Reporte de operaciones con S.E.L

Universidad Centroamericana "José Simeón Cañas"
Análisis numérico

Reducción gaussiana con sustitución hacia atrás

Resolución del sistema de ecuaciones lineales A

$$A =
\begin{aligned}
&456178a_0 + 468a_1 &&+4868a_2 + 4.86682e + 07a_3 + 4818a_4 + 4.86877e + 06a_5 + 4.68768e + 06a_6 + 4.67682e + 07a_7 + 46881a_8 + 4.8\\
&a_0 + 8a_1 &&+4381a_2 + 38a_3 &&+43a_4 + 138a_5 &&+4a_6 + 43a_7 &&+8413a_8 + 81\\
&81a_0 + 8a_1 &&+618a_2 + 318a_3 &&+631a_4 + 8361a_5 &&+836a_6 + 1893a_7 &&+1493a_8 + a_9\\
&4391a_0 + 4931a_1 &&+4931a_2 + 491a_3 &&+493a_4 + 1493a_5 &&+143a_6 + 149a_7 &&+18a_8 + 31\\
&793a_0 + 1493a_1 &&+149a_2 + 318a_3 &&+391a_4 + 4914a_5 &&+914a_6 + 931a_7 &&+8a_8 + 3a\\
&831a_0 + 8391a_1 &&+8361a_2 + 49a_3 &&+193a_4 + 1493a_5 &&+1493a_6 + 1439a_7 &&+1493a_8 + 14\\
&4931a_0 + 4931a_1 &&+14a_2 + 31a_3 &&+4914a_4 + 181a_5 &&+94a_6 + 914a_7 &&+6a_8 + 68\\
&1793a_0 + 1793a_1 &&+1379a_2 + 197a_3 &&+1796a_4 + 16a_5 &&+168a_6 + 18a_7 &&+37a_8 + 67\\
&17a_0 + 5917a_1 &&+317a_2 + 8617a_3 &&+617a_4 + 6817a_5 &&+617a_6 + 6817a_7 &&+81a_8 + 91\\
&6817a_0 + 1768a_1 &&+178a_2 + 6176a_3 &&+17a_4 + 6817a_5 &&+617a_6 + 617a_7 &&+6817a_8 + 68\\
&17a_0 + 617a_1 &&+681a_2 + 761a_3 &&+717a_4 + 617a_5 &&+68a_6 + 717a_7 &&+61a_8 + 76\\
&1781a_0 + 67a_1 &&+61768a_2 + 17a_3 &&+617a_4 + 617a_5 &&+617a_6 + 6a_7 &&+17a_8 + 61\\
&761a_0 + 761a_1 &&+617a_2 + 617a_3 &&+617a_4 + 617a_5 &&+671a_6 + 617a_7 &&+6817a_8 + 68\\
&176a_0 + 1761a_1 &&+76176a_2 + 176a_3 &&+1761a_4 + 7676a_5 &&+17691a_6 + 7a_7 &&+18978a_8 + 17\\
&1616a_0 + 1769a_1 &&+169716a_2 + 6a_3 &&+776a_4 + 176176a_5 &&+617a_6 + 71a_7 &&+117a_8
\end{aligned}$$

Proceso de reducción gaussiana con la matriz aumentada $[\mathbf{A}, \mathbf{B}] = \tilde{\mathbf{A}}^{(1)}$

$$\tilde{A}^{(1)} =
\begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488e+09 & 646\\
1 & 8 & 4381 & 38 & 43 & 138 & 4 & 43 & 8413 & 8143 & 13\\
81 & 8 & 618 & 318 & 631 & 8361 & 836 & 1893 & 1493 & 1 & 919\\
4391 & 4931 & 4931 & 491 & 493 & 1493 & 143 & 149 & 18 & 315 & 93\\
793 & 1493 & 149 & 318 & 391 & 4914 & 914 & 931 & 8 & 3 & \\
831 & 8391 & 8361 & 49 & 193 & 1493 & 1493 & 1439 & 1493 & 1493 & 1\\
4931 & 4931 & 14 & 31 & 4914 & 181 & 94 & 914 & 6 & 681793 & 17\\
1793 & 1793 & 1379 & 197 & 1796 & 16 & 168 & 18 & 37 & 67 & 967\\
17 & 5917 & 317 & 8617 & 617 & 6817 & 617 & 6817 & 81 & 917 & 9\\
6817 & 1768 & 178 & 6176 & 17 & 6817 & 617 & 617 & 6817 & 681 & 768\\
17 & 617 & 681 & 761 & 717 & 617 & 68 & 717 & 61 & 761 & 786\\
1781 & 67 & 61768 & 17 & 617 & 617 & 617 & 6 & 17 & 61 & 768\\
761 & 761 & 617 & 617 & 617 & 617 & 671 & 617 & 6817 & 6817 & 68176\\
176 & 1761 & 76176 & 176 & 1761 & 7676 & 17691 & 7 & 18978 & 1781 & 787\\
1616 & 1769 & 169716 & 6 & 776 & 176176 & 617 & 71 & 117 & 0 &
\end{bmatrix}$$

1

$$\tilde{A}^{(2)} =$$

456178	468	4868	4.86682e+07	4818	4.86877e+06	4.68768e+06	4.67682e+07	46881	4.86488
0	7.99897	4380.99	−68.6868	42.9894	127.327	−6.27599	−59.5218	8412.9	−25
0	7.9169	617.136	−8323.63	630.145	7496.49	3.64473	−6411.26	1484.68	−8
0	4926.5	4884.14	−467971	446.624	−45372	−44978.9	−450024	−433.259	−4.68272
0	1492.19	140.538	−84284.6	382.625	−3549.65	−7234.86	−80368.7	−73.4959	−8.45689
0	8390.15	8352.13	−88607.7	184.223	−7376.23	−7046.35	−83756.6	1407.6	−8.86065
0	4925.94	−38.62	−526042	4861.92	−52447.3	−50576.9	−504621	−500.754	−5.19045
0	1791.16	1359.87	−191092	1777.06	−19120.6	−18256.9	−183804	−147.265	−1.91213
0	5916.98	316.819	6803.32	616.82	6635.56	442.308	5074.13	79.2529	−1
0	1761.01	105.254	−721108	−54.9989	−65940.5	−69434.4	−698274	6116.42	−7.26987
0	616.983	680.819	−1052.68	716.82	435.56	−106.692	−1025.87	59.2529	−1
0	65.1728	61749	−189992	598.19	−18391.5	−17684.5	−182585	−166.032	−1.89933
0	760.219	608.879	−80571.6	608.963	−7505.12	−7149.03	−77402.1	6738.79	−8.10881
0	1760.82	76174.1	−18600.9	1759.14	5797.56	15882.4	−18036.8	18959.9	−1.87516
0	1767.34	169699	−172400	758.932	158929	−15989	−165604	−49.0749	−1.72337

$$\tilde{A}^{(3)} =$$

456178	468	4868	4.86682e+07	4818	4.86877e+06	4.68768e+06	4.67682e+07	468
0	7.99897	4380.99	−68.6868	42.9894	127.327	−6.27599	−59.5218	8412
0	0	−3718.9	−8255.65	587.596	7370.47	9.85633	−6352.35	−6841
0	0	−2.69333e+06	−425667	−26030.2	−123792	−41113.6	−413365	−5.18186e+
0	0	−817121	−71471.3	−7636.94	−27302.2	−6064.09	−69265.1	−1.56948e+
0	0	−4.58688e+06	−16561.9	−44907.5	−140930	−463.443	−21324	−8.82291e+
0	0	−2.69795e+06	−483743	−21611.9	−130858	−46712	−467966	−5.18134e+
0	0	−979648	−175712	−7849.29	−47632.2	−16851.5	−170475	−1.884e+
0	0	−3.24038e+06	57612.2	−31183.2	−87550.5	5084.77	49103.4	−6.22309e+
0	0	−964387	−705986	−9519.3	−93972.1	−68052.7	−685170	−1.84602e+
0	0	−337237	4245.32	−2599.07	−9385.52	377.392	3565.2	−6488
0	0	26054.2	−189433	247.927	−19429	−17633.4	−182100	−68711
0	0	−415759	−74043.7	−3476.74	−19606.2	−6552.56	−71745.1	−7928
0	0	−888216	−3480.81	−7704.15	−22231	17264	−4934.27	−1.83298e+
0	0	−798264	−157224	−8739.42	130796	−14602.3	−152453	−1.85885e+

$$\tilde{A}^{(4)} =$$

456178	468	4868	4.86682e+07	4818	4.86877e+06	4.68768e+06	4.67682e+07	46881	4.864
0	7.99897	4380.99	−68.6868	42.9894	127.327	−6.27599	−59.5218	8412.9	−
0	0	−3718.9	−8255.65	587.596	7370.47	9.85633	−6352.35	−6841.9	−
0	0	0	5.55329e+06	−451583	−5.46168e+06	−48251.8	4.18717e+06	−226775	5.785
0	0	0	1.74247e+06	−136744	−1.64675e+06	−8229.73	1.32648e+06	−66167	1.812
0	0	0	1.01659e+07	−769646	−9.23164e+06	−12620.2	7.81364e+06	−384130	1.056
0	0	0	5.50547e+06	−447894	−5.4779e+06	−53862.5	4.14046e+06	−217761	5.744
0	0	0	1.99902e+06	−162636	−1.98919e+06	−19447.9	1.50289e+06	−81674.8	2.083
0	0	0	7.25098e+06	−543171	−6.50964e+06	−3503.31	5.58408e+06	−261560	7.521
0	0	0	1.43487e+06	−161895	−2.00528e+06	−70608.7	962124	−71772.5	1.512
0	0	0	752882	−55883.3	−677753	−516.397	579608	−28414.4	7.812
0	0	0	−247271	4364.56	32207.8	−17564.4	−226604	−116645	−2.500
0	0	0	848905	−69167.7	−843596	−7654.46	638423	−27922.1	8.842
0	0	0	1.96828e+06	−148045	−1.78258e+06	14909.9	1.51225e+06	−198869	2.043
0	0	0	1.61485e+06	−134867	−1.45128e+06	−16718	1.21108e+06	−390229	1.682

$$\tilde{A}^{(5)} = \begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.864 \\
0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & - \\
0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\
0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.785 \\
0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\
0 & 0 & 0 & 0 & 57026.7 & 766580 & 75710.1 & 148547 & 31007 & -2.906 \\
0 & 0 & 0 & 0 & -200.311 & -63253.8 & -6026.22 & -10653.4 & 7060.84 & \\
0 & 0 & 0 & 0 & -79.4879 & -23144.1 & -2078.67 & -4375.3 & -42.3672 & \\
0 & 0 & 0 & 0 & 46464 & 621724 & 59499.4 & 116847 & 34542.2 & -3.198 \\
0 & 0 & 0 & 0 & -45214 & -594084 & -58141.3 & -119767 & -13177.9 & 1.736 \\
0 & 0 & 0 & 0 & 5339.58 & 62709.3 & 6025.29 & 11935.4 & 2330.36 & - \\
0 & 0 & 0 & 0 & -15743 & -210984 & -19712.9 & -40162.3 & -126743 & \\
0 & 0 & 0 & 0 & -136.35 & -8694.59 & -278.443 & -1650.9 & 6743.88 & \\
0 & 0 & 0 & 0 & 12012.4 & 153232 & 32012 & 28166.4 & -118492 & - \\
0 & 0 & 0 & 0 & -3550.35 & 136936 & -2686.77 & -6516.74 & -324285 & -
\end{bmatrix}$$

$$\tilde{A}^{(6)} = \begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\
0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -25 \\
0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & -8 \\
0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\
0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & -2 \\
0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 74 \\
0 & 0 & 0 & 0 & 0 & -60543.6 & -5746.58 & -10141.1 & 7262.71 & 9 \\
0 & 0 & 0 & 0 & 0 & -22068.6 & -1967.7 & -4171.99 & 37.7417 & 82 \\
0 & 0 & 0 & 0 & 0 & -6943.93 & -5366.17 & -1998.45 & -12284.9 & -7 \\
0 & 0 & 0 & 0 & 0 & 17670.6 & 4979.19 & -4119.44 & 32389.3 & -6 \\
0 & 0 & 0 & 0 & 0 & -9536.31 & -1428.97 & -1722.12 & -3050.93 & -32 \\
0 & 0 & 0 & 0 & 0 & 2022.42 & 2265 & 104.987 & -110877 & -70 \\
0 & 0 & 0 & 0 & 0 & -6849.74 & -88.0927 & -1302.15 & 6881.29 & - \\
0 & 0 & 0 & 0 & 0 & -9297.97 & 15242.2 & -2558.78 & -130599 & - \\
0 & 0 & 0 & 0 & 0 & 184973 & 2269.66 & 2564.32 & -320707 & -2
\end{bmatrix}$$

$$\tilde{A}^{(7)} = \begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4. \\
0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & \\
0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & \\
0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5. \\
0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & \\
0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & \\
0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & \\
0 & 0 & 0 & 0 & 0 & 0 & 15240.8 & -16014.9 & 116772 & \\
0 & 0 & 0 & 0 & 0 & 0 & 48.5256 & -5724.83 & 24445.8 & \\
0 & 0 & 0 & 0 & 0 & 0 & -8799.87 & 5363.28 & -61081.1 & \\
0 & 0 & 0 & 0 & 0 & 0 & 6007.2 & -6839.68 & 47392.4 & \\
0 & 0 & 0 & 0 & 0 & 0 & 687.968 & 1190.3 & -121574 & \\
0 & 0 & 0 & 0 & 0 & 0 & 5253.16 & -4977.99 & 43113.7 & \\
0 & 0 & 0 & 0 & 0 & 0 & 22492.6 & -7548.43 & -81416.1 & \\
0 & 0 & 0 & 0 & 0 & 0 & -141968 & 101828 & -1.29914e+06 & 2.
\end{bmatrix}$$

$$\tilde{A}^{(8)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -25 \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & -8 \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & -2 \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 74 \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 60 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & -2 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -5674.94 & 24062.5 & -8 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -3684.35 & 8427.5 & -3 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -663.353 & -57.3698 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1897.64 & -127009 & -41 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 423.072 & 1619.99 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 15577.4 & -259081 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -44136.6 & -177766 & 2.75884e \end{bmatrix}$$

$$\tilde{A}^{(9)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.8648 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & - \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.7851 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.5537 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 47012.6 & 2.522 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 6889.73 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -146882 & -1.5214 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -2810.72 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -422218 & -1.2344 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 284464 & 3.7185 \end{bmatrix}$$

$$\tilde{A}^{(10)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 4 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 4.73029 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 5.62635 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 2.50778 \end{bmatrix}$$

$$\tilde{A}^{(11)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \end{bmatrix}$$

$$\tilde{A}^{(12)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \end{bmatrix}$$

$$\tilde{A}^{(13)} = \begin{bmatrix} 456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\ 0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\ 0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\ 0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\ 0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\ 0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\ 0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \end{bmatrix}$$

$$\tilde{A}^{(14)} = \begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\
0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\
0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\
0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\
0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\
0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\
0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
\end{bmatrix}$$

$$\tilde{A}^{(15)} = \begin{bmatrix}
456178 & 468 & 4868 & 4.86682e+07 & 4818 & 4.86877e+06 & 4.68768e+06 & 4.67682e+07 & 46881 & 4.86488 \\
0 & 7.99897 & 4380.99 & -68.6868 & 42.9894 & 127.327 & -6.27599 & -59.5218 & 8412.9 & -2 \\
0 & 0 & -3718.9 & -8255.65 & 587.596 & 7370.47 & 9.85633 & -6352.35 & -6841.9 & - \\
0 & 0 & 0 & 5.55329e+06 & -451583 & -5.46168e+06 & -48251.8 & 4.18717e+06 & -226775 & 5.78518 \\
0 & 0 & 0 & 0 & 4949.95 & 66973.9 & 6910.32 & 12660.9 & 4988.62 & - \\
0 & 0 & 0 & 0 & 0 & -5003.24 & -3901.4 & 2684.94 & -26465.2 & 7 \\
0 & 0 & 0 & 0 & 0 & 0 & 41463.7 & -42631.1 & 327514 & 6 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & -344.945 & -3612.5 & - \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 83494.5 & 3.55378 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \\
\end{bmatrix}$$

Solución encontrada:

a_0	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_10	a_11
11.0677	-1.88733	2.36083	-8.59696	-4.81178	-2.31496	-7.71706	15.8874	-0.775866	-0.0579713	0.00830325	-0.2042(