

# Solução do Problema seba - Solver HiGHS

Análise Computacional

16 de setembro de 2025

## 1 Informações do Problema

### Informações do Problema:

- Nome: seba
- Número de Variáveis: 1028
- Número de Restrições: 515
- Inviabilidade Primal: 0.000e+00
- Inviabilidade Dual: 0.000e+00
- Valor Primal: 1.571e+04
- Valor Dual: 1.938e+04
- Gap: 0.000e+00
- Número de Iterações: 7

## 2 Variáveis Primais e Custos Reduzidos

Tabela 1: Variáveis primais e custos reduzidos do problema seba

Coordenada x	Valor x	Coordenada z	Valor z
1	1.500000	1	0.000000
2	0.000000	2	2.100000
3	5.000000	3	0.000000
4	10.000000	4	0.000000
5	0.000000	5	38.400000
6	0.000000	6	91.100000
7	2.000000	7	-13.500000
8	2.500000	8	0.000000
9	4.000000	9	0.000000
10	0.000000	10	72.100000
11	0.000000	11	203.000000
12	0.000000	12	69.700000

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Coordenada x	Valor x	Coordenada z	Valor z
13	50.000000	13	0.000000
14	0.000000	14	52.900000
15	15.000000	15	0.000000
16	0.000000	16	43.200000
17	2.500000	17	0.000000
18	14.000000	18	0.000000
19	84.000000	19	0.000000
20	-0.000000	20	0.000000
21	84.000000	21	0.000000
22	2.500000	22	0.000000
23	172.000000	23	0.000000
24	630.000000	24	0.000000
25	630.000000	25	0.000000
26	3150.000000	26	0.000000
27	3150.000000	27	0.000000
28	597.500000	28	0.000000
29	2773.500000	29	0.000000
30	597.500000	30	0.000000
31	597.500000	31	0.000000
32	597.500000	32	0.000000
33	2773.500000	33	0.000000
34	2773.500000	34	0.000000
35	32.500000	35	0.000000
36	86.000000	36	0.000000
37	86.000000	37	0.000000
38	86.000000	38	0.000000
39	42.000000	39	0.000000
40	2148.000000	40	0.000000
41	2079.500000	41	0.000000
42	2079.500000	42	0.000000
43	13727.500000	43	0.000000
44	13727.500000	44	0.000000
45	205.500000	45	0.000000
46	2186.000000	46	0.000000
47	2186.000000	47	0.000000
48	1762.000000	48	0.000000
49	342.500000	49	0.000000
50	346.000000	50	0.000000
51	42.000000	51	0.000000
52	965.000000	52	0.000000
53	965.000000	53	0.000000
54	482.500000	54	0.000000
55	604.500000	55	0.000000
56	482.500000	56	0.000000
57	26.500000	57	0.000000
58	86.000000	58	0.000000
59	86.000000	59	0.000000
60	86.000000	60	0.000000
61	86.000000	61	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
62	86.000000	62	0.000000
63	246.000000	63	0.000000
64	172.000000	64	0.000000
65	86.000000	65	0.000000
66	86.000000	66	0.000000
67	86.000000	67	0.000000
68	86.000000	68	0.000000
69	28.000000	69	0.000000
70	70.000000	70	0.000000
71	-0.000000	71	0.000000
72	-0.000000	72	0.000000
73	-0.000000	73	0.000000
74	967.000000	74	0.000000
75	1948.000000	75	0.000000
76	1948.000000	76	0.000000
77	974.000000	77	0.000000
78	1941.000000	78	0.000000
79	988.000000	79	0.000000
80	1948.000000	80	0.000000
81	974.000000	81	0.000000
82	7.000000	82	0.000000
83	70.000000	83	0.000000
84	258.000000	84	0.000000
85	251.000000	85	0.000000
86	258.000000	86	0.000000
87	630.000000	87	0.000000
88	630.000000	88	0.000000
89	505.000000	89	0.000000
90	505.000000	90	0.000000
91	841.500000	91	0.000000
92	841.500000	92	0.000000
93	86.000000	93	0.000000
94	86.000000	94	0.000000
95	14.000000	95	0.000000
96	540.000000	96	0.000000
97	86.000000	97	0.000000
98	848.500000	98	0.000000
99	865.000000	99	0.000000
100	781.000000	100	0.000000
101	1033.000000	101	0.000000
102	781.000000	102	0.000000
103	86.000000	103	0.000000
104	688.000000	104	0.000000
105	86.000000	105	0.000000
106	57.500000	106	0.000000
107	57.500000	107	0.000000
108	57.500000	108	0.000000
109	115.000000	109	0.000000
110	172.500000	110	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
111	115.000000	111	0.000000
112	57.500000	112	0.000000
113	230.000000	113	0.000000
114	172.500000	114	0.000000
115	230.000000	115	0.000000
116	57.500000	116	0.000000
117	57.500000	117	0.000000
118	57.500000	118	0.000000
119	57.500000	119	0.000000
120	230.000000	120	0.000000
121	230.000000	121	0.000000
122	402.500000	122	0.000000
123	86.000000	123	0.000000
124	86.000000	124	0.000000
125	96.000000	125	0.000000
126	344.000000	126	0.000000
127	1.500000	127	0.000000
128	-0.000000	128	0.000000
129	82.500000	129	0.000000
130	172.000000	130	0.000000
131	172.000000	131	0.000000
132	974.000000	132	0.000000
133	888.000000	133	0.000000
134	6597.000000	134	0.000000
135	9529.000000	135	0.000000
136	703.500000	136	0.000000
137	659.500000	137	0.000000
138	86.000000	138	0.000000
139	-0.000000	139	0.000000
140	50.000000	140	0.000000
141	-0.000000	141	0.000000
142	1869.500000	142	0.000000
143	1425.000000	143	0.000000
144	1425.000000	144	0.000000
145	86.000000	145	0.000000
146	1022.000000	146	0.000000
147	83.500000	147	0.000000
148	362.500000	148	0.000000
149	183.000000	149	0.000000
150	86.000000	150	0.000000
151	685.000000	151	0.000000
152	86.000000	152	0.000000
153	201.000000	153	0.000000
154	2594.000000	154	0.000000
155	82.500000	155	0.000000
156	134.500000	156	0.000000
157	598.000000	157	0.000000
158	345.500000	158	0.000000
159	66.500000	159	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
160	88.000000	160	0.000000
161	475.000000	161	0.000000
162	72.000000	162	0.000000
163	86.000000	163	0.000000
164	83.500000	164	0.000000
165	14.000000	165	0.000000
166	86.000000	166	0.000000
167	86.000000	167	0.000000
168	82.500000	168	0.000000
169	86.000000	169	0.000000
170	86.000000	170	0.000000
171	86.000000	171	0.000000
172	86.000000	172	0.000000
173	86.000000	173	0.000000
174	82.500000	174	0.000000
175	82.500000	175	0.000000
176	82.500000	176	0.000000
177	86.000000	177	0.000000
178	86.000000	178	0.000000
179	21.000000	179	0.000000
180	2.500000	180	0.000000
181	86.000000	181	0.000000
182	12.500000	182	0.000000
183	86.000000	183	0.000000
184	86.000000	184	0.000000
185	1.500000	185	0.000000
186	172.000000	186	0.000000
187	458.000000	187	0.000000
188	172.000000	188	0.000000
189	172.000000	189	0.000000
190	28.000000	190	0.000000
191	28.000000	191	0.000000
192	86.000000	192	0.000000
193	86.000000	193	0.000000
194	14.000000	194	0.000000
195	53.500000	195	0.000000
196	597.500000	196	0.000000
197	597.500000	197	0.000000
198	576.500000	198	0.000000
199	53.500000	199	0.000000
200	630.000000	200	0.000000
201	53.500000	201	0.000000
202	485.500000	202	0.000000
203	86.000000	203	0.000000
204	86.000000	204	0.000000
205	-0.000000	205	0.000000
206	86.000000	206	0.000000
207	86.000000	207	0.000000
208	14.000000	208	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
209	-0.000000	209	0.000000
210	184.500000	210	0.000000
211	475.000000	211	0.000000
212	73.500000	212	0.000000
213	31.000000	213	0.000000
214	86.000000	214	0.000000
215	974.000000	215	0.000000
216	86.000000	216	0.000000
217	14.000000	217	0.000000
218	630.000000	218	0.000000
219	630.000000	219	0.000000
220	72.000000	220	0.000000
221	140.000000	221	0.000000
222	55.000000	222	0.000000
223	70.000000	223	0.000000
224	70.000000	224	0.000000
225	-0.000000	225	0.000000
226	55.000000	226	0.000000
227	86.000000	227	0.000000
228	40.500000	228	0.000000
229	144.000000	229	0.000000
230	72.000000	230	0.000000
231	216.000000	231	0.000000
232	360.000000	232	0.000000
233	72.000000	233	0.000000
234	72.000000	234	0.000000
235	72.000000	235	0.000000
236	144.000000	236	0.000000
237	72.000000	237	0.000000
238	72.000000	238	0.000000
239	72.000000	239	0.000000
240	72.000000	240	0.000000
241	72.000000	241	0.000000
242	70.000000	242	0.000000
243	72.000000	243	0.000000
244	50.000000	244	0.000000
245	70.000000	245	0.000000
246	55.000000	246	0.000000
247	55.000000	247	0.000000
248	288.000000	248	0.000000
249	144.000000	249	0.000000
250	276.000000	250	0.000000
251	276.000000	251	0.000000
252	672.000000	252	0.000000
253	152.000000	253	0.000000
254	276.000000	254	0.000000
255	55.000000	255	0.000000
256	144.000000	256	0.000000
257	14.000000	257	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
258	-0.000000	258	0.000000
259	-0.000000	259	0.000000
260	-0.000000	260	0.000000
261	86.000000	261	0.000000
262	216.000000	262	0.000000
263	57.000000	263	0.000000
264	72.000000	264	0.000000
265	72.000000	265	0.000000
266	70.000000	266	0.000000
267	70.000000	267	0.000000
268	57.000000	268	0.000000
269	497.000000	269	0.000000
270	254.000000	270	0.000000
271	154.000000	271	0.000000
272	3.500000	272	0.000000
273	457.500000	273	0.000000
274	28.500000	274	0.000000
275	28.500000	275	0.000000
276	11.500000	276	0.000000
277	26.500000	277	0.000000
278	11.500000	278	0.000000
279	11.500000	279	0.000000
280	72.000000	280	0.000000
281	-0.000000	281	0.000000
282	64.000000	282	0.000000
283	17.000000	283	0.000000
284	-0.000000	284	0.000000
285	-0.000000	285	0.000000
286	-0.000000	286	0.000000
287	55.000000	287	0.000000
288	3.500000	288	0.000000
289	72.000000	289	0.000000
290	3.500000	290	0.000000
291	342.000000	291	0.000000
292	331.500000	292	0.000000
293	143.000000	293	0.000000
294	135.500000	294	0.000000
295	95.500000	295	0.000000
296	285.000000	296	0.000000
297	336.500000	297	0.000000
298	353.500000	298	0.000000
299	445.500000	299	0.000000
300	1090.500000	300	0.000000
301	861.500000	301	0.000000
302	25.000000	302	0.000000
303	10.000000	303	0.000000
304	25.000000	304	0.000000
305	25.000000	305	0.000000
306	25.000000	306	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
307	28.500000	307	0.000000
308	28.500000	308	0.000000
309	15.000000	309	0.000000
310	25.000000	310	0.000000
311	25.000000	311	0.000000
312	65.000000	312	0.000000
313	150.000000	313	0.000000
314	0.000000	314	0.000000
315	-0.000000	315	0.000000
316	52.000000	316	0.000000
317	144.000000	317	0.000000
318	86.000000	318	0.000000
319	86.000000	319	0.000000
320	86.000000	320	0.000000
321	-0.000000	321	0.000000
322	2.500000	322	0.000000
323	55.000000	323	0.000000
324	-0.000000	324	0.000000
325	72.000000	325	0.000000
326	86.000000	326	0.000000
327	86.000000	327	0.000000
328	27.000000	328	0.000000
329	-0.000000	329	0.000000
330	15.000000	330	0.000000
331	72.000000	331	0.000000
332	15.000000	332	0.000000
333	17.000000	333	0.000000
334	17.000000	334	0.000000
335	630.000000	335	0.000000
336	344.500000	336	0.000000
337	394.500000	337	0.000000
338	57.500000	338	0.000000
339	10.000000	339	0.000000
340	-0.000000	340	0.000000
341	-0.000000	341	0.000000
342	5.000000	342	0.000000
343	-0.000000	343	0.000000
344	-0.000000	344	0.000000
345	5.000000	345	0.000000
346	86.000000	346	0.000000
347	2.000000	347	0.000000
348	-0.000000	348	0.000000
349	-0.000000	349	0.000000
350	-0.000000	350	0.000000
351	-0.000000	351	0.000000
352	55.000000	352	0.000000
353	50.000000	353	0.000000
354	2.000000	354	0.000000
355	57.500000	355	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
356	-0.000000	356	0.000000
357	-0.000000	357	0.000000
358	17.000000	358	0.000000
359	86.000000	359	0.000000
360	602.000000	360	0.000000
361	86.000000	361	0.000000
362	65.000000	362	0.000000
363	286.000000	363	0.000000
364	5.000000	364	0.000000
365	86.000000	365	0.000000
366	71.000000	366	0.000000
367	5.000000	367	0.000000
368	25.000000	368	0.000000
369	25.000000	369	0.000000
370	3366.000000	370	0.000000
371	1948.000000	371	0.000000
372	84.000000	372	0.000000
373	84.000000	373	0.000000
374	841.500000	374	0.000000
375	72.000000	375	0.000000
376	72.000000	376	0.000000
377	50.000000	377	0.000000
378	-0.000000	378	0.000000
379	72.000000	379	0.000000
380	12.500000	380	0.000000
381	84.500000	381	0.000000
382	647.000000	382	0.000000
383	86.000000	383	0.000000
384	86.000000	384	0.000000
385	18.500000	385	0.000000
386	27.000000	386	0.000000
387	25.000000	387	0.000000
388	-0.000000	388	0.000000
389	-0.000000	389	0.000000
390	25.000000	390	0.000000
391	25.000000	391	0.000000
392	28.500000	392	0.000000
393	28.500000	393	0.000000
394	11.000000	394	0.000000
395	57.500000	395	0.000000
396	72.000000	396	0.000000
397	14.000000	397	0.000000
398	25.000000	398	0.000000
399	86.000000	399	0.000000
400	14.000000	400	0.000000
401	72.000000	401	0.000000
402	28.500000	402	0.000000
403	27.000000	403	0.000000
404	5.000000	404	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
405	14.000000	405	0.000000
406	72.000000	406	0.000000
407	14.000000	407	0.000000
408	72.000000	408	0.000000
409	72.000000	409	0.000000
410	-0.000000	410	0.000000
411	57.500000	411	0.000000
412	57.500000	412	0.000000
413	7.500000	413	0.000000
414	-0.000000	414	0.000000
415	70.000000	415	0.000000
416	-0.000000	416	0.000000
417	7.500000	417	0.000000
418	-0.000000	418	0.000000
419	0.000000	419	0.000000
420	50.000000	420	0.000000
421	50.000000	421	0.000000
422	57.500000	422	0.000000
423	12.500000	423	0.000000
424	14.000000	424	0.000000
425	12.500000	425	0.000000
426	12.500000	426	0.000000
427	27.000000	427	0.000000
428	1.500000	428	0.000000
429	1.500000	429	0.000000
430	-0.000000	430	0.000000
431	28.500000	431	0.000000
432	65.000000	432	0.000000
433	86.000000	433	0.000000
434	86.000000	434	0.000000
435	86.000000	435	0.000000
436	-0.000000	436	0.000000
437	-0.000000	437	0.000000
438	-0.000000	438	0.000000
439	630.000000	439	0.000000
440	630.000000	440	0.000000
441	630.000000	441	0.000000
442	72.000000	442	0.000000
443	888.000000	443	0.000000
444	86.000000	444	0.000000
445	86.000000	445	0.000000
446	86.000000	446	0.000000
447	516.000000	447	0.000000
448	-0.000000	448	0.000000
449	-0.000000	449	0.000000
450	-0.000000	450	0.000000
451	-0.000000	451	0.000000
452	-0.000000	452	0.000000
453	-0.000000	453	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
454	-0.000000	454	0.000000
455	-0.000000	455	0.000000
456	-0.000000	456	0.000000
457	-0.000000	457	0.000000
458	28.500000	458	0.000000
459	25.000000	459	0.000000
460	5864.000000	460	0.000000
461	86.000000	461	0.000000
462	86.000000	462	0.000000
463	86.000000	463	0.000000
464	86.000000	464	0.000000
465	0.000000	465	0.000000
466	86.000000	466	0.000000
467	57.000000	467	0.000000
468	0.000000	468	0.000000
469	86.000000	469	0.000000
470	86.000000	470	0.000000
471	86.000000	471	0.000000
472	57.000000	472	0.000000
473	25.000000	473	0.000000
474	86.000000	474	0.000000
475	-0.000000	475	0.000000
476	72.000000	476	0.000000
477	-0.000000	477	0.000000
478	172.000000	478	0.000000
479	-0.000000	479	0.000000
480	1.500000	480	0.000000
481	86.000000	481	0.000000
482	58.500000	482	0.000000
483	74.500000	483	0.000000
484	841.500000	484	0.000000
485	611.000000	485	0.000000
486	86.000000	486	0.000000
487	86.000000	487	0.000000
488	-0.000000	488	0.000000
489	-0.000000	489	0.000000
490	-0.000000	490	0.000000
491	0.000000	491	0.000000
492	14.000000	492	0.000000
493	14.000000	493	0.000000
494	72.000000	494	0.000000
495	2.500000	495	0.000000
496	11.500000	496	0.000000
497	0.000000	497	0.000000
498	-0.000000	498	0.000000
499	-0.000000	499	0.000000
500	25.000000	500	0.000000
501	10.000000	501	0.000000
502	15.000000	502	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
503	50.000000	503	0.000000
504	-0.000000	504	0.000000
505	-0.000000	505	0.000000
506	-0.000000	506	0.000000
507	-0.000000	507	0.000000
508	25.000000	508	0.000000
509	65.000000	509	0.000000
510	21.000000	510	0.000000
511	86.000000	511	0.000000
512	72.000000	512	0.000000
513	72.000000	513	0.000000
514	630.000000	514	0.000000
515	3366.000000	515	0.000000
516	28.500000	516	0.000000
517	346.000000	517	0.000000
518	-0.000000	518	0.000000
519	0.000000	519	0.000000
520	0.000000	520	0.000000
521	0.000000	521	0.000000
522	-0.000000	522	0.000000
523	0.000000	523	5.200000
524	0.000000	524	1.560000
525	0.000000	525	0.270000
526	0.000000	526	8.900000
527	0.000000	527	0.470000
528	0.000000	528	5.742000
529	0.000000	529	0.146000
530	0.000000	530	0.029000
531	0.000000	531	0.137000
532	0.000000	532	0.015000
533	0.000000	533	0.033000
534	0.000000	534	0.097000
535	0.000000	535	0.010000
536	0.000000	536	0.210000
537	0.000000	537	0.124000
538	0.000000	538	0.055000
539	0.000000	539	0.037000
540	0.000000	540	0.007000
541	0.000000	541	1.040000
542	0.000000	542	0.204000
543	0.000000	543	0.245000
544	0.000000	544	0.303000
545	0.000000	545	5.032000
546	0.000000	546	0.021000
547	0.000000	547	0.041000
548	0.000000	548	0.008000
549	0.000000	549	0.013000
550	0.000000	550	0.011000
551	0.000000	551	0.062000

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Coordenada x	Valor x	Coordenada z	Valor z
552	0.000000	552	0.013000
553	0.000000	553	0.038000
554	0.000000	554	0.011000
555	0.000000	555	0.078000
556	0.000000	556	0.083000
557	0.000000	557	0.156000
558	0.000000	558	0.179000
559	0.000000	559	0.024000
560	0.000000	560	0.091000
561	0.000000	561	0.040000
562	0.000000	562	0.115000
563	0.000000	563	2.856000
564	0.000000	564	0.197000
565	0.000000	565	0.150000
566	0.000000	566	0.211000
567	0.000000	567	0.128000
568	0.000000	568	0.221000
569	0.000000	569	0.204000
570	0.000000	570	0.112000
571	0.000000	571	0.388000
572	0.000000	572	0.250000
573	0.000000	573	0.408000
574	0.000000	574	0.544000
575	0.000000	575	0.211000
576	0.000000	576	0.469000
577	0.000000	577	0.140000
578	0.000000	578	4.785000
579	0.000000	579	0.138000
580	0.000000	580	0.435000
581	0.000000	581	0.031000
582	0.000000	582	0.022000
583	0.000000	583	0.070000
584	0.000000	584	0.044000
585	0.000000	585	0.038000
586	0.000000	586	0.035000
587	0.000000	587	0.023000
588	0.000000	588	0.600000
589	0.000000	589	0.250000
590	0.000000	590	0.095000
591	0.000000	591	0.110000
592	0.000000	592	0.107000
593	0.000000	593	0.190000
594	0.000000	594	0.135000
595	0.000000	595	0.129000
596	0.000000	596	0.063000
597	0.000000	597	0.073000
598	0.000000	598	0.032000
599	0.000000	599	0.128000
600	0.000000	600	0.135000

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Coordenada x	Valor x	Coordenada z	Valor z
601	0.000000	601	0.891000
602	0.000000	602	0.043000
603	0.000000	603	0.170000
604	0.000000	604	0.046000
605	0.000000	605	0.062000
606	0.000000	606	0.126000
607	0.000000	607	0.135000
608	0.000000	608	0.068000
609	0.000000	609	0.170000
610	0.000000	610	0.022000
611	0.000000	611	0.503000
612	0.000000	612	0.820000
613	0.000000	613	1.010000
614	0.000000	614	1.210000
615	0.000000	615	0.155000
616	0.000000	616	0.165000
617	0.000000	617	0.141000
618	0.000000	618	0.335000
619	0.000000	619	0.069000
620	0.000000	620	0.098000
621	0.000000	621	0.096000
622	0.000000	622	0.300000
623	0.000000	623	0.265000
624	0.000000	624	0.860000
625	0.000000	625	0.950000
626	0.000000	626	0.149000
627	0.000000	627	0.225000
628	0.000000	628	0.066000
629	0.000000	629	0.214000
630	0.000000	630	0.197000
631	0.000000	631	0.354000
632	0.000000	632	0.057000
633	0.000000	633	7.548000
634	0.000000	634	6.188000
635	0.000000	635	0.272000
636	0.000000	636	0.153000
637	0.000000	637	0.065000
638	0.000000	638	0.097000
639	0.000000	639	0.075000
640	0.000000	640	0.005000
641	0.000000	641	0.002000
642	0.000000	642	0.064000
643	0.000000	643	0.031000
644	0.000000	644	0.218000
645	0.000000	645	0.163000
646	0.000000	646	0.160000
647	0.000000	647	0.012000
648	0.000000	648	0.030000
649	0.000000	649	0.044000

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Coordenada x	Valor x	Coordenada z	Valor z
650	0.000000	650	0.045000
651	0.000000	651	0.150000
652	0.000000	652	0.023000
653	0.000000	653	0.374000
654	0.000000	654	0.058000
655	0.000000	655	0.124000
656	0.000000	656	0.139000
657	0.000000	657	0.022000
658	0.000000	658	0.214000
659	0.000000	659	0.087000
660	0.000000	660	0.010000
661	0.000000	661	0.160000
662	0.000000	662	0.099000
663	0.000000	663	0.066000
664	0.000000	664	0.055000
665	0.000000	665	0.194000
666	0.000000	666	0.177000
667	0.000000	667	0.128000
668	0.000000	668	0.150000
669	0.000000	669	0.214000
670	0.000000	670	0.177000
671	0.000000	671	0.456000
672	0.000000	672	0.700000
673	0.000000	673	0.265000
674	0.000000	674	0.220000
675	0.000000	675	0.517000
676	0.000000	676	0.177000
677	0.000000	677	0.619000
678	0.000000	678	0.367000
679	0.000000	679	0.220000
680	0.000000	680	0.150000
681	0.000000	681	0.173000
682	0.000000	682	0.207000
683	0.000000	683	0.153000
684	0.000000	684	0.150000
685	0.000000	685	0.469000
686	0.000000	686	4.216000
687	0.000000	687	0.262000
688	0.000000	688	5.100000
689	0.000000	689	0.170000
690	0.000000	690	0.163000
691	0.000000	691	8.704000
692	0.000000	692	0.180000
693	0.000000	693	0.076000
694	0.000000	694	0.095000
695	0.000000	695	0.190000
696	0.000000	696	0.197000
697	0.000000	697	0.228000
698	0.000000	698	0.190000

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Coordenada x	Valor x	Coordenada z	Valor z
699	0.000000	699	0.194000
700	0.000000	700	0.816000
701	0.000000	701	2.652000
702	0.000000	702	0.110000
703	0.000000	703	0.037000
704	0.000000	704	0.185000
705	0.000000	705	1.904000
706	0.000000	706	0.315000
707	0.000000	707	0.255000
708	0.000000	708	1.802000
709	0.000000	709	0.850000
710	0.000000	710	0.305000
711	0.000000	711	0.029000
712	0.000000	712	0.279000
713	0.000000	713	0.129000
714	0.000000	714	0.571000
715	0.000000	715	0.167000
716	0.000000	716	0.082000
717	0.000000	717	0.087000
718	0.000000	718	0.214000
719	0.000000	719	1.285000
720	0.000000	720	0.918000
721	0.000000	721	0.112000
722	0.000000	722	0.156000
723	0.000000	723	0.653000
724	0.000000	724	0.248000
725	0.000000	725	0.056000
726	0.000000	726	0.483000
727	0.000000	727	0.135000
728	0.000000	728	5.300000
729	0.000000	729	1.640000
730	0.000000	730	0.800000
731	0.000000	731	8.400000
732	0.000000	732	1.115000
733	0.000000	733	0.143000
734	0.000000	734	0.986000
735	0.000000	735	0.215000
736	0.000000	736	0.367000
737	0.000000	737	0.080000
738	0.000000	738	0.173000
739	0.000000	739	0.422000
740	0.000000	740	0.315000
741	0.000000	741	0.401000
742	0.000000	742	0.180000
743	0.000000	743	0.238000
744	0.000000	744	0.394000
745	0.000000	745	0.490000
746	0.000000	746	0.320000
747	0.000000	747	0.262000

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Coordenada x	Valor x	Coordenada z	Valor z
748	0.000000	748	0.456000
749	0.000000	749	0.252000
750	0.000000	750	0.282000
751	0.000000	751	4.488000
752	0.000000	752	3.020000
753	0.000000	753	0.860000
754	0.000000	754	0.081000
755	0.000000	755	0.201000
756	0.000000	756	0.103000
757	0.000000	757	0.122000
758	0.000000	758	0.063000
759	0.000000	759	0.146000
760	0.000000	760	0.462000
761	0.000000	761	2.448000
762	0.000000	762	4.216000
763	0.000000	763	0.694000
764	0.000000	764	5.032000
765	0.000000	765	5.168000
766	0.000000	766	4.964000
767	0.000000	767	0.238000
768	0.000000	768	0.139000
769	0.000000	769	0.870000
770	0.000000	770	0.558000
771	0.000000	771	0.428000
772	0.000000	772	0.449000
773	0.000000	773	0.286000
774	0.000000	774	0.248000
775	0.000000	775	0.078000
776	0.000000	776	0.079000
777	0.000000	777	0.086000
778	0.000000	778	1.306000
779	0.000000	779	0.038000
780	0.000000	780	0.782000
781	0.000000	781	0.610000
782	0.000000	782	5.500000
783	0.000000	783	0.510000
784	0.000000	784	7.221000
785	0.000000	785	3.150000
786	0.000000	786	2.006000
787	0.000000	787	6.800000
788	0.000000	788	6.800000
789	0.000000	789	6.800000
790	0.000000	790	0.122000
791	0.000000	791	0.120000
792	0.000000	792	0.124000
793	0.000000	793	7.134000
794	0.000000	794	2.448000
795	0.000000	795	0.207000
796	0.000000	796	2.584000

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Coordenada x	Valor x	Coordenada z	Valor z
797	0.000000	797	0.059000
798	0.000000	798	0.059000
799	0.000000	799	0.103000
800	0.000000	800	0.126000
801	0.000000	801	0.108000
802	0.000000	802	0.053000
803	0.000000	803	0.167000
804	0.000000	804	0.067000
805	0.000000	805	0.058000
806	0.000000	806	0.046000
807	0.000000	807	0.067000
808	0.000000	808	0.435000
809	0.000000	809	3.740000
810	0.000000	810	0.517000
811	0.000000	811	0.503000
812	0.000000	812	0.669000
813	0.000000	813	1.040000
814	0.000000	814	0.585000
815	0.000000	815	0.367000
816	0.000000	816	0.510000
817	0.000000	817	0.496000
818	0.000000	818	0.435000
819	0.000000	819	0.153000
820	0.000000	820	0.045000
821	0.000000	821	3.959000
822	0.000000	822	7.072000
823	0.000000	823	0.214000
824	0.000000	824	0.340000
825	0.000000	825	0.241000
826	0.000000	826	0.194000
827	0.000000	827	5.032000
828	0.000000	828	9.135000
829	0.000000	829	9.135000
830	0.000000	830	19.923000
831	0.000000	831	0.289000
832	0.000000	832	0.323000
833	0.000000	833	0.240000
834	0.000000	834	0.299000
835	0.000000	835	8.636000
836	0.000000	836	7.004000
837	0.000000	837	0.802000
838	0.000000	838	5.500000
839	0.000000	839	7.395000
840	0.000000	840	3.090000
841	0.000000	841	0.182000
842	0.000000	842	0.045000
843	0.000000	843	0.044000
844	0.000000	844	0.610000
845	0.000000	845	4.012000

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Coordenada x	Valor x	Coordenada z	Valor z
846	0.000000	846	4.828000
847	0.000000	847	2.380000
848	0.000000	848	2.380000
849	0.000000	849	2.380000
850	0.000000	850	2.380000
851	0.000000	851	7.600000
852	0.000000	852	0.650000
853	0.000000	853	0.415000
854	0.000000	854	0.082000
855	0.000000	855	1.330000
856	0.000000	856	0.483000
857	0.000000	857	0.823000
858	0.000000	858	0.401000
859	0.000000	859	0.843000
860	0.000000	860	0.836000
861	0.000000	861	0.660000
862	0.000000	862	0.296000
863	0.000000	863	0.409000
864	0.000000	864	3.400000
865	0.000000	865	0.201000
866	0.000000	866	0.051000
867	0.000000	867	0.632000
868	0.000000	868	0.265000
869	0.000000	869	0.099000
870	0.000000	870	3.740000
871	0.000000	871	0.300000
872	0.000000	872	1.006000
873	0.000000	873	0.381000
874	0.000000	874	1.537000
875	0.000000	875	0.564000
876	0.000000	876	0.007000
877	0.000000	877	0.015000
878	0.000000	878	0.270000
879	0.000000	879	0.410000
880	0.000000	880	0.036000
881	0.000000	881	0.666000
882	0.000000	882	0.292000
883	0.000000	883	3.672000
884	0.000000	884	0.367000
885	0.000000	885	0.374000
886	0.000000	886	0.381000
887	0.000000	887	0.380000
888	0.000000	888	0.027000
889	0.000000	889	0.173000
890	0.000000	890	0.150000
891	0.000000	891	1.272000
892	0.000000	892	0.428000
893	0.000000	893	0.394000
894	0.000000	894	11.300000

Continua na próxima página

Coordenada x	Valor x	Coordenada z	Valor z
895	0.000000	895	5.032000
896	0.000000	896	0.891000
897	0.000000	897	0.700000
898	0.000000	898	0.388000
899	0.000000	899	0.449000
900	0.000000	900	0.187000
901	0.000000	901	0.250000
902	0.000000	902	0.503000
903	0.000000	903	0.612000
904	0.000000	904	1.428000
905	0.000000	905	0.224000
906	0.000000	906	0.700000
907	0.000000	907	0.490000
908	0.000000	908	0.632000
909	0.000000	909	0.802000
910	0.000000	910	0.380000
911	0.000000	911	2.754000
912	0.000000	912	2.278000
913	0.000000	913	0.898000
914	0.000000	914	0.843000
915	0.000000	915	0.184000
916	0.000000	916	2.278000
917	0.000000	917	1.090000
918	0.000000	918	0.315000
919	0.000000	919	5.046000
920	0.000000	920	9.900000
921	0.000000	921	1.455000
922	0.000000	922	8.439000
923	0.000000	923	2.850000
924	0.000000	924	7.743000
925	0.000000	925	3.850000
926	0.000000	926	10.962000
927	0.000000	927	4.050000
928	0.000000	928	0.570000
929	0.000000	929	2.006000
930	0.000000	930	0.800000
931	0.000000	931	0.990000
932	0.000000	932	2.822000
933	0.000000	933	1.040000
934	0.000000	934	32.190000
935	0.000000	935	18.900000
936	0.000000	936	32.799000
937	0.000000	937	0.415000
938	0.000000	938	0.286000
939	0.000000	939	0.714000
940	0.000000	940	0.235000
941	0.000000	941	0.395000
942	0.000000	942	0.374000
943	0.000000	943	6.324000

Continua na próxima página

Coordenada x	Valor x	Coordenada z	Valor z
944	0.000000	944	5.372000
945	0.000000	945	0.194000
946	0.000000	946	0.120000
947	0.000000	947	0.047000
948	0.000000	948	0.381000
949	0.000000	949	0.067000
950	0.000000	950	0.163000
951	0.000000	951	0.177000
952	0.000000	952	0.809000
953	0.000000	953	0.052000
954	0.000000	954	0.105000
955	0.000000	955	2.040000
956	0.000000	956	0.264000
957	0.000000	957	0.231000
958	0.000000	958	0.231000
959	0.000000	959	1.564000
960	0.000000	960	5.100000
961	0.000000	961	5.700000
962	0.000000	962	8.526000
963	0.000000	963	6.873000
964	0.000000	964	0.241000
965	0.000000	965	0.469000
966	0.000000	966	0.009000
967	0.000000	967	0.290000
968	0.000000	968	0.184000
969	0.000000	969	0.911000
970	0.000000	970	0.228000
971	0.000000	971	5.900000
972	0.000000	972	0.524000
973	0.000000	973	0.600000
974	0.000000	974	5.700000
975	0.000000	975	0.660000
976	0.000000	976	0.320000
977	0.000000	977	0.345000
978	0.000000	978	0.972000
979	0.000000	979	0.537000
980	0.000000	980	0.211000
981	0.000000	981	21.924000
982	0.000000	982	1.163000
983	0.000000	983	6.400000
984	0.000000	984	0.116000
985	0.000000	985	0.078000
986	0.000000	986	1.353000
987	0.000000	987	0.260000
988	0.000000	988	0.316000
989	0.000000	989	0.395000
990	0.000000	990	0.120000
991	0.000000	991	0.124000
992	0.000000	992	0.218000

Continua na próxima página

Coordenada x	Valor x	Coordenada z	Valor z
993	0.000000	993	1.870000
994	0.000000	994	10.800000
995	0.000000	995	8.700000
996	0.000000	996	8.961000
997	0.000000	997	5.400000
998	0.000000	998	0.605000
999	0.000000	999	0.966000
1000	0.000000	1000	0.843000
1001	0.000000	1001	2.482000
1002	0.000000	1002	2.550000
1003	0.000000	1003	7.700000
1004	0.000000	1004	7.500000
1005	0.000000	1005	8.636000
1006	0.000000	1006	2.700000
1007	0.000000	1007	15.747000
1008	0.000000	1008	15.747000
1009	0.000000	1009	0.231000
1010	0.000000	1010	15.660000
1011	0.000000	1011	16.356000
1012	0.000000	1012	21.924000
1013	0.000000	1013	18.270000
1014	0.000000	1014	0.993000
1015	0.000000	1015	0.469000
1016	0.000000	1016	0.585000
1017	0.000000	1017	0.449000
1018	0.000000	1018	0.598000
1019	0.000000	1019	0.335000
1020	0.000000	1020	0.100000
1021	0.000000	1021	0.018000
1022	0.000000	1022	0.483000
1023	0.000000	1023	0.055000
1024	0.000000	1024	9.135000
1025	0.000000	1025	7.395000
1026	0.000000	1026	2.856000
1027	0.000000	1027	4.896000
1028	0.000000	1028	72.080000

### 3 Variáveis Duais (Multiplicadores de Lagrange)

Tabela 2: Variáveis duais do problema seba

Coordenada y	Valor y
1	-0.000000
2	-0.000000
3	-0.000000
4	-0.000000
Continua na próxima página	

Coordenada y	Valor y
5	-0.000000
6	-0.000000
7	-0.000000
8	-0.000000
9	-0.000000
10	-0.000000
11	-0.000000
12	-0.000000
13	-0.000000
14	-0.000000
15	-0.000000
16	-0.000000
17	-0.000000
18	-0.000000
19	-0.000000
20	-0.000000
21	-0.000000
22	-0.000000
23	-0.000000
24	-0.000000
25	-0.000000
26	-0.000000
27	-0.000000
28	-0.000000
29	-0.000000
30	-0.000000
31	-0.000000
32	-0.000000
33	-0.000000
34	-0.000000
35	-0.000000
36	-0.000000
37	-0.000000
38	-0.000000
39	-0.000000
40	-0.000000
41	-0.000000
42	-0.000000
43	-0.000000
44	-0.000000
45	-0.000000
46	-0.000000
47	-0.000000
48	-0.000000
49	-0.000000
50	-0.000000
51	-0.000000
52	-0.000000
53	-0.000000
Continua na próxima página	

Coordenada y	Valor y
54	-0.000000
55	-0.000000
56	-0.000000
57	-0.000000
58	-0.000000
59	-0.000000
60	-0.000000
61	-0.000000
62	-0.000000
63	-0.000000
64	-0.000000
65	-0.000000
66	-0.000000
67	-0.000000
68	-0.000000
69	-0.000000
70	-0.000000
71	-0.000000
72	-0.000000
73	-0.000000
74	-0.000000
75	-0.000000
76	-0.000000
77	-0.000000
78	-0.000000
79	-0.000000
80	-0.000000
81	-0.000000
82	-0.000000
83	-0.000000
84	-0.000000
85	-0.000000
86	-0.000000
87	-0.000000
88	-0.000000
89	-0.000000
90	-0.000000
91	-0.000000
92	-0.000000
93	-0.000000
94	-0.000000
95	-0.000000
96	-0.000000
97	-0.000000
98	-0.000000
99	-0.000000
100	-0.000000
101	-0.000000
102	-0.000000
Continua na próxima página	



Coordenada y	Valor y
103	-0.000000
104	-0.000000
105	-0.000000
106	-0.000000
107	-0.000000
108	-0.000000
109	-0.000000
110	-0.000000
111	-0.000000
112	-0.000000
113	-0.000000
114	-0.000000
115	-0.000000
116	-0.000000
117	-0.000000
118	-0.000000
119	-0.000000
120	-0.000000
121	-0.000000
122	-0.000000
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Coordenada y	Valor y
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510	268.600000
511	194.400000
512	129.400000
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## 4 Observações

- O solver HiGHS foi configurado com o método IPM (Interior Point Method).
- Este arquivo contém a solução detalhada para o problema seba.
- As variáveis duais representam os multiplicadores de Lagrange das restrições.
- Os custos reduzidos ( $z$ ) indicam o impacto de forçar variáveis não-básicas na base.