Solução do Problema grow7 - Solver HiGHS

Análise Computacional

16 de setembro de 2025

1 Informações do Problema

Informações do Problema:

- Nome: grow7

- Número de Variáveis: 301

- Número de Restrições: 140

- Inviabilidade Primal: 0.000e+00

- Inviabilidade Dual: 3.999e-13

- Valor Primal: -4.779e+07

- Valor Dual: 0.000e+00

- Gap: -1.631e-24

- Número de Iterações: 19

2 Variáveis Primais e Custos Reduzidos

Tabela 1: Variáveis primais e custos reduzidos do problema grow7

Coordenada x	Valor x	Coordenada z	Valor z
1	185645.547405	1	0.000000
2	11848.389174	2	0.000000
3	6040.174370	3	0.000000
4	9092.000000	4	-0.000000
5	4104.692278	5	0.000000
6	17447.640939	6	0.000000
7	47233.522349	7	0.000000
8	5392.139807	8	0.000000
9	62908.000000	9	-61.532836
10	7114.615081	10	0.000000
11	32131.153615	11	0.000000
12	5934.664705	12	0.000000

Coordenada x	Valor x	Coordenada z	Valor z
13	36579.443413	13	0.000000
14	29534.944584	14	0.000000
15	67.453838	15	0.000000
16	635.076474	16	0.000000
17	9893.782196	17	0.000000
18	4608.782977	18	0.000000
19	13667.179261	19	0.000000
20	67301.329732	20	0.000000
21	0.000000	21	4.229781
22	0.000000	22	3.000000
23	0.000000	23	0.690552
24	119100.643375	24	0.000000
25	8561.090948	25	0.000000
26	0.000000	26	0.000000
27	4546.000000	27	0.000000
28	0.000000	28	0.000000
29	0.000000	29	-0.000000
30	23857.442020	30	0.000000
31	0.000000	31	0.000000
32	31376.547227	32	0.000000
33	0.000000	33	0.000000
34	20590.500000	34	0.000000
35	0.000000	35	0.000000
36	25110.751996	36	0.000000
37	0.000000	37	0.000000
38	0.000000	38	0.000000
39	0.000000	39	0.000000
40	0.000000	40	0.000000
41	0.000000	41	-0.000000
42	7107.616278	42	0.000000
43	0.000000	43	-0.000000
44	1017140.117728	44	0.000000
45	0.000000	45	-0.000000
46	1562041.928899	46	0.000000
47	1187.606494	47	0.000000
48	65544.581436	48	0.000000
49	99425.658346	49	0.000000
50	0.000000	50	-0.000000
51	21720.336668	51	0.000000
52	62908.000000	52	-61.532836
53	31444.829357	53	0.000000
54	7036.512818	54	0.000000
55	16573.686780	55	0.000000
56	0.000000	56	0.000000
57	221331.374269	57	0.000000
58	1924.582963	58	0.000000
59	7773.489778	59	0.000000
60	42900.240550	60	0.000000
61	33159.000000	61	-0.000000

Coordenada x	Valor x	Coordenada z	Valor z
62	22639.000000	62	-0.000000
63	978337.325454	63	0.000000
64	750000.000000	64	-1.770219
65	0.000000	65	0.000000
66	1000000.000000	66	-1.309448
67	29136.083005	67	0.000000
68	5823.791385	68	0.000000
69	500000.000000	69	-0.000000
70	0.000000	70	0.000000
71	0.000000	71	-0.000000
72	0.000000	72	0.000000
73	14762.157974	73	0.000000
74	0.000000	74	0.000000
75	3736.437807	75	0.000000
76	0.000000	76	-0.000000
77	0.000000	77	0.000000
78	0.000000	78	0.000000
79	15804.124224	79	0.000000
80	25327.468359	80	0.000000
81	1025.827948	81	0.000000
82	0.000000	82	-0.000000
83	0.000000	83	-0.000000
84	2222.514349	84	0.000000
85	11319.500000	85	0.000000
86	333932.408970	86	0.000000
87	0.000000	87	0.000000
88	591220.079562	88	0.000000
89	532279.941235	89	0.000000
90	9092.000000	90	0.000000
91	65057.738899	91	0.000000
92	75960.789073	92	0.000000
93	0.000000	93	-0.000000
94	19299.345653	94	0.000000
95	62908.000000	95	-61.532836
96	34040.000000	96	-0.000000
97	32081.658487	97	0.000000
98	29482.000000	98	0.000000
99	0.000000	99	-0.000000
100	197319.062556	100	0.000000
101	0.000000	101	0.000000
102	9475.444353	102	0.000000
103	22112.792433	103	0.000000
104	25649.965503	104	0.000000
105	8237.441342	105	0.000000
106	0.000000	106	0.000000
107	0.000000	107	4.229781
108	500000.000000	108	-3.000000
109	1000000.000000	109	-3.309448
110	0.000000	110	0.000000

Coordenada x	Valor x	Coordenada z	Valor z
111	0.000000	111	0.000000
112	0.000000	112	0.000000
113	1379.424492	113	0.000000
114	42494.474702	114	0.000000
115	59464.500000	115	0.000000
116	7229.762194	116	0.000000
117	4245.574629	117	0.000000
118	12335.198328	118	0.000000
119	17020.000000	119	0.000000
120	0.000000	120	0.000000
121	6484.890282	121	0.000000
122	11977.658087	122	0.000000
123	84380.795377	123	0.000000
124	1006.533657	124	0.000000
125	8665.500000	125	-0.000000
126	0.000000	126	0.000000
127	0.000000	127	0.000000
128	11319.500000	128	0.000000
129	83355.815802	129	0.000000
130	1100155.604908	130	0.000000
131	147229.388075	131	0.000000
132	1032800.445951	132	0.000000
133	2374.926454	133	0.000000
134	0.000000	134	-0.000000
135	23711.938913	135	0.000000
136	0.000000	136	-0.000000
137	0.000000	137	0.000000
138	62908.000000	138	-61.532836
139	8784.930977	139	0.000000
140	12098.109296	140	0.000000
141	0.000000	141	0.000000
142	0.000000	142	-0.000000
143	0.000000	143	-0.000000
144	0.000000	144	-0.000000
145	0.000000	145	-0.000000
146	29234.408848	146	0.000000
147	21648.809509	147	0.000000
148	0.000000	148	0.000000
149	320028.560217	149	0.000000
150	750000.000000	150	-1.770219
151	121866.565000	151	0.000000
152	1000000.000000	152	-5.309448
153	0.000000	153	0.000000
154	0.000000	154	0.000000
155	0.000000	155	0.000000
156	0.000000	156	0.000000
157	0.000000	157	0.000000
158	0.000000	158	0.000000
159	0.000000	159	0.000000

Coordenada x	Valor x	Coordenada z	Valor z
160	0.000000	160	0.000000
161	0.000000	161	0.000000
162	0.000000	162	0.000000
163	0.000000	163	0.000000
164	4870.445348	164	0.000000
165	8841.691745	165	0.000000
166	0.000000	166	0.000000
167	701.925629	167	0.000000
168	6013.632477	168	0.000000
169	0.000000	169	0.000000
170	0.000000	170	0.000000
171	5395.525919	171	0.000000
172	0.000000	172	0.000000
173	8087.259493	173	0.000000
174	1934.074986	174	0.000000
175	1043303.721752	175	0.000000
176	2831.723511	176	0.000000
177	33746.810964	177	0.000000
178	4894.471312	178	0.000000
179	21300.344360	179	0.000000
180	8242.869937	180	0.000000
181	62908.000000	181	-61.532836
182	26257.811539	182	0.000000
183	16748.096783	183	0.000000
184	0.000000	184	0.000000
185	0.000000	185	-0.000000
186	86452.624447	186	0.000000
187	0.000000	187	-0.000000
188	0.000000	188	-0.000000
189	12471.088000	189	0.000000
190	15115.484604	190	0.000000
191	12423.450520	191	0.000000
192	266743.042265	192	0.000000
193	0.000000	193	4.229781
194	0.000000	194	3.000000
195	1000000.000000	195	-3.309448
196	0.000000	196	-0.000000
197	0.000000	197	-0.000000
198	0.000000	198	-0.000000
199	0.000000	199	-0.000000
200	0.000000	200	-0.000000
201	0.000000	201	-0.000000
202	9136.534463	202	0.000000
203	0.000000	203	-0.000000
204	23911.150633	204	0.000000
205	17020.000000	205	-0.000000
206	0.000000	206	-0.000000
207	0.000000	207	-0.000000
208	6097.295058	208	0.000000

Coordenada x	Valor x	Coordenada z	Valor z
209	0.000000	209	-0.000000
210	457.259444	210	0.000000
211	3849.214746	211	0.000000
212	0.000000	212	-0.000000
213	0.000000	213	-0.000000
214	7731.802134	214	0.000000
215	0.000000	215	0.000000
216	1144247.606318	216	0.000000
217	156652.430372	217	0.000000
218	1034703.356829	218	0.000000
219	6942.608257	219	0.000000
220	46424.785245	220	0.000000
221	103994.294325	221	0.000000
222	0.000000	222	0.000000
223	15620.802427	223	0.000000
224	62908.000000	224	-61.532836
225	12712.793320	225	0.000000
226	24728.737242	226	0.000000
227	13189.479482	227	0.000000
228	0.000000	228	0.000000
229	146157.414200	229	0.000000
230	0.000000	230	-0.000000
231	0.000000	231	-0.000000
232	39123.695911	232	0.000000
233	28953.772306	233	0.000000
234	0.000000	234	0.000000
235	483854.267038	235	0.000000
236	750000.000000	236	-1.770219
237	128825.786129	237	0.000000
238	1000000.000000	238	-1.309448
239	0.000000	239	4.229781
240	0.000000	240	3.207878
241	0.000000	241	1.358943
242	0.000000	242	4.936809
243	0.000000	243	2.650710
244	0.000000	244	3.358487
245	0.000000	245	10.043946
246	0.000000	246	7.054247
247	0.000000	247	69.393833
248	0.000000	248	2.712381
249	0.000000	249	2.654455
250	0.000000	250	3.920276
251	0.000000	251	4.135383
252	0.000000	252	4.493892
253	0.000000	253	0.996956
254	0.000000	254	0.850949
255	0.000000	255	1.146770
256	2702.415633	256	0.000000
257	0.000000	257	0.525440

Coordenada x	Valor x	Coordenada z	Valor z
258	0.000000	258	0.891202
259	64279.833916	259	0.000000
260	598682.282165	260	0.000000
261	1040066.585759	261	0.000000
262	6245.985605	262	0.000000
263	41615.180540	263	0.000000
264	11644.323310	264	0.000000
265	13901.785008	265	0.000000
266	12343.271987	266	0.000000
267	62908.000000	267	-11.676146
268	18987.994988	268	0.000000
269	33492.208284	269	0.000000
270	16359.351566	270	0.000000
271	6697.081657	271	0.000000
272	157290.684424	272	0.000000
273	373.551499	273	0.000000
274	3417.770405	274	0.000000
275	23853.144010	275	0.000000
276	33159.000000	276	-0.762418
277	11560.735356	277	0.000000
278	401641.258698	278	0.000000
279	35042.410196	279	0.000000
280	500000.000000	280	-6.207878
281	1000000.000000	281	-0.668391
282	0.000000	282	1.000000
283	0.000000	283	0.792122
284	0.000000	284	0.331609
285	0.000000	285	1.210351
286	0.000000	286	0.632824
287	0.000000	287	0.799330
288	0.000000	288	2.371744
289	0.000000	289	1.676914
290	0.000000	290	16.280055
291	0.000000	291	0.651232
292	0.000000	292	0.657647
293	0.000000	293	0.961999
294	0.000000	294	0.986805
295	0.000000	295	1.070569
296	0.000000	296	0.242672
297	0.000000	297	0.205479
298	0.000000	298	0.277779
299	0.000000	299	1.076274
300	0.000000	300	0.131703
301	0.000000	301	0.221585

3   Variáveis Duais (Multiplicadores de Lagrange)

Tabela 2: Variáveis duais do problema grow7

Coordenada y	Valor y
1	5.229781
2	4.000000
3	1.690552
4	6.147161
5	3.283533
6	4.157817
7	12.415691
8	8.731162
9	85.673889
10	3.363614
11	3.312102
12	4.882275
13	5.122188
14	5.564461
15	1.239628
16	1.056428
17	1.424549
18	1.076274
19	0.657143
20	1.112787
21	5.229781
22	4.000000
23	1.690552
24	6.147161
25	3.283533
26	4.157817
27	12.415691
28	8.731162
29	85.673889
30	3.363614
31	3.312102
32	4.882275
33	5.122188
34	5.564461
35	1.239628
36	1.056428
37	1.424549
38	1.076274
39	0.657143
40	1.112787
41	5.229781
42	4.000000
43	1.690552
44	6.147161
45	3.283533
46	4.157817

Coordenada y	Valor y
47	12.415691
48	8.731162
49	85.673889
50	3.363614
51	3.312102
52	4.882275
53	5.122188
54	5.564461
55	1.239628
56	1.056428
57	1.424549
58	1.076274
59	0.657143
60	1.112787
61	5.229781
62	4.000000
63	1.690552
64	6.147161
65	3.283533
66	4.157817
67	12.415691
68	8.731162
69	85.673889
70	3.363614
71	3.312102
72	4.882275
73	5.122188
74	5.564461
75	1.239628
76	1.056428
77	1.424549
78	1.076274
79	0.657143
80	1.112787
81	5.229781
82	4.000000
83	1.690552
84	6.147161
85	3.283533
86	4.157817
87	12.415691
88	8.731162
89	85.673889
90	3.363614
91	3.312102
92	4.882275
93	5.122188
94	5.564461
95	1.239628

Coordenada y	Valor y
96	1.056428
97	1.424549
98	1.076274
99	0.657143
100	1.112787
101	5.229781
102	4.000000
103	1.690552
104	6.147161
105	3.283533
106	4.157817
107	12.415691
108	8.731162
109	85.673889
110	3.363614
111	3.312102
112	4.882275
113	5.122188
114	5.564461
115	1.239628
116	1.056428
117	1.424549
118	1.076274
119	0.657143
120	1.112787
121	1.000000
122	0.792122
123	0.331609
124	1.210351
125	0.632824
126	0.799330
127	2.371744
128	1.676914
129	16.280055
130	0.651232
131	0.657647
132	0.961999
133	0.986805
134	1.070569
135	0.242672
136	0.205479
137	0.277779
138	1.076274
139	0.131703
140	0.221585

4 Observações

- O solver HiGHS foi configurado com o método IPM (Interior Point Method).

- Este arquivo contém a solução detalhada para o problema grow7.

- As variáveis duais representam os multiplicadores de Lagrange das restrições.

- Os custos reduzidos (z) indicam o impacto de forçar variáveis não-básicas na base.