SEMESTRE AGOSTO-DICIEMBRE 2025

Profesor: Alma Xochitl SÉPTIMO SEMESTRE

Ejercicio (12/09/25) **Métodos Numéricos**

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1. Ejercicio en clase

1.1. Función 1

Para la función

$$f(c) = \frac{gm}{c}(1 - e^{-\frac{ct}{m}}) - v$$

$$m = 68.1\,Kg \qquad g = 9.8\,m/s^2 \qquad t = 10\,s \qquad v = 40\,m/s$$

En el intérvalo $[4, 20]$ con un $E_{max} = 0.0001$:

1.1.1. Método de bisección

Iteracion	a	k	b	f(k)	Error (rel)	Error (aprox)	Error(calc)
0	12.000000	12.000000	20.000000	6.113943	inf	inf	inf
1	12.000000	16.000000	20.000000	-2.230261	0.250000	4.000000	4.000000
2	12.000000	14.000000	16.000000	1.611116	0.142857	2.000000	2.000000
3	14.000000	15.000000	16.000000	-0.384458	0.066667	1.000000	1.000000
4	14.000000	14.500000	15.000000	0.593698	0.034483	0.500000	0.500000
5	14.500000	14.750000	15.000000	0.099830	0.016949	0.250000	0.250000
6	14.750000	14.875000	15.000000	-0.143497	0.008403	0.125000	0.125000
7	14.750000	14.812500	14.875000	-0.022131	0.004219	0.062500	0.062500
8	14.750000	14.781250	14.812500	0.038775	0.002114	0.031250	0.031250
9	14.781250	14.796875	14.812500	0.008303	0.001056	0.015625	0.015625
10	14.796875	14.804688	14.812500	-0.006919	0.000528	0.007812	0.007812
11	14.796875	14.800781	14.804688	0.000691	0.000264	0.003906	0.003906
12	14.800781	14.802734	14.804688	-0.003114	0.000132	0.001953	0.001953
13	14.800781	14.801758	14.802734	-0.001212	0.000066	0.000977	0.000977

Raiz aproximada: 14.801758
Error final: 0.000066
Numero de iteraciones: 13

1.1.2. Método de la falsa posición

Iteracion	a	k	b	f(k)	Error (rel)	Error (aprox)
0	4.000000	16.853905	20.000000	-3.698145	inf	inf
1	4.000000	15.599293	16.853905	-1.507713	0.080427	1.254612
2	4.000000	15.109395	15.599293	-0.593418	0.032423	0.489898
3	4.000000	14.919867	15.109395	-0.230257	0.012703	0.189528
4	4.000000	14.846819	14.919867	-0.088847	0.004920	0.073048
5	4.000000	14.818705	14.846819	-0.034206	0.001897	0.028114
6	4.000000	14.807892	14.818705	-0.013159	0.000730	0.010813
7	4.000000	14.803734	14.807892	-0.005061	0.000281	0.004158
8	4.000000	14.802134	14.803734	-0.001944	0.000108	0.001600
9	4.000000	14.801518	14.802134	-0.000745	0.000042	0.000615

Raiz aproximada: 14.801518
Error final: 0.000042
Numero de iteraciones: 9

1.2. Función 2

Para la función

$$f(x) = x^{10} - 1$$

En el intérvalo $[0, 1.3]$ con un $E_{max} = 0.01$:

1.2.1. Método de bisección

Iteracion	a	k	b	f(k)	Error (rel)	Error (aprox)	Error(calc)
0	0.650000	0.650000	1.300000	-0.986537	inf	inf	inf
1	0.650000	0.975000	1.300000	-0.223671	0.333333	0.325000	0.325000
2	0.975000	1.137500	1.300000	2.626718	0.142857	0.162500	0.162500
3	0.975000	1.056250	1.137500	0.728491	0.076923	0.081250	0.081250
4	0.975000	1.015625	1.056250	0.167707	0.040000	0.040625	0.040625
5	0.975000	0.995312	1.015625	-0.045899	0.020408	0.020313	0.020312
6	0.995312	1.005469	1.015625	0.056053	0.010101	0.010156	0.010156
7	0.995312	1.000391	1.005469	0.003912	0.005076	0.005078	0.005078

Raiz aproximada: 1.000391
Error final: 0.005076
Numero de iteraciones: 7

1.2.2. Método de la falsa posición

Iteracion	a	k	b	f(k)	Error (rel)	Error (aprox)
0	0.000000	0.094300	1.300000	-1.000000	inf	inf
1	0.094300	0.181759	1.300000	-1.000000	0.481183	0.087459
2	0.181759	0.262874	1.300000	-0.999998	0.308570	0.081115
3	0.262874	0.338105	1.300000	-0.999980	0.222588	0.075231
4	0.338105	0.407878	1.300000	-0.999873	0.171063	0.069773
5	0.407878	0.472583	1.300000	-0.999444	0.136918	0.064705
6	0.472583	0.532572	1.300000	-0.998164	0.112639	0.059988
7	0.532572	0.588145	1.300000	-0.995047	0.094489	0.055573
8	0.588145	0.639544	1.300000	-0.988553	0.080369	0.051399
9	0.639544	0.686943	1.300000	-0.976600	0.069000	0.047399
10	0.686943	0.730447	1.300000	-0.956760	0.059557	0.043503
11	0.730447	0.770099	1.300000	-0.926639	0.051490	0.039652
12	0.770099	0.805908	1.300000	-0.884428	0.044433	0.035809
13	0.805908	0.837874	1.300000	-0.829475	0.038152	0.031966
14	0.837874	0.866028	1.300000	-0.762689	0.032509	0.028154
15	0.866028	0.890457	1.300000	-0.686577	0.027435	0.024430
16	0.890457	0.911328	1.300000	-0.604862	0.022902	0.020871
17	0.911328	0.928885	1.300000	-0.521791	0.018900	0.017556
18	0.928885	0.943436	1.300000	-0.441369	0.015424	0.014551
19	0.943436	0.955334	1.300000	-0.366783	0.012454	0.011898
20	0.955334	0.964946	1.300000	-0.300112	0.009961	0.009612

Raiz aproximada: 0.964946
Error final: 0.009961
Numero de iteraciones: 20