

Test Results

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1 Python Tests

Results for the methods coded in python can be found in the next url:
<https://documenter.getpostman.com/view/17454502/UVyuRa5f>

2 MATLAB Tests

2.0.1 Incremental Search

```
>> [a, b, iter] = C1_busquedas(f,x0,h,Nmax)
```

Table				
i	a	b	f(a)	f(b)
1	-3	-2.5	-0.48028	-0.19386
2	-2.5	-2	-0.19386	0.10258

```
a =  
  
-2.5000  
  
b =  
  
-2  
  
iter =  
  
2
```

2.0.2 Bisection

i	a	f(a)	b	f(b)	E
1	0	-0.5	1	0.035366	1e+13
2	0.5	-0.29311	1	0.035366	0.25
3	0.75	-0.1184	1	0.035366	0.125
4	0.875	-0.036818	1	0.035366	0.0625
5	0.875	-0.036818	0.9375	0.00063392	0.03125
6	0.90625	-0.017772	0.9375	0.00063392	0.015625
7	0.92188	-0.0084866	0.9375	0.00063392	0.0078125
8	0.92969	-0.0039054	0.9375	0.00063392	0.0039062
9	0.93359	-0.0016304	0.9375	0.00063392	0.0019531
10	0.93555	-0.00049694	0.9375	0.00063392	0.00097656
11	0.93555	-0.00049694	0.93652	6.8822e-05	0.00048828
12	0.93604	-0.00021397	0.93652	6.8822e-05	0.00024414
13	0.93628	-7.2555e-05	0.93652	6.8822e-05	0.00012207
14	0.9364	-1.861e-06	0.93652	6.8822e-05	6.1035e-05
15	0.9364	-1.861e-06	0.93646	3.3482e-05	3.0518e-05
16	0.9364	-1.861e-06	0.93643	1.5811e-05	1.5259e-05
17	0.9364	-1.861e-06	0.93642	6.975e-06	7.6294e-06
18	0.9364	-1.861e-06	0.93641	2.557e-06	3.8147e-06
19	0.9364	-1.861e-06	0.93641	3.4803e-07	1.9073e-06

x = 0.9364

iter = 20

err = 9.5367e-07

2.0.3 False Rule

i	a	f(a)	b	f(b)	E
1	0	-0.5	1	0.035366	1000
2	0.93394	-0.0014291	1	0.035366	0.0025657
3	0.93394	-0.0014291	0.93651	5.8756e-05	0.00010132

x =

0.9364

iter =

4

err =

1.4964e-07

2.0.4 Fixed Point

i	x	f(x)	E	
0	-0.5	-0.29311	1000	
1	-0.29311	-0.29311	0.20689	
2	-0.41982	-0.41982	0.12671	
3	-0.3463	-0.3463	0.073517	
4	-0.39096	-0.39096	0.044654	
5	-0.36441	-0.36441	0.026553	
6	-0.38043	-0.38043	0.016021	
7	-0.37084	-0.37084	0.0095895	
8	-0.37661	-0.37661	0.0057689	
9	-0.37315	-0.37315	0.0034602	
10	-0.37522	-0.37522	0.0020792	
11	-0.37398	-0.37398	0.0012481	
12	-0.37473	-0.37473	0.00074963	
13	-0.37428	-0.37428	0.00045008	x =
14	-0.37455	-0.37455	0.0002703	
15	-0.37438	-0.37438	0.0001623	-0.3744
16	-0.37448	-0.37448	9.7464e-05	
17	-0.37442	-0.37442	5.8526e-05	
18	-0.37446	-0.37446	3.5145e-05	iter =
19	-0.37444	-0.37444	2.1104e-05	
20	-0.37445	-0.37445	1.2673e-05	25
21	-0.37444	-0.37444	7.61e-06	
22	-0.37445	-0.37445	4.5697e-06	
23	-0.37444	-0.37444	2.7441e-06	err =
24	-0.37445	-0.37445	1.6478e-06	
25	-0.37444	-0.37444	9.895e-07	9.8950e-07

2.0.5 Newton

i	x	f(x)	df(x)	E	
0	0.5	-0.29311	0.93318	1000	
1	0.8141	-0.075593	1.2344	0.3141	
2	0.87534	-0.036609	1.2404	0.061241	
3	0.90485	-0.018611	1.236	0.029514	
4	0.91991	-0.0096459	1.2319	0.015058	
5	0.92774	-0.0050439	1.2292	0.0078302	
6	0.93184	-0.002649	1.2277	0.0041032	
7	0.934	-0.0013943	1.2269	0.0021577	
8	0.93514	-0.00073476	1.2264	0.0011365	x =
9	0.93574	-0.00038743	1.2262	0.00059911	
10	0.93605	-0.00020435	1.2261	0.00031596	0.9364
11	0.93622	-0.0001078	1.226	0.00016667	
12	0.93631	-5.6874e-05	1.226	8.793e-05	
13	0.93635	-3.0007e-05	1.2259	4.6392e-05	iter =
14	0.93638	-1.5832e-05	1.2259	2.4477e-05	
15	0.93639	-8.3535e-06	1.2259	1.2915e-05	20
16	0.9364	-4.4076e-06	1.2259	6.8141e-06	
17	0.9364	-2.3256e-06	1.2259	3.5953e-06	
18	0.9364	-1.227e-06	1.2259	1.897e-06	err =
19	0.9364	-6.4743e-07	1.2259	1.0009e-06	
20	0.9364	-3.416e-07	1.2259	5.2812e-07	5.2812e-07

2.0.6 Secant

				x =
				0.9364
i	x	f(x)	E	
1	1	0.035366	1000	iter =
2	0.94617	0.0056194	0.053834	6
3	0.936	-0.00023632	0.01017	
4	0.93641	1.4022e-06	0.00041042	
5	0.9364	3.4372e-10	2.4209e-06	err =
6	0.9364	-4.996e-16	5.9356e-10	5.9356e-10

2.0.7 Multiple Roots

						x =
						-4.2186e-11
						iter =
i	x	f(x)	df(x)	d2f(x)	E	5
0	1	0.71828	1.7183	2.7183	1000	
1	-0.23421	0.025406	-0.2088	0.7912	1.2342	
2	-0.0084583	3.5671e-05	-0.0084226	0.99158	0.22575	
3	-1.189e-05	7.0688e-11	-1.189e-05	0.99999	0.0084464	err =
4	-4.2186e-11	0	-4.2186e-11	1	1.189e-05	
5	-4.2186e-11	0	-4.2186e-11	1	0	0

2.0.8 Gaussian Elimination

Matriz inicial

```
-----  
2.00000 -0000001 0 3.00000 0000001  
1.00000 5.0000000e-01 3 8.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
14.00000 0000005 -2 3.00000 0000001  
-----
```

ERROR: La diagonal tiene un cero.

Etapa 1

```
-----  
2.00000 -0000001 0 3.00000 0000001  
0.00000 0000001 3 6.50000 5.0000000e-01  
0.00000 0000013 -2 11.00000 0000001  
0.00000 0000012 -2 -18.00000 -0000006  
-----
```

Etapa 2

```
-----  
2.00000 -0000001 0 3.00000 0000001  
0.00000 0000001 3 6.50000 5.0000000e-01  
0.00000 0000000 -41 -73.50000 -5.5000000e+00  
0.00000 0000000 -38 -96.00000 -0000012  
-----
```

Etapa 3

```
-----  
2.00000 -0000001 0 3.00000 0000001  
0.00000 0000001 3 6.50000 5.0000000e-01  
0.00000 0000000 -41 -73.50000 -5.5000000e+00  
0.00000 0000000 0 -27.87805 -6.9024390e+00  
-----
```

Solución

```
-----  
0.03850  
-0.18023  
-0.30971  
0.24759  
-----
```

2.0.9 Gaussian Elimination with Partial Pivoting

Matriz inicial

```
-----  
2.00000 -0000001 0 3.00000 0000001  
1.00000 5.0000000e-01 3 8.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
14.00000 0000005 -2 3.00000 0000001  
-----
```

Etapas 1

```
-----  
14.00000 0000005 -2 3.00000 0000001  
0.00000 1.4285714e-01 3.14286 7.78571 9.2857143e-01  
0.00000 0000013 -2 11.00000 0000001  
0.00000 -1.7142857e+00 0.285714 2.57143 8.5714286e-01  
-----
```

Etapas 2

```
-----  
14.00000 0000005 -2 3.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
0.00000 0000000 3.16484 7.66484 9.1758242e-01  
0.00000 2.2204460e-16 0.021978 4.02198 9.8901099e-01  
-----
```

Etapas 3

```
-----  
14.00000 0000005 -2 3.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
0.00000 0000000 3.16484 7.66484 9.1758242e-01  
0.00000 2.2204460e-16 0 3.96875 9.8263889e-01  
-----
```

Solución

```
-----  
0.03850  
-0.18023  
-0.30971  
0.24759
```

2.0.10 Gaussian Elimination with Total Pivoting

Matriz inicial

```
-----  
2.00000 -0000001 0 3.00000 0000001  
1.00000 5.0000000e-01 3 8.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
14.00000 0000005 -2 3.00000 0000001  
-----
```

Etapas 1

```
-----  
14.00000 0000005 -2 3.00000 0000001  
0.00000 1.4285714e-01 3.14286 7.78571 9.2857143e-01  
0.00000 0000013 -2 11.00000 0000001  
0.00000 -1.7142857e+00 0.285714 2.57143 8.5714286e-01  
-----
```

Etapas 2

```
-----  
14.00000 0000005 -2 3.00000 0000001  
0.00000 0000013 -2 11.00000 0000001  
0.00000 0000000 3.16484 7.66484 9.1758242e-01  
0.00000 2.2204460e-16 0.021978 4.02198 9.8901099e-01  
-----
```

Etapas 3

```
-----  
14.00000 0000005 3 -2.00000 0000001  
0.00000 0000013 11 -2.00000 0000001  
0.00000 0000000 7.66484 3.16484 9.1758242e-01  
0.00000 2.2204460e-16 0 -1.63871 5.0752688e-01  
-----
```

Solución

```
-----  
0.03850  
-0.18023  
-0.30971  
0.24759
```