	-1.2086
43	0.34711	-1.2163
44	0.34015	-1.2237
45	0.33344	-1.2308
46	0.32697	-1.2377
47	0.32074	-1.2443
48	0.31472	-1.2506
49	0.30892	-1.2567
50	0.30331	-1.2626
51	0.2979	-1.2683
52	0.29267	-1.2738
53	0.2876	-1.2791
54	0.28271	-1.2842
55	0.27797	-1.2891
56	0.27338	-1.2939
57	0.26893	-1.2985
58	0.26462	-1.303
59	0.26044	-1.3073
60	0.25639	-1.3115
61	0.25246	-1.3156
62	0.24864	-1.3195
63	0.24493	-1.3233
64	0.24133	-1.3271

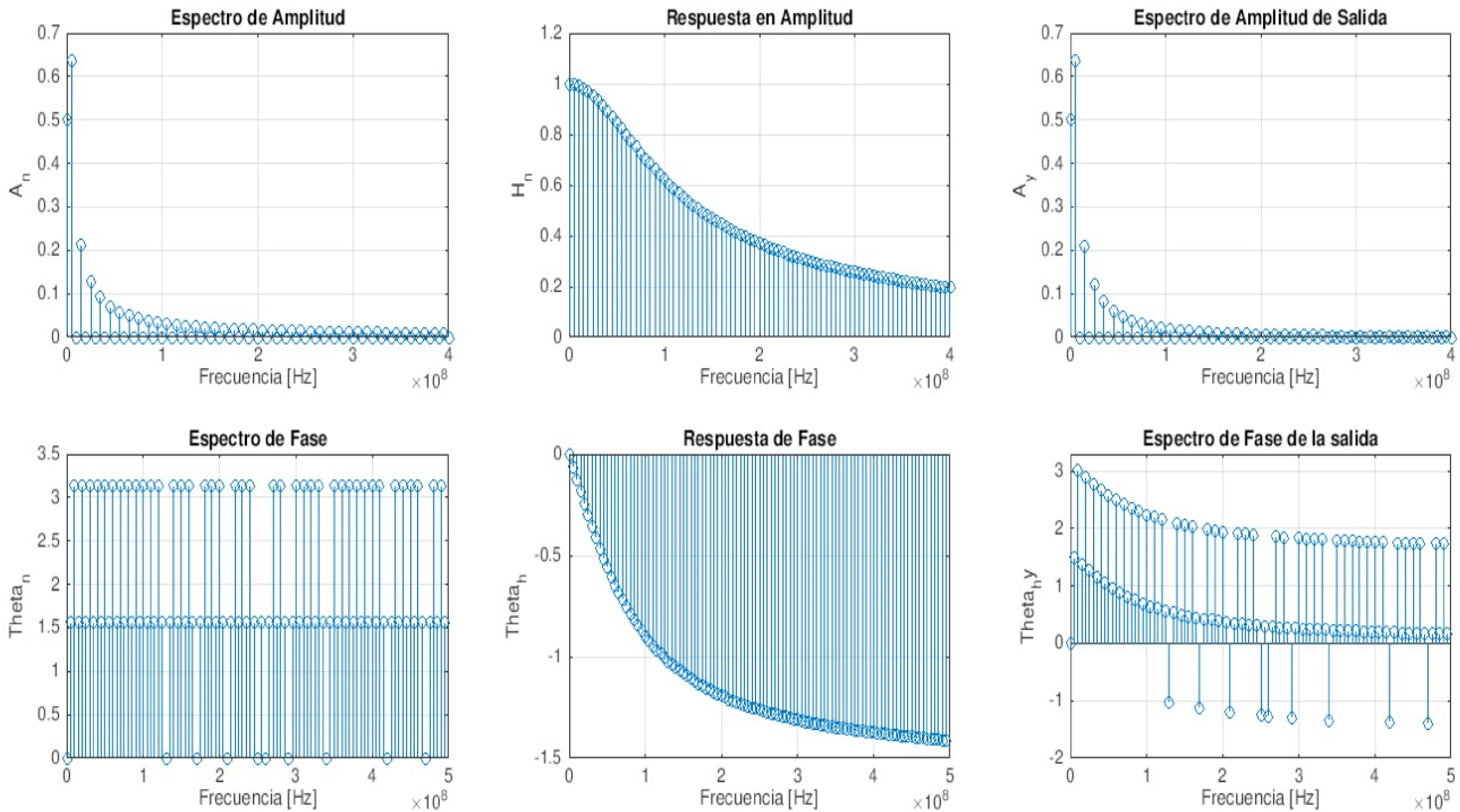
65	0.23783	-1.3307
66	0.23442	-1.3342
67	0.23111	-1.3376
68	0.22789	-1.3409
69	0.22476	-1.3441
70	0.22171	-1.3472
71	0.21873	-1.3503
72	0.21584	-1.3532
73	0.21302	-1.3561
74	0.21027	-1.3589
75	0.20758	-1.3617
76	0.20497	-1.3644
77	0.20242	-1.367
78	0.19993	-1.3695
79	0.19749	-1.372
80	0.19512	-1.3744
81	0.1928	-1.3768
82	0.19054	-1.3791
83	0.18832	-1.3813
84	0.18616	-1.3835
85	0.18404	-1.3857
86	0.18197	-1.3878
87	0.17995	-1.3899
88	0.17797	-1.3919
89	0.17603	-1.3938
90	0.17414	-1.3958
91	0.17228	-1.3977
92	0.17046	-1.3995
93	0.16868	-1.4013
94	0.16694	-1.4031
95	0.16523	-1.4048
96	0.16355	-1.4065
97	0.16191	-1.4082
98	0.1603	-1.4098
99	0.15872	-1.4114

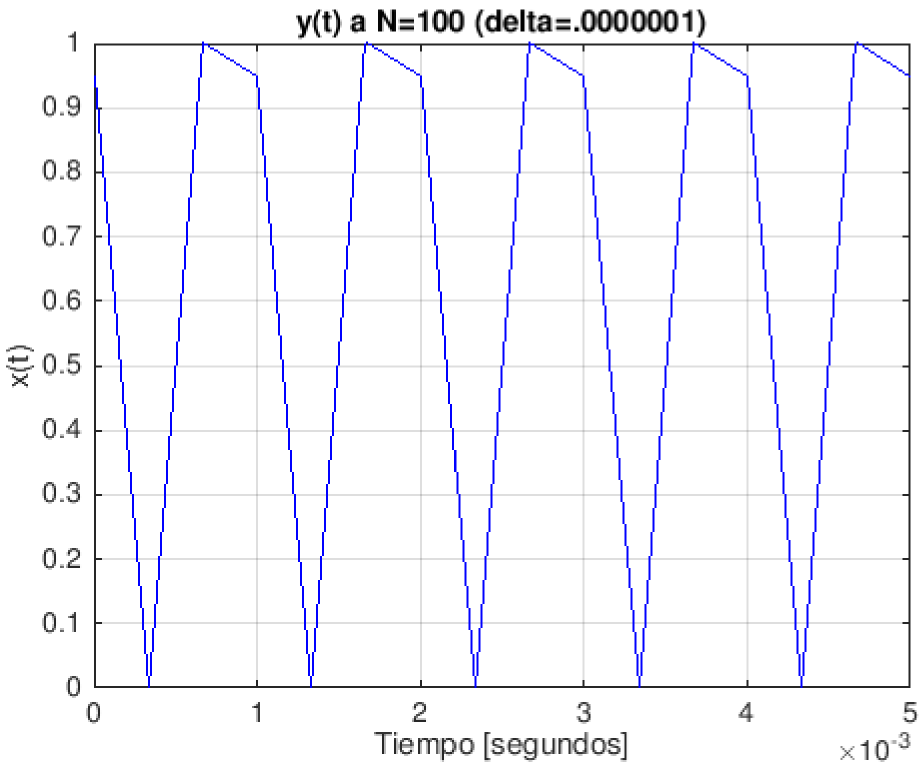
Para la salida

n	**Any**	**theta_h_y**
0	0.5	0
1	0.63537	1.508
2	0	3.0166
3	0.20853	1.3845
4	0	2.8954
5	0.12147	1.2664
6	0	2.7811
7	0.083249	1.1564
8	0	2.6758
9	0.061573	1.0561

10	0	2.5806
11	0.04761	0.96603
12	0	2.4955
13	0.037927	0.88589
14	0	2.4201
15	0.030886	0.815
16	0	2.3535
17	0.025594	0.75246
18	0	2.2948
19	0.021516	0.69728
20	0	2.243
21	0.018311	0.64853
22	0	2.1971
23	0.01575	0.60532
24	0	2.1564
25	0.013675	0.56691
26	0	-1.0215
27	0.011973	0.53264
28	0	2.0877
29	0.010562	0.50193
30	0	2.0586
31	0.0093794	0.47431
32	0	2.0323
33	0.0083803	0.44938
34	0	-1.133
35	0.0075292	0.42678
36	0	1.9871
37	0.0067988	0.40622
38	0	1.9674
39	0.0061677	0.38746
40	0	1.9495
41	0.0056189	0.37028
42	0	-1.2086
43	0.0051391	0.35449
44	0	1.9179
45	0.0047172	0.33995
46	0	1.9039
47	0.0043444	0.32651
48	0	1.891
49	0.0040136	0.31406
50	0	-1.2626
51	0.0037186	0.30249
52	0	-1.2738
53	0.0034546	0.29172
54	0	1.8574
55	0.0032175	0.28168
56	0	1.8477
57	0.0030036	0.27228
58	0	-1.303
59	0.0028102	0.26348
60	0	1.8301
61	0.0026348	0.25522

62	0	1.8221
63	0.0024751	0.24745
64	0	1.8145
65	0.0023293	0.24013
66	0	1.8074
67	0.002196	0.23322
68	0	-1.3409
69	0.0020737	0.22669
70	0	1.7944
71	0.0019613	0.22052
72	0	1.7883
73	0.0018577	0.21466
74	0	1.7826
75	0.001762	0.2091
76	0	1.7772
77	0.0016735	0.20382
78	0	1.7721
79	0.0015915	0.1988
80	0	1.7672
81	0.0015153	0.19402
82	0	1.7625
83	0.0014445	0.18945
84	0	-1.3835
85	0.0013784	0.1851
86	0	1.7538
87	0.0013168	0.18094
88	0	1.7497
89	0.0012592	0.17696
90	0	1.7458
91	0.0012052	0.17314
92	0	1.7421
93	0.0011547	0.16949
94	0	-1.4031
95	0.0011072	0.16599
96	0	1.7351
97	0.0010626	0.16263
98	0	1.7318
99	0.0010207	0.1594


Espectro de Amplitud
A_n
Frecuencia [Hz]
×10^8
Respuesta en Amplitud
H_n
Frecuencia [Hz]
×10^8
Espectro de Amplitud de Salida
A_y
Frecuencia [Hz]
×10^8
Espectro de Fase
Theta_n
Frecuencia [Hz]
×10^8
Respuesta de Fase
Theta_h
Frecuencia [Hz]
×10^8
Espectro de Fase de la salida
Theta_h y
Frecuencia [Hz]
×10^8



ii) Δ=0.05[uS]; T=0.05 [uS]

n	Anx	thetan
0	0.5	0
1	0.63662	1.5708
2	0	3.1416
3	0.21221	1.5708
4	0	3.1416
5	0.12732	1.5708
6	0	3.1416
7	0.090946	1.5708
8	0	3.1416
9	0.070736	1.5708
10	0	3.1416
11	0.057875	1.5708
12	0	3.1416
13	0.048971	1.5708
14	0	3.1416
15	0.042441	1.5708
16	0	3.1416
17	0.037448	1.5708
18	0	3.1416

19	0.033506	1.5708
20	0	3.1416
21	0.030315	1.5708
22	0	3.1416
23	0.027679	1.5708
24	0	3.1416
25	0.025465	1.5708
26	0	0
27	0.023579	1.5708
28	0	3.1416
29	0.021952	1.5708
30	0	3.1416
31	0.020536	1.5708
32	0	3.1416
33	0.019292	1.5708
34	0	0
35	0.018189	1.5708
36	0	3.1416
37	0.017206	1.5708
38	0	3.1416
39	0.016324	1.5708
40	0	3.1416
41	0.015527	1.5708
42	0	0
43	0.014805	1.5708
44	0	3.1416
45	0.014147	1.5708
46	0	3.1416
47	0.013545	1.5708
48	0	3.1416
49	0.012992	1.5708
50	0	0
51	0.012483	1.5708
52	0	0
53	0.012012	1.5708
54	0	3.1416
55	0.011575	1.5708
56	0	3.1416
57	0.011169	1.5708
58	0	0
59	0.01079	1.5708
60	0	3.1416
61	0.010436	1.5708
62	0	3.1416
63	0.010105	1.5708
64	0	3.1416
65	0.0097942	1.5708
66	0	3.1416
67	0.0095018	1.5708
68	0	0
69	0.0092264	1.5708
70	0	3.1416

71	0.0089665	1.5708
72	0	3.1416
73	0.0087208	1.5708
74	0	3.1416
75	0.0084883	1.5708
76	0	3.1416
77	0.0082678	1.5708
78	0	3.1416
79	0.0080585	1.5708
80	0	3.1416
81	0.0078595	1.5708
82	0	3.1416
83	0.0076701	1.5708
84	0	0
85	0.0074896	1.5708
86	0	3.1416
87	0.0073175	1.5708
88	0	3.1416
89	0.007153	1.5708
90	0	3.1416
91	0.0069958	1.5708
92	0	3.1416
93	0.0068454	1.5708
94	0	0
95	0.0067013	1.5708
96	0	3.1416
97	0.0065631	1.5708
98	0	3.1416
99	0.0064305	1.5708

n	**Hn**	**theta_h**
0	1	0
1	0.9922	-0.12501
2	0.96984	-0.24623
3	0.93572	-0.36052
4	0.89348	-0.46577
5	0.84673	-0.56098
6	0.79847	-0.64604
7	0.75085	-0.72146
8	0.70523	-0.78805
9	0.6624	-0.84678
10	0.62268	-0.89864
11	0.58613	-0.94452
12	0.55267	-0.98524
13	0.52209	-1.0215
14	0.49416	-1.0539
15	0.46865	-1.083
16	0.44532	-1.1093
17	0.42395	-1.133
18	0.40434	-1.1545

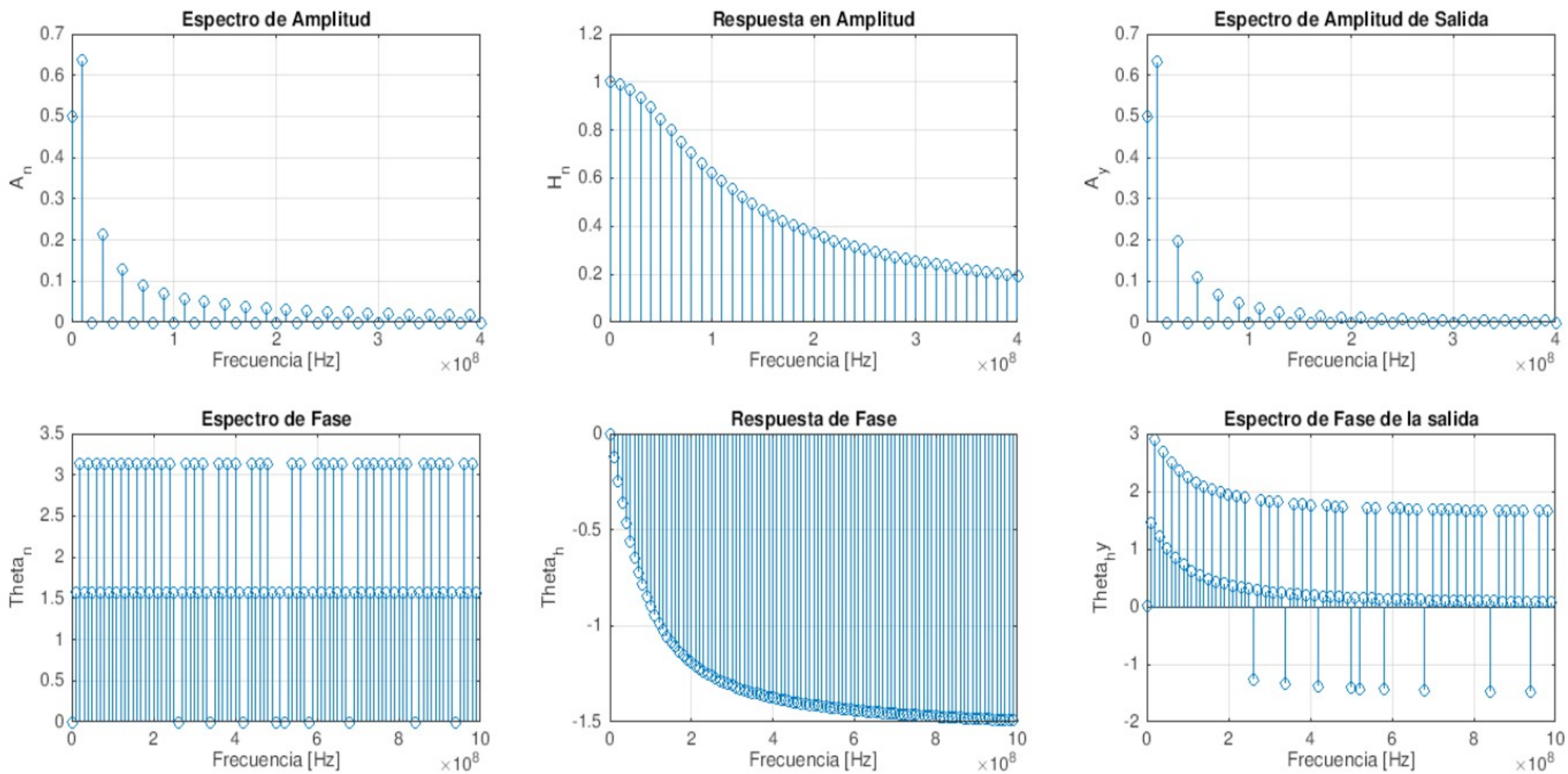
19	0.38631	-1.1742
20	0.3697	-1.1921
21	0.35435	-1.2086
22	0.34015	-1.2237
23	0.32697	-1.2377
24	0.31472	-1.2506
25	0.30331	-1.2626
26	0.29267	-1.2738
27	0.28271	-1.2842
28	0.27338	-1.2939
29	0.26462	-1.303
30	0.25639	-1.3115
31	0.24864	-1.3195
32	0.24133	-1.3271
33	0.23442	-1.3342
34	0.22789	-1.3409
35	0.22171	-1.3472
36	0.21584	-1.3532
37	0.21027	-1.3589
38	0.20497	-1.3644
39	0.19993	-1.3695
40	0.19512	-1.3744
41	0.19054	-1.3791
42	0.18616	-1.3835
43	0.18197	-1.3878
44	0.17797	-1.3919
45	0.17414	-1.3958
46	0.17046	-1.3995
47	0.16694	-1.4031
48	0.16355	-1.4065
49	0.1603	-1.4098
50	0.15718	-1.413
51	0.15417	-1.416
52	0.15127	-1.4189
53	0.14848	-1.4218
54	0.14579	-1.4245
55	0.1432	-1.4271
56	0.14069	-1.4296
57	0.13827	-1.4321
58	0.13593	-1.4344
59	0.13367	-1.4367
60	0.13148	-1.4389
61	0.12936	-1.4411
62	0.12731	-1.4431
63	0.12532	-1.4451
64	0.12339	-1.4471
65	0.12152	-1.449
66	0.1197	-1.4508
67	0.11794	-1.4526
68	0.11623	-1.4543
69	0.11457	-1.456
70	0.11295	-1.4576

71	0.11138	-1.4592
72	0.10986	-1.4607
73	0.10837	-1.4622
74	0.10692	-1.4637
75	0.10551	-1.4651
76	0.10414	-1.4665
77	0.1028	-1.4678
78	0.1015	-1.4691
79	0.10022	-1.4704
80	0.098983	-1.4717
81	0.097773	-1.4729
82	0.096592	-1.4741
83	0.095439	-1.4752
84	0.094313	-1.4763
85	0.093213	-1.4774
86	0.092138	-1.4785
87	0.091088	-1.4796
88	0.090061	-1.4806
89	0.089058	-1.4816
90	0.088076	-1.4826
91	0.087115	-1.4836
92	0.086175	-1.4845
93	0.085256	-1.4854
94	0.084355	-1.4863
95	0.083473	-1.4872
96	0.08261	-1.4881
97	0.081764	-1.4889
98	0.080935	-1.4898
99	0.080123	-1.4906

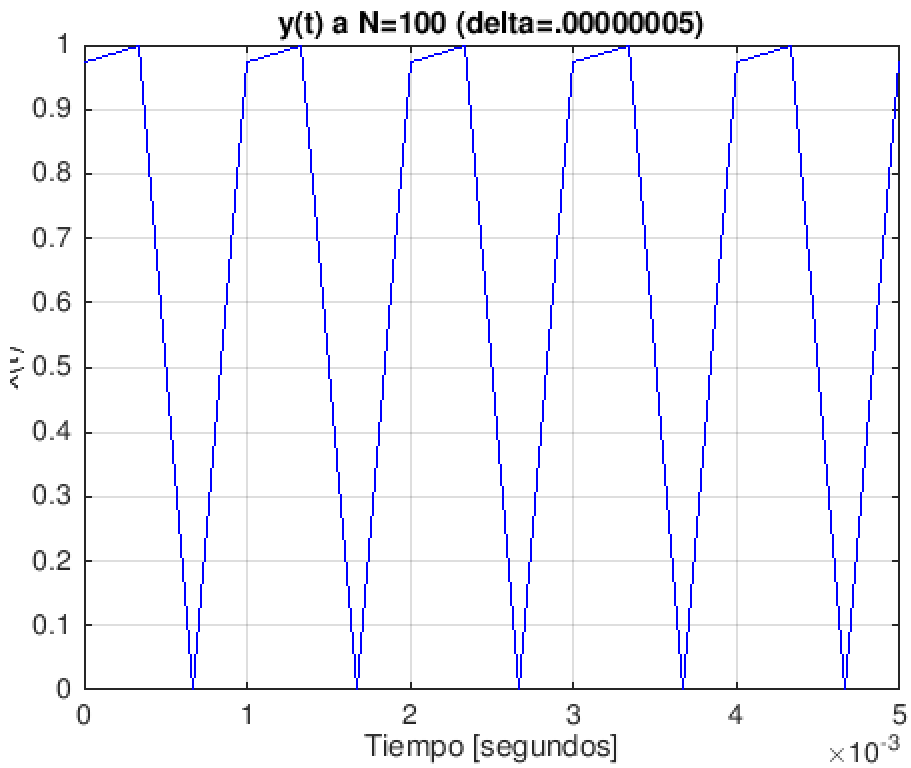
n	**Any**	**theta_h_y**
0	0.5	0
1	0.63165	1.4458
2	0	2.8954
3	0.19856	1.2103
4	0	2.6758
5	0.10781	1.0098
6	0	2.4955
7	0.068286	0.84934
8	0	2.3535
9	0.046855	0.72401
10	0	2.243
11	0.033922	0.62628
12	0	2.1564
13	0.025567	0.54929
14	0	2.0877
15	0.01989	0.48776
16	0	2.0323
17	0.015876	0.43781
18	0	1.9871

19	0.012944	0.39663
20	0	1.9495
21	0.010742	0.36222
22	0	1.9179
23	0.0090503	0.3331
24	0	1.891
25	0.0077238	0.30817
26	0	-1.2738
27	0.0066658	0.28662
28	0	1.8477
29	0.0058091	0.26781
30	0	1.8301
31	0.0051061	0.25128
32	0	1.8145
33	0.0045224	0.23663
34	0	-1.3409
35	0.0040326	0.22356
36	0	1.7883
37	0.0036178	0.21185
38	0	1.7772
39	0.0032635	0.20128
40	0	1.7672
41	0.0029585	0.19171
42	0	-1.3835
43	0.0026941	0.18299
44	0	1.7497
45	0.0024635	0.17503
46	0	1.7421
47	0.0022612	0.16772
48	0	1.7351
49	0.0020827	0.161
50	0	-1.413
51	0.0019244	0.15479
52	0	-1.4189
53	0.0017835	0.14903
54	0	1.7171
55	0.0016575	0.14369
56	0	1.712
57	0.0015443	0.13871
58	0	-1.4344
59	0.0014423	0.13407
60	0	1.7027
61	0.00135	0.12972
62	0	1.6984
63	0.0012663	0.12565
64	0	1.6945
65	0.0011902	0.12182
66	0	1.6908
67	0.0011207	0.11822
68	0	-1.4543
69	0.0010571	0.11482
70	0	1.684

71	0.00099872	0.11162
72	0	1.6809
73	0.00094506	0.10858
74	0	1.6779
75	0.00089561	0.10571
76	0	1.6751
77	0.00084993	0.10298
78	0	1.6725
79	0.00080765	0.10039
80	0	1.6699
81	0.00076845	0.09793
82	0	1.6675
83	0.00073203	0.095584
84	0	-1.4763
85	0.00069813	0.093348
86	0	1.6631
87	0.00066653	0.091215
88	0	1.661
89	0.00063703	0.089176
90	0	1.659
91	0.00060944	0.087226
92	0	1.6571
93	0.00058361	0.085359
94	0	-1.4863
95	0.00055938	0.083571
96	0	1.6535
97	0.00053662	0.081855
98	0	1.6518
99	0.00051523	0.080209



Espectro de Amplitud
A_n
Frecuencia [Hz]
$\times 10^8$
Respuesta en Amplitud
H_n
Frecuencia [Hz]
$\times 10^8$
Espectro de Amplitud de Salida
A_y
Frecuencia [Hz]
$\times 10^8$
Espectro de Fase
$Theta_n$
Frecuencia [Hz]
$\times 10^8$
Respuesta de Fase
$Theta_h$
Frecuencia [Hz]
$\times 10^8$
Espectro de Fase de la salida
$Theta_h y$
Frecuencia [Hz]
$\times 10^8$



iii) Δ=0.01[uS]; T=0.01 [uS]

n	**Anx**	**thetan**
0	0.5	0
1	0.63662	1.5708
2	0	3.1416
3	0.21221	1.5708
4	0	3.1416
5	0.12732	1.5708
6	0	3.1416
7	0.090946	1.5708
8	0	3.1416
9	0.070736	1.5708
10	0	3.1416
11	0.057875	1.5708
12	0	3.1416
13	0.048971	1.5708
14	0	3.1416
15	0.042441	1.5708
16	0	3.1416
17	0.037448	1.5708
18	0	3.1416
19	0.033506	1.5708

20	0	3.1416
21	0.030315	1.5708
22	0	3.1416
23	0.027679	1.5708
24	0	3.1416
25	0.025465	1.5708
26	0	0
27	0.023579	1.5708
28	0	3.1416
29	0.021952	1.5708
30	0	3.1416
31	0.020536	1.5708
32	0	3.1416
33	0.019292	1.5708
34	0	0
35	0.018189	1.5708
36	0	3.1416
37	0.017206	1.5708
38	0	3.1416
39	0.016324	1.5708
40	0	3.1416
41	0.015527	1.5708
42	0	0
43	0.014805	1.5708
44	0	3.1416
45	0.014147	1.5708
46	0	3.1416
47	0.013545	1.5708
48	0	3.1416
49	0.012992	1.5708
50	0	0
51	0.012483	1.5708
52	0	0
53	0.012012	1.5708
54	0	3.1416
55	0.011575	1.5708
56	0	3.1416
57	0.011169	1.5708
58	0	0
59	0.01079	1.5708
60	0	3.1416
61	0.010436	1.5708
62	0	3.1416
63	0.010105	1.5708
64	0	3.1416
65	0.0097942	1.5708
66	0	3.1416
67	0.0095018	1.5708
68	0	0
69	0.0092264	1.5708
70	0	3.1416
71	0.0089665	1.5708

72	0	3.1416
73	0.0087208	1.5708
74	0	3.1416
75	0.0084883	1.5708
76	0	3.1416
77	0.0082678	1.5708
78	0	3.1416
79	0.0080585	1.5708
80	0	3.1416
81	0.0078595	1.5708
82	0	3.1416
83	0.0076701	1.5708
84	0	0
85	0.0074896	1.5708
86	0	3.1416
87	0.0073175	1.5708
88	0	3.1416
89	0.007153	1.5708
90	0	3.1416
91	0.0069958	1.5708
92	0	3.1416
93	0.0068454	1.5708
94	0	0
95	0.0067013	1.5708
96	0	3.1416
97	0.0065631	1.5708
98	0	3.1416
99	0.0064305	1.5708

n	**Hn**	**theta_h**
0	1	0
1	0.84673	-0.56098
2	0.62268	-0.89864
3	0.46865	-1.083
4	0.3697	-1.1921
5	0.30331	-1.2626
6	0.25639	-1.3115
7	0.22171	-1.3472
8	0.19512	-1.3744
9	0.17414	-1.3958
10	0.15718	-1.413
11	0.1432	-1.4271
12	0.13148	-1.4389
13	0.12152	-1.449
14	0.11295	-1.4576
15	0.10551	-1.4651
16	0.098983	-1.4717
17	0.093213	-1.4774
18	0.088076	-1.4826
19	0.083473	-1.4872

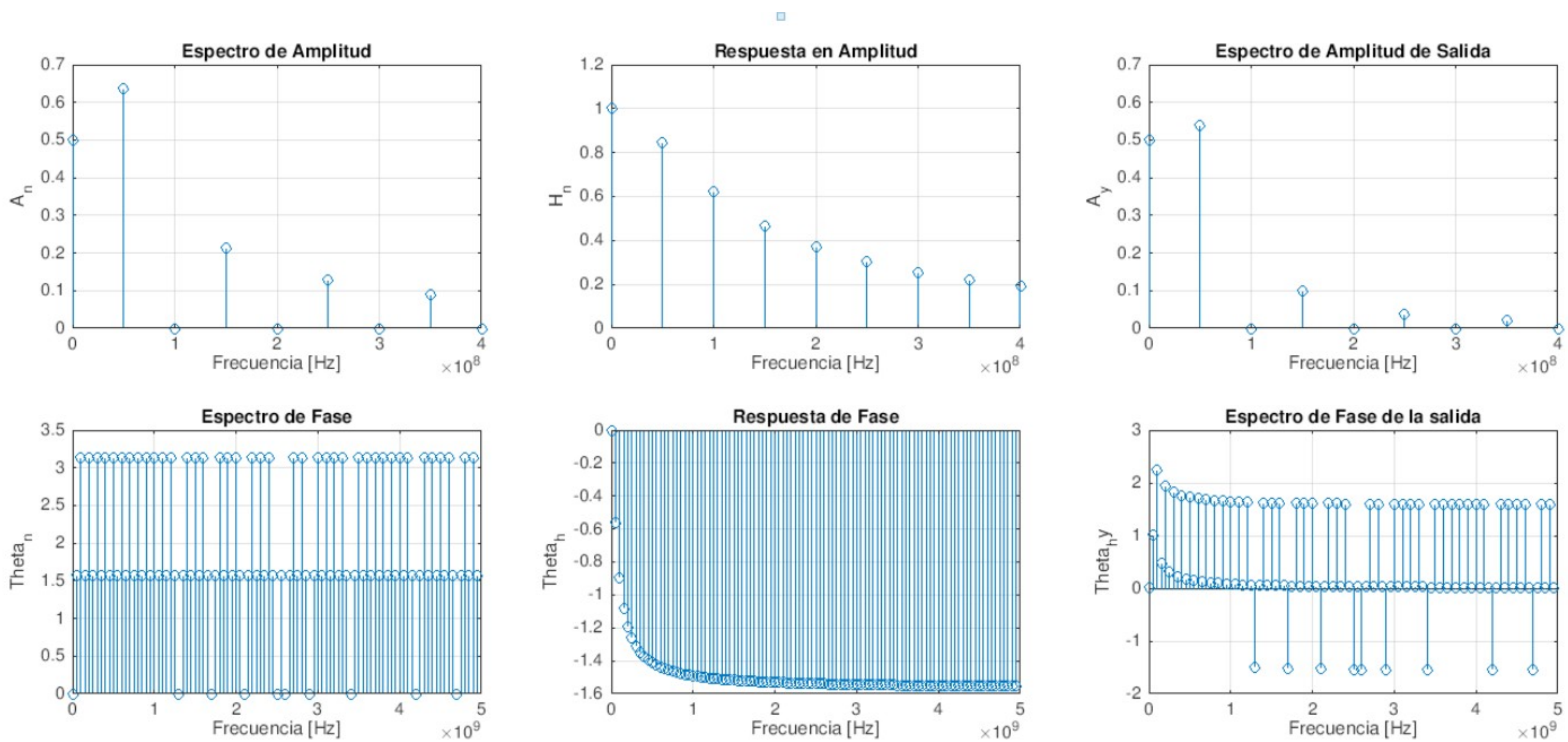
20	0.079327	-1.4914
21	0.075571	-1.4952
22	0.072155	-1.4986
23	0.069033	-1.5017
24	0.066169	-1.5046
25	0.063533	-1.5072
26	0.061099	-1.5097
27	0.058844	-1.5119
28	0.056749	-1.514
29	0.054799	-1.516
30	0.052977	-1.5178
31	0.051273	-1.5195
32	0.049675	-1.5211
33	0.048173	-1.5226
34	0.046759	-1.524
35	0.045426	-1.5254
36	0.044167	-1.5266
37	0.042975	-1.5278
38	0.041846	-1.5289
39	0.040775	-1.53
40	0.039757	-1.531
41	0.038789	-1.532
42	0.037867	-1.5329
43	0.036987	-1.5338
44	0.036148	-1.5346
45	0.035346	-1.5354
46	0.034578	-1.5362
47	0.033843	-1.5369
48	0.033139	-1.5377
49	0.032463	-1.5383
50	0.031815	-1.539
51	0.031192	-1.5396
52	0.030592	-1.5402
53	0.030016	-1.5408
54	0.02946	-1.5413
55	0.028925	-1.5419
56	0.028409	-1.5424
57	0.027911	-1.5429
58	0.02743	-1.5434
59	0.026966	-1.5438
60	0.026516	-1.5443
61	0.026082	-1.5447
62	0.025662	-1.5451
63	0.025255	-1.5455
64	0.02486	-1.5459
65	0.024478	-1.5463
66	0.024107	-1.5467
67	0.023748	-1.547
68	0.023399	-1.5474
69	0.02306	-1.5477
70	0.022731	-1.5481
71	0.022411	-1.5484

72	0.022099	-1.5487
73	0.021797	-1.549
74	0.021502	-1.5493
75	0.021216	-1.5496
76	0.020937	-1.5499
77	0.020665	-1.5501
78	0.0204	-1.5504
79	0.020142	-1.5507
80	0.01989	-1.5509
81	0.019645	-1.5512
82	0.019405	-1.5514
83	0.019172	-1.5516
84	0.018944	-1.5519
85	0.018721	-1.5521
86	0.018503	-1.5523
87	0.018291	-1.5525
88	0.018083	-1.5527
89	0.01788	-1.5529
90	0.017681	-1.5531
91	0.017487	-1.5533
92	0.017297	-1.5535
93	0.017111	-1.5537
94	0.016929	-1.5539
95	0.016751	-1.554
96	0.016576	-1.5542
97	0.016406	-1.5544
98	0.016238	-1.5546
99	0.016074	-1.5547

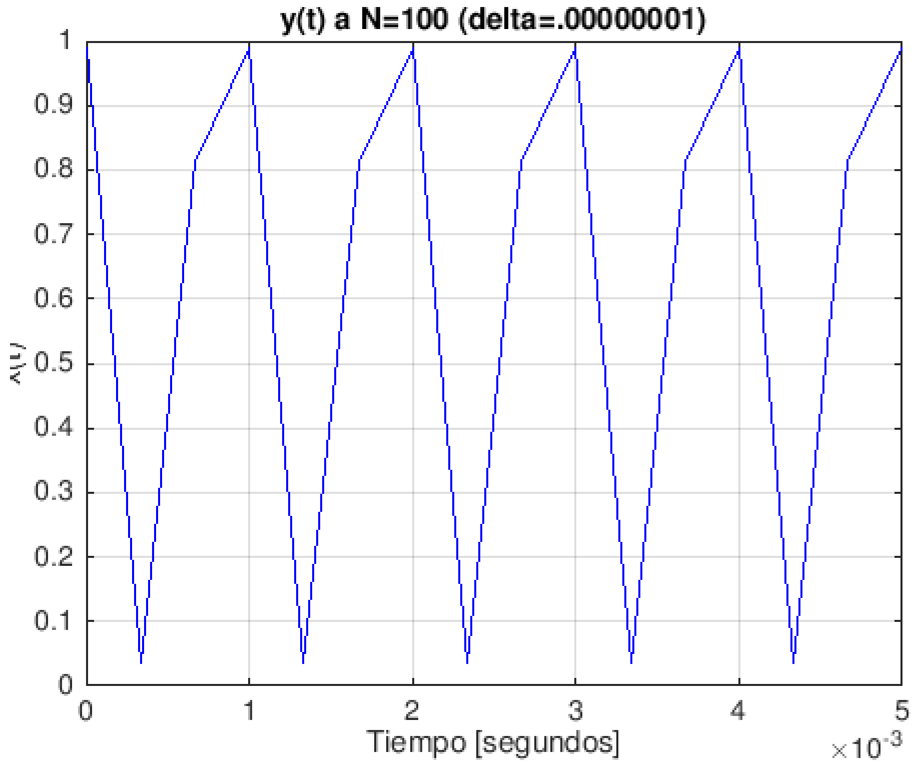
n	**Any**	**theta_h_y**
0	0.5	0
1	0.53905	1.0098
2	0	2.243
3	0.099451	0.48776
4	0	1.9495
5	0.038619	0.30817
6	0	1.8301
7	0.020163	0.22356
8	0	1.7672
9	0.012318	0.17503
10	0	1.7286
11	0.0082874	0.14369
12	0	1.7027
13	0.0059509	0.12182
14	0	1.684
15	0.004478	0.10571
16	0	1.6699
17	0.0034907	0.093348
18	0	1.659
19	0.0027969	0.083571

20	0	1.6502
21	0.002291	0.075643
22	0	1.643
23	0.0019108	0.069088
24	0	1.637
25	0.0016179	0.063576
26	0	-1.5097
27	0.0013875	0.058878
28	0	1.6276
29	0.001203	0.054826
30	0	1.6238
31	0.0010529	0.051295
32	0	1.6205
33	0.00092933	0.048191
34	0	-1.524
35	0.00082626	0.045442
36	0	1.615
37	0.00073943	0.042988
38	0	1.6127
39	0.00066559	0.040786
40	0	1.6106
41	0.00060229	0.038799
42	0	-1.5329
43	0.0005476	0.036996
44	0	1.607
45	0.00050004	0.035353
46	0	1.6054
47	0.00045841	0.03385
48	0	1.6039
49	0.00042177	0.032469
50	0	-1.539
51	0.00038936	0.031197
52	0	-1.5402
53	0.00036054	0.03002
54	0	1.6003
55	0.00033481	0.028929
56	0	1.5992
57	0.00031173	0.027915
58	0	-1.5434
59	0.00029096	0.026969
60	0	1.5973
61	0.0002722	0.026085
62	0	1.5965
63	0.0002552	0.025257
64	0	1.5957
65	0.00023974	0.02448
66	0	1.5949
67	0.00022565	0.02375
68	0	-1.5474
69	0.00021276	0.023062
70	0	1.5935
71	0.00020094	0.022412

72	0	1.5929
73	0.00019009	0.021799
74	0	1.5923
75	0.00018009	0.021217
76	0	1.5917
77	0.00017085	0.020667
78	0	1.5912
79	0.00016231	0.020143
80	0	1.5907
81	0.0001544	0.019646
82	0	1.5902
83	0.00014705	0.019173
84	0	-1.5519
85	0.00014021	0.018722
86	0	1.5893
87	0.00013384	0.018292
88	0	1.5889
89	0.00012789	0.017881
90	0	1.5885
91	0.00012234	0.017488
92	0	1.5881
93	0.00011713	0.017112
94	0	-1.5539
95	0.00011225	0.016752
96	0	1.5874
97	0.00010767	0.016406
98	0	1.587
99	0.00010337	0.016075



Espectro de Amplitud
A_n
Frecuencia [Hz]
×10^8
Respuesta en Amplitud
H_n
Frecuencia [Hz]
×10^8
Espectro de Amplitud de Salida
A_y
Frecuencia [Hz]
×10^8
Espectro de Fase
Theta_n
Frecuencia [Hz]
×10^9
Respuesta de Fase
Theta_h
Frecuencia [Hz]
×10^9
Espectro de Fase de la salida
Theta_hy
Frecuencia [Hz]
×10^9



b. Código de los espectros de amplitud y fase

```
%%Definiendo variables
clc;
%delta=.0000001;%definiendo ancho de pulso
%para cada caso:
%delta=.00000005
delta=.00000001
T0=2*delta;%definiendo duracion del pulso
a0=(1/T0)*delta;%componente de directa
n=1:1:99; %definiendo valores de n
R=1000;
C=.000000000002;
%%Obteniendo valores de An, thetan, an, bn
Anx=((sqrt(2))./(pi.*n)).*(sqrt(1.-cos((2*pi.*n)*(delta/T0))));%vector de An
an=(1./(pi*n)).*sin((2*pi.*n)*(delta/T0));
bn=(1./(pi*n)).*(1.-cos((2*pi.*n)*(delta/T0)));
Hn=1./(sqrt(1+power(n.*2*pi*(1/T0)*R*C,2)));
Any=Anx.*Hn;
theta_h=atan2((n.*2*pi*(1/T0)*R*C),1).*-1;
thetan=atan2(bn,an);
theta_h_y=theta_h+thetan;
n=[0,n];
theta_h=[0,theta_h];
Hn=[1,Hn];
an=[a0,an];
bn=[0,bn];
```

```matlab
Anx=[a0,Anx];
Any=[0.5,Any];
thetan=[0,thetan];
theta_h_y=[0,theta_h_y];
an=an';
bn=bn';
Anx=Anx';
thetan=thetan';
n=n';
theta_h=theta_h';
Hn=Hn';
Any=Any';
theta_h_y=theta_h_y';
tabla=table(n,Anx,thetan);
disp(tabla);
tabla2=table(n,Hn,theta_h);
disp(tabla2);
tabla3=table(n,Any,theta_h_y);
disp(tabla3);
%% Graficas del espectro en amplitud y en fase
subplot(2,3,1);
stem(n.*(1/T0), Anx);
title('Espectro de Amplitud');
xlabel('Frecuencia [Hz]');
ylabel('A_n');
axis([0 400000000 0 0.7]);
grid;
%%
subplot(2,3,4);
stem(n.*(1/T0), thetan);
title('Espectro de Fase');
xlabel('Frecuencia [Hz]');
ylabel('Theta_n');
grid;
%%
subplot(2,3,2);
stem(n.*(1/T0), Hn);
title('Respuesta en Amplitud');
xlabel('Frecuencia [Hz]');
ylabel('H_n');
axis([0 400000000 0 1.2]);
grid;
%%
subplot(2,3,5);
stem(n.*(1/T0), theta_h);
title('Respuesta de Fase');
xlabel('Frecuencia [Hz]');
ylabel('Theta_h');
grid;
%%
```

```
subplot(2,3,3);
stem(n.*(1/T0), Any);
title('Espectro de Amplitud de Salida');
xlabel('Frecuencia [Hz]');
ylabel('A_y');
axis([0 400000000 0 0.7]);
grid;
%%
subplot(2,3,6);
stem(n.*(1/T0), theta_h_y);
title('Espectro de Fase de la salida');
xlabel('Frecuencia [Hz]');
ylabel('Theta_hy');
grid;
```

c. ***Código de y(t).***

```
%%Definiendo variables
clc;
%delta=.0000001;%definiendo ancho de pulso
%delta=.00000005;
delta=.00000001;
T0=2*delta;%definiendo duracion del pulso
T01=2*delta1;
T02=2*delta2;
a0=(1/T0)*delta;%componente de directa
n=1:1:99; %definiendo valores de n
an=(1./(pi*n)).*sin((2*pi.*n)*(delta/T0));
bn=(1./(pi*n)).*(1.-cos((2*pi.*n)*(delta/T0)));
fm=3000;
t=0:1/fm:0.3;
R=1000;
C=.000000000002
%%Obteniendo valores de An, thetan, an, bn
Anx=((sqrt(2))./(pi.*n)).*(sqrt(1.-cos((2*pi.*n)*(delta/T0))));%vector de An
thetan=atan2(bn,an);%vector de theta sub n
Hn=1./(sqrt(1+power(n.*2*pi*(1/T0)*R*C,2)));
Any=Anx.*Hn;
theta_h=atan2((n.*2*pi*(1/T0)*R*C),1).*-1;
theta_h_y=theta_h+thetan;
n=[0,n];
Anx=[a0,Anx];
thetan=[0,thetan];
theta_h_y=[0,theta_h_y];
Any=[0.5,Any];
y=0;
for i=1:100
```

```
    y=Any(i)*cos(2*pi*n(i)*(1/T0)*t-theta_h_y(i))+y;
end
%% Se definien subplots y donde estara situado cada uno en la ventana
plot(t,y, 'b');
title('y(t) a N=100 (delta=.00000001)');
xlabel('Tiempo [segundos]');
ylabel('x(t)');
axis([0 0.005 0 1]);
grid;
```