

Solução do Problema scfxm2 - Solver HiGHS

Análise Computacional

16 de setembro de 2025

1 Informações do Problema

Informações do Problema:

- Nome: scfxm2
- Número de Variáveis: 914
- Número de Restrições: 660
- Inviabilidade Primal: 5.500e-15
- Inviabilidade Dual: 0.000e+00
- Valor Primal: 3.666e+04
- Valor Dual: 3.666e+04
- Gap: 0.000e+00
- Número de Iterações: 22

2 Variáveis Primais e Custos Reduzidos

Tabela 1: Variáveis primais e custos reduzidos do problema scfxm2

Coordenada x	Valor x	Coordenada z	Valor z
1	2.438808	1	0.000000
2	0.000000	2	3.873700
3	53.240649	3	0.000000
4	0.000000	4	0.000000
5	5.850000	5	0.000000
6	33.321192	6	0.000000
7	0.000000	7	3.873700
8	112.926004	8	0.000000
9	0.000000	9	0.000000
10	24.519351	10	0.000000
11	9.040099	11	0.000000
12	22.906869	12	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
13	24.000000	13	0.000000
14	48.000000	14	0.000000
15	0.000000	15	3.260000
16	55.200000	16	0.000000
17	105.000000	17	0.000000
18	14.748993	18	0.000000
19	58.032275	19	0.000000
20	0.000000	20	0.049034
21	0.000000	21	0.657106
22	43.507468	22	0.000000
23	102.503568	23	0.000000
24	0.000000	24	10.030525
25	513.300017	25	0.000000
26	21.504651	26	0.000000
27	0.750000	27	0.000000
28	1.740615	28	0.000000
29	54.378686	29	0.000000
30	0.000000	30	1.939189
31	4.950000	31	0.000000
32	28.800000	32	0.000000
33	11.250000	33	0.000000
34	0.000000	34	0.000000
35	30.483150	35	0.000000
36	45.000000	36	0.000000
37	204.390000	37	0.000000
38	155.107946	38	0.000000
39	15.184554	39	0.000000
40	34.378779	40	0.000000
41	59.596911	41	0.000000
42	0.000000	42	0.237138
43	0.000000	43	6.922185
44	240.000000	44	0.000000
45	0.000000	45	6.879884
46	0.000000	46	6.879601
47	61.789799	47	0.000000
48	310.043757	48	0.000000
49	0.000000	49	7.112880
50	480.000000	50	0.000000
51	0.000000	51	7.070579
52	3950.037096	52	0.000000
53	0.000000	53	7.056101
54	60.254265	54	0.000000
55	16.575728	55	0.000000
56	39.678210	56	0.000000
57	0.000000	57	4.863763
58	48.647356	58	0.000000
59	174.703322	59	0.000000
60	51.443203	60	0.000000
61	0.000000	61	0.227031

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Coordenada x	Valor x	Coordenada z	Valor z
62	44.099117	62	0.000000
63	0.000000	63	0.424865
64	0.000000	64	0.218447
65	0.000000	65	5.863474
66	5.164376	66	0.000000
67	38.269891	67	0.000000
68	1102.945742	68	0.000000
69	38.905431	69	0.000000
70	0.000000	70	0.013373
71	5.387873	71	0.000000
72	31.247590	72	0.000000
73	79.534754	73	0.000000
74	0.000000	74	0.287779
75	0.000000	75	0.451949
76	71.723757	76	0.000000
77	26.304316	77	0.000000
78	274.640731	78	0.000000
79	0.000000	79	5.565649
80	16.040023	80	0.000000
81	83.480175	81	0.000000
82	302.712079	82	0.000000
83	0.000000	83	1.033675
84	0.000000	84	1.323330
85	3.610731	85	0.000000
86	4.444208	86	0.000000
87	0.000000	87	2.427829
88	0.827312	88	0.000000
89	0.000000	89	2.276342
90	0.000000	90	2.262844
91	6.112373	91	0.000000
92	0.000000	92	4.413577
93	0.000000	93	3.873700
94	0.000000	94	4.994098
95	0.000000	95	4.345453
96	0.000000	96	1.383789
97	74.246850	97	0.000000
98	0.000000	98	0.886258
99	1.064398	99	0.000000
100	15.399001	100	0.000000
101	31.356815	101	0.000000
102	42.874128	102	0.000000
103	55.200000	103	0.000000
104	24.000000	104	0.000000
105	0.000000	105	2.285806
106	0.000000	106	3.432862
107	0.000000	107	4.863763
108	0.000000	108	4.769677
109	3.000000	109	0.000000
110	0.000000	110	7.346744

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Coordenada x	Valor x	Coordenada z	Valor z
111	480.000000	111	0.000000
112	0.000000	112	7.323229
113	36.858349	113	0.000000
114	0.000000	114	7.325452
115	71.723757	115	0.000000
116	145.000000	116	0.000000
117	480.000000	117	0.000000
118	55.679457	118	0.000000
119	280.563514	119	0.000000
120	5.666543	120	0.000000
121	12.354000	121	0.000000
122	0.000000	122	0.012057
123	3.321600	123	0.000000
124	10.323457	124	0.000000
125	0.000000	125	0.041654
126	0.000000	126	4.035500
127	0.000000	127	3.833800
128	13.084740	128	0.000000
129	3.741444	129	0.000000
130	0.000000	130	0.189216
131	6.150000	131	0.000000
132	-0.000000	132	0.000000
133	1.691075	133	0.000000
134	-0.000000	134	0.000000
135	0.000000	135	0.184449
136	2.696581	136	0.000000
137	0.000000	137	0.091743
138	8.934987	138	0.000000
139	21.930000	139	0.000000
140	0.000000	140	0.869931
141	0.000000	141	0.347305
142	0.000000	142	0.085088
143	10.490750	143	0.000000
144	0.000000	144	0.032113
145	0.000000	145	0.220368
146	2.504262	146	0.000000
147	48.462000	147	0.000000
148	55.114920	148	0.000000
149	0.000000	149	1.493577
150	0.000000	150	0.970952
151	0.000000	151	0.708734
152	0.000000	152	0.623647
153	0.000000	153	0.030660
154	0.000000	154	0.044545
155	23.271600	155	0.000000
156	16.353750	156	0.000000
157	0.000000	157	0.125515
158	0.000000	158	0.128939
159	0.000000	159	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
160	-0.000000	160	0.000000
161	4.500000	161	0.000000
162	0.000000	162	0.000000
163	37.903737	163	0.000000
164	34.160000	164	0.000000
165	3.108748	165	0.000000
166	3.827107	166	0.000000
167	5.929615	167	0.000000
168	1.213065	168	0.000000
169	6.396776	169	0.000000
170	-0.000000	170	0.000000
171	123.000000	171	0.000000
172	-0.000000	172	0.000000
173	147.000000	173	0.000000
174	6.655280	174	0.000000
175	31.615952	175	0.000000
176	5.656923	176	0.000000
177	6.148829	177	0.000000
178	0.000000	178	0.424015
179	793.541834	179	0.000000
180	2.152204	180	0.000000
181	6.518693	181	0.000000
182	0.000000	182	3.575007
183	26.767702	183	0.000000
184	18.223543	184	0.000000
185	0.000000	185	0.051585
186	4.756252	186	0.000000
187	6.388319	187	0.000000
188	0.000000	188	0.177683
189	0.000000	189	5.174674
190	3.173589	190	0.000000
191	117.579781	191	0.000000
192	-0.000000	192	0.000000
193	27.060000	193	0.000000
194	15.999132	194	0.000000
195	150.600000	195	0.000000
196	-0.000000	196	0.000000
197	18.375000	197	0.000000
198	5.800308	198	0.000000
199	16.026394	199	0.000000
200	-0.000000	200	0.000000
201	56.349225	201	0.000000
202	0.000000	202	5.012800
203	2.775412	203	0.000000
204	0.000000	204	0.172283
205	177.882900	205	0.000000
206	0.000000	206	0.215885
207	10.979080	207	0.000000
208	13.530000	208	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
209	8.426633	209	0.000000
210	0.000000	210	0.173741
211	0.000000	211	0.099616
212	0.000000	212	0.168508
213	1.708157	213	0.000000
214	71.723757	214	0.000000
215	0.000000	215	0.000000
216	0.000000	216	0.000000
217	0.000000	217	0.000000
218	-0.000000	218	0.000000
219	0.000000	219	0.000000
220	0.000000	220	0.000000
221	-0.000000	221	0.000000
222	-0.000000	222	0.000000
223	0.000000	223	3.873700
224	64.800000	224	0.000000
225	0.000000	225	6.511419
226	89.800000	226	0.000000
227	0.000000	227	3.873700
228	119.200000	228	0.000000
229	0.000000	229	3.780000
230	219.200000	230	0.000000
231	0.000000	231	0.195340
232	25.000000	232	0.000000
233	59.900000	233	0.000000
234	84.900000	234	0.000000
235	0.000000	235	0.945649
236	100.000000	236	0.000000
237	103.500000	237	0.000000
238	203.500000	238	0.000000
239	0.000000	239	3.873700
240	44.500000	240	0.000000
241	0.000000	241	4.035500
242	0.000000	242	6.511419
243	69.500000	243	0.000000
244	0.000000	244	3.873700
245	25.000000	245	0.000000
246	0.000000	246	3.833800
247	0.000000	247	3.780000
248	55.000000	248	0.000000
249	0.000000	249	0.688800
250	25.000000	250	0.000000
251	19.000000	251	0.000000
252	0.000000	252	0.493460
253	44.000000	253	0.000000
254	0.000000	254	0.945649
255	50.000000	255	0.000000
256	1.851031	256	0.000000
257	39.848969	257	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
258	91.700000	258	0.000000
259	5.200000	259	0.000000
260	19.800000	260	0.000000
261	0.000000	261	2.731419
262	24.763514	262	0.000000
263	0.000000	263	0.005000
264	50.236486	264	0.000000
265	0.000000	265	0.101640
266	0.000000	266	0.050000
267	50.000000	267	0.000000
268	0.000000	268	0.851949
269	0.000000	269	0.050000
270	150.000000	270	0.000000
271	0.000000	271	0.060000
272	25.000000	272	0.000000
273	0.000000	273	2.781419
274	0.000000	274	0.055000
275	75.000000	275	0.000000
276	0.000000	276	0.045000
277	0.000000	277	0.111640
278	34.900000	278	0.000000
279	15.100000	279	0.000000
280	0.000000	280	0.861949
281	3.500000	281	0.000000
282	196.500000	282	0.000000
283	0.000000	283	0.005000
284	20.000000	284	0.000000
285	0.000000	285	2.847719
286	5.800000	286	0.000000
287	44.200000	287	0.000000
288	0.000000	288	0.111300
289	0.000000	289	0.056640
290	25.000000	290	0.000000
291	0.000000	291	0.066300
292	0.000000	292	0.806949
293	100.000000	293	0.000000
294	0.000000	294	0.066300
295	10.000000	295	0.000000
296	0.000000	296	0.071300
297	0.000000	297	2.852719
298	40.000000	298	0.000000
299	0.000000	299	0.076300
300	0.000000	300	0.121300
301	25.000000	301	0.000000
302	0.000000	302	0.019660
303	0.000000	303	0.019660
304	0.000000	304	0.730649
305	0.000000	305	0.000000
306	100.000000	306	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
307	0.000000	307	0.086500
308	34.979457	308	0.000000
309	15.020543	309	0.000000
310	0.000000	310	2.453119
311	0.000000	311	0.373000
312	0.000000	312	0.188800
313	0.000000	313	0.077500
314	150.000000	314	0.000000
315	0.000000	315	0.911100
316	9.000000	316	0.000000
317	41.000000	317	0.000000
318	0.000000	318	0.474160
319	0.000000	319	1.187249
320	0.000000	320	0.116000
321	0.000000	321	0.019300
322	200.000000	322	0.000000
323	10.479457	323	0.000000
324	9.520543	324	0.000000
325	0.000000	325	0.108000
326	0.000000	326	2.636619
327	0.000000	327	0.095100
328	25.000000	328	0.000000
329	11.008898	329	0.000000
330	13.991102	330	0.000000
331	0.000000	331	0.834100
332	10.000000	332	0.000000
333	0.000000	333	0.096700
334	0.000000	334	0.639160
335	0.000000	335	0.994249
336	41.700000	336	0.000000
337	8.300000	337	0.000000
338	0.000000	338	0.049000
339	220.335686	339	0.000000
340	0.000000	340	6.511419
341	0.000000	341	3.780000
342	0.000000	342	3.470576
343	70.229151	343	0.000000
344	1.000663	344	0.000000
345	0.000000	345	1.531250
346	0.000000	346	0.547400
347	1.007734	347	0.000000
348	9.301121	348	0.000000
349	0.000000	349	1.993434
350	9.301121	350	0.000000
351	9.177106	351	0.000000
352	1.469200	352	0.000000
353	34.407491	353	0.000000
354	0.000000	354	8.049881
355	-0.000000	355	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
356	248.029893	356	0.000000
357	0.000000	357	4.515200
358	1.333160	358	0.000000
359	0.000000	359	1.682838
360	-0.000000	360	0.000000
361	0.000000	361	1.861947
362	0.000000	362	2.829007
363	0.000000	363	0.127497
364	0.000000	364	3.235742
365	0.000000	365	1.152972
366	0.000000	366	2.637633
367	0.000000	367	0.762833
368	0.000000	368	1.853235
369	0.000000	369	0.242494
370	0.000000	370	1.377458
371	26.028110	371	0.000000
372	0.000000	372	4.459421
373	0.000000	373	2.072461
374	0.000000	374	3.672100
375	0.000000	375	1.618712
376	0.000000	376	2.858087
377	0.000000	377	1.139011
378	0.000000	378	2.295495
379	0.000000	379	0.890383
380	0.000000	380	0.476659
381	0.000000	381	0.638019
382	0.000000	382	0.368813
383	0.000000	383	0.536120
384	0.000000	384	1.313179
385	0.000000	385	1.489992
386	26.028110	386	0.000000
387	10.322247	387	0.000000
388	17.122621	388	0.000000
389	0.000000	389	1.191673
390	28.879767	390	0.000000
391	0.000000	391	1.761750
392	3.794378	392	0.000000
393	0.068664	393	0.000000
394	0.000000	394	5.236376
395	1.247397	395	0.000000
396	50.650991	396	0.000000
397	0.000000	397	1.768800
398	4.520609	398	0.000000
399	14561.358333	399	0.000000
400	13.586441	400	0.000000
401	0.000000	401	3.140656
402	0.000000	402	2.596815
403	0.000000	403	2.173673
404	0.000000	404	2.006756

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Coordenada x	Valor x	Coordenada z	Valor z
405	13.666840	405	0.000000
406	0.488632	406	0.000000
407	2.726849	407	0.000000
408	2.167715	408	0.000000
409	0.000000	409	0.103777
410	0.000000	410	5.668134
411	240.658926	411	0.000000
412	4.770849	412	0.000000
413	0.070501	413	0.000000
414	50.863850	414	0.000000
415	280.169193	415	0.000000
416	10.907395	416	0.000000
417	6.316088	417	0.000000
418	47.390681	418	0.000000
419	0.000000	419	0.300619
420	0.000000	420	0.730621
421	0.000000	421	1.395262
422	0.000000	422	2.340600
423	3.424549	423	0.000000
424	138.682068	424	0.000000
425	1.118209	425	0.000000
426	0.000000	426	7.719038
427	0.000000	427	44.578226
428	0.000000	428	6.917592
429	0.000000	429	0.597122
430	0.000000	430	1.074087
431	0.000000	431	0.655888
432	4.138470	432	0.000000
433	4.300936	433	0.000000
434	0.000000	434	5.109629
435	5.127538	435	0.000000
436	0.000000	436	1.799481
437	0.000000	437	50.428350
438	0.000000	438	4.620000
439	7.514742	439	0.000000
440	12094.302449	440	0.000000
441	0.000000	441	33.467065
442	12924.140805	442	0.000000
443	554.728273	443	0.000000
444	0.565331	444	0.000000
445	1.596478	445	0.000000
446	62.422636	446	0.000000
447	-0.000000	447	0.000000
448	-0.000000	448	0.000000
449	121.120233	449	0.000000
450	722.988343	450	0.000000
451	30.000000	451	0.000000
452	365.273151	452	0.000000
453	1701.166901	453	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
454	1.952108	454	0.000000
455	0.000000	455	0.227402
456	0.000000	456	0.564703
457	0.000000	457	0.100000
458	35.760000	458	0.000000
459	0.000000	459	3.873700
460	23.868287	460	0.000000
461	0.000000	461	0.000000
462	0.000000	462	0.000000
463	0.000000	463	0.000000
464	0.000000	464	3.873700
465	112.216131	465	0.000000
466	5.850000	466	0.000000
467	53.891713	467	0.000000
468	8.962017	468	0.000000
469	22.548347	469	0.000000
470	24.000000	470	0.000000
471	48.000000	471	0.000000
472	0.000000	472	3.260000
473	55.200000	473	0.000000
474	105.000000	474	0.000000
475	12.085807	475	0.000000
476	70.954762	476	0.000000
477	11.144446	477	0.000000
478	0.000000	478	1.456611
479	51.176471	479	0.000000
480	101.355554	480	0.000000
481	0.000000	481	9.937010
482	510.073323	482	0.000000
483	20.203663	483	0.000000
484	0.750000	484	0.000000
485	1.239893	485	0.000000
486	50.793470	486	0.000000
487	0.000000	487	1.912518
488	10.800000	488	0.000000
489	22.950000	489	0.000000
490	11.250000	490	0.000000
491	0.000000	491	0.000000
492	30.570500	492	0.000000
493	45.000000	493	0.000000
494	204.390000	494	0.000000
495	133.857774	495	0.000000
496	13.606791	496	0.000000
497	32.098783	497	0.000000
498	80.395898	498	0.000000
499	0.000000	499	3.670000
500	0.000000	500	6.887927
501	240.000000	501	0.000000
502	0.000000	502	6.877341

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Coordenada x	Valor x	Coordenada z	Valor z
503	0.000000	503	6.847886
504	0.000000	504	1.233249
505	283.847398	505	0.000000
506	0.000000	506	7.077774
507	480.000000	507	0.000000
508	0.000000	508	7.067188
509	3738.896385	509	0.000000
510	0.000000	510	7.024386
511	40.703913	511	0.000000
512	0.000000	512	0.906156
513	66.494433	513	0.000000
514	0.000000	514	0.274967
515	48.102518	515	0.000000
516	173.237005	516	0.000000
517	47.314197	517	0.000000
518	0.000000	518	0.308189
519	51.782920	519	0.000000
520	0.000000	520	0.839231
521	0.000000	521	0.207539
522	0.000000	522	5.768970
523	0.000000	523	0.141742
524	45.000000	524	0.000000
525	1088.957076	525	0.000000
526	17.145532	526	0.000000
527	154.339711	527	0.000000
528	3.757351	528	0.000000
529	37.500000	529	0.000000
530	82.532467	530	0.000000
531	0.000000	531	0.332619
532	0.000000	532	0.266728
533	45.527398	533	0.000000
534	25.736403	534	0.000000
535	272.482368	535	0.000000
536	0.000000	536	5.541093
537	18.622739	537	0.000000
538	80.626023	538	0.000000
539	308.240887	539	0.000000
540	0.000000	540	0.803095
541	0.000000	541	1.425952
542	4.144854	542	0.000000
543	3.980186	543	0.000000
544	0.000000	544	3.605517
545	0.900835	545	0.000000
546	0.000000	546	2.488918
547	0.000000	547	2.675144
548	6.115795	548	0.000000
549	0.000000	549	3.703262
550	0.000000	550	3.873700
551	0.000000	551	4.311110

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Coordenada x	Valor x	Coordenada z	Valor z
552	0.000000	552	3.721304
553	0.000000	553	0.192330
554	74.159500	554	0.000000
555	0.000000	555	1.165257
556	1.050416	556	0.000000
557	15.302200	557	0.000000
558	26.410898	558	0.000000
559	41.895120	559	0.000000
560	55.200000	560	0.000000
561	24.000000	561	0.000000
562	0.000000	562	2.532556
563	13.450300	563	0.000000
564	0.000000	564	0.274967
565	10.679830	565	0.000000
566	3.000000	566	0.000000
567	0.000000	567	7.327360
568	480.000000	568	0.000000
569	0.000000	569	7.321983
570	25.345146	570	0.000000
571	0.000000	571	7.307339
572	45.527398	572	0.000000
573	120.000000	573	0.000000
574	480.000000	574	0.000000
575	59.628287	575	0.000000
576	275.468208	576	0.000000
577	1.717713	577	0.000000
578	12.354000	578	0.000000
579	0.000000	579	0.264686
580	3.321600	580	0.000000
581	14.272287	581	0.000000
582	0.000000	582	0.105816
583	0.000000	583	4.035500
584	0.000000	584	3.833800
585	13.084740	585	0.000000
586	8.389140	586	0.000000
587	-0.000000	587	0.000000
588	6.150000	588	0.000000
589	-0.000000	589	0.000000
590	6.839910	590	0.000000
591	1.240800	591	0.000000
592	0.000000	592	0.093412
593	0.000000	593	0.010866
594	0.000000	594	0.119091
595	3.033958	595	0.000000
596	21.930000	596	0.000000
597	0.000000	597	0.407484
598	0.000000	598	0.547121
599	0.000000	599	0.529289
600	10.490750	600	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
601	10.979080	601	0.000000
602	0.000000	602	0.394967
603	0.000000	603	0.310592
604	48.462000	604	0.000000
605	55.114920	605	0.000000
606	0.000000	606	0.783262
607	0.000000	607	1.003445
608	0.000000	608	0.984437
609	0.000000	609	0.449857
610	0.000000	610	0.017412
611	0.000000	611	0.028783
612	23.271600	612	0.000000
613	16.353750	613	0.000000
614	0.000000	614	0.125515
615	0.000000	615	0.128939
616	0.000000	616	0.000000
617	0.000000	617	0.057748
618	4.500000	618	0.000000
619	0.000000	619	0.057748
620	37.926210	620	0.000000
621	34.160000	621	0.000000
622	3.108748	622	0.000000
623	0.373207	623	0.000000
624	5.929615	624	0.000000
625	4.666966	625	0.000000
626	6.399794	626	0.000000
627	-0.000000	627	0.000000
628	123.000000	628	0.000000
629	-0.000000	629	0.000000
630	147.000000	630	0.000000
631	6.556959	631	0.000000
632	29.689074	632	0.000000
633	5.656923	633	0.000000
634	6.148829	634	0.000000
635	0.000000	635	0.424015
636	793.528127	636	0.000000
637	2.155222	637	0.000000
638	6.518693	638	0.000000
639	0.000000	639	3.575007
640	27.025869	640	0.000000
641	18.139939	641	0.000000
642	0.000000	642	0.113998
643	4.756252	643	0.000000
644	6.388319	644	0.000000
645	0.000000	645	0.146872
646	0.000000	646	5.085646
647	3.170178	647	0.000000
648	125.558291	648	0.000000
649	-0.000000	649	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
650	27.060000	650	0.000000
651	16.063673	651	0.000000
652	150.600000	652	0.000000
653	-0.000000	653	0.000000
654	18.375000	654	0.000000
655	5.800308	655	0.000000
656	16.109997	656	0.000000
657	-0.000000	657	0.000000
658	56.349225	658	0.000000
659	0.000000	659	5.012800
660	2.781631	660	0.000000
661	0.000000	661	0.244478
662	178.022475	662	0.000000
663	2.573789	663	0.000000
664	0.000000	664	0.396452
665	13.530000	665	0.000000
666	7.112203	666	0.000000
667	0.000000	667	0.110644
668	1.253333	668	0.000000
669	0.000000	669	0.082673
670	6.909000	670	0.000000
671	45.527398	671	0.000000
672	0.000000	672	0.000000
673	0.000000	673	0.000000
674	-0.000000	674	0.000000
675	-0.000000	675	0.000000
676	0.000000	676	0.000000
677	0.000000	677	0.000000
678	-0.000000	678	0.000000
679	-0.000000	679	0.000000
680	0.000000	680	3.873700
681	64.800000	681	0.000000
682	0.000000	682	4.200000
683	89.800000	683	0.000000
684	0.000000	684	3.873700
685	119.200000	685	0.000000
686	0.000000	686	3.780000
687	219.200000	687	0.000000
688	0.000000	688	0.308970
689	25.000000	689	0.000000
690	59.900000	690	0.000000
691	84.900000	691	0.000000
692	0.000000	692	0.921093
693	100.000000	693	0.000000
694	103.500000	694	0.000000
695	203.500000	695	0.000000
696	0.000000	696	3.873700
697	44.500000	697	0.000000
698	0.000000	698	4.035500

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Coordenada x	Valor x	Coordenada z	Valor z
699	0.000000	699	4.200000
700	69.500000	700	0.000000
701	0.000000	701	3.873700
702	25.000000	702	0.000000
703	0.000000	703	3.833800
704	0.000000	704	3.780000
705	55.000000	705	0.000000
706	0.000000	706	0.683324
707	25.000000	707	0.000000
708	19.000000	708	0.000000
709	0.000000	709	0.374354
710	44.000000	710	0.000000
711	0.000000	711	0.921093
712	50.000000	712	0.000000
713	1.940853	713	0.000000
714	39.759147	714	0.000000
715	91.700000	715	0.000000
716	5.200000	716	0.000000
717	19.800000	717	0.000000
718	0.000000	718	0.420000
719	19.668208	719	0.000000
720	0.000000	720	0.005000
721	55.331792	721	0.000000
722	0.000000	722	0.215270
723	0.000000	723	0.050000
724	50.000000	724	0.000000
725	0.000000	725	0.827393
726	0.000000	726	0.050000
727	150.000000	727	0.000000
728	0.000000	728	0.060000
729	25.000000	729	0.000000
730	0.000000	730	0.470000
731	0.000000	731	0.055000
732	75.000000	732	0.000000
733	0.000000	733	0.045000
734	0.000000	734	0.225270
735	9.900000	735	0.000000
736	40.100000	736	0.000000
737	0.000000	737	0.837393
738	3.500000	738	0.000000
739	196.500000	739	0.000000
740	0.000000	740	0.005000
741	20.000000	741	0.000000
742	0.000000	742	0.536300
743	5.800000	743	0.000000
744	44.200000	744	0.000000
745	0.000000	745	0.111300
746	0.000000	746	0.170270
747	25.000000	747	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
748	0.000000	748	0.066300
749	0.000000	749	0.782393
750	100.000000	750	0.000000
751	0.000000	751	0.066300
752	10.000000	752	0.000000
753	0.000000	753	0.071300
754	0.000000	754	0.541300
755	40.000000	755	0.000000
756	0.000000	756	0.076300
757	0.000000	757	0.121300
758	0.000000	758	0.093970
759	25.000000	759	0.000000
760	0.000000	760	0.000000
761	0.000000	761	0.706093
762	0.000000	762	0.000000
763	100.000000	763	0.000000
764	0.000000	764	0.086500
765	38.928287	765	0.000000
766	11.071713	766	0.000000
767	0.000000	767	0.141700
768	0.000000	768	0.373000
769	0.000000	769	0.188800
770	0.000000	770	0.077500
771	150.000000	771	0.000000
772	0.000000	772	0.905624
773	9.000000	773	0.000000
774	41.000000	774	0.000000
775	0.000000	775	0.355054
776	0.000000	776	1.162693
777	0.000000	777	0.116000
778	0.000000	778	0.019300
779	200.000000	779	0.000000
780	14.428287	780	0.000000
781	5.571713	781	0.000000
782	0.000000	782	0.108000
783	0.000000	783	0.325200
784	0.000000	784	0.095100
785	25.000000	785	0.000000
786	23.298477	786	0.000000
787	1.701523	787	0.000000
788	0.000000	788	0.828624
789	10.000000	789	0.000000
790	0.000000	790	0.096700
791	0.000000	791	0.520054
792	0.000000	792	0.969693
793	41.700000	793	0.000000
794	8.300000	794	0.000000
795	0.000000	795	0.049000
796	226.165858	796	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
797	0.000000	797	4.200000
798	0.000000	798	3.780000
799	0.000000	799	5.556551
800	75.000000	800	0.000000
801	0.996056	801	0.000000
802	0.000000	802	1.531250
803	0.000000	803	0.547400
804	1.087482	804	0.000000
805	7.445578	805	0.000000
806	0.000000	806	2.744073
807	9.404522	807	0.000000
808	9.279128	808	0.000000
809	1.488498	809	0.000000
810	34.859427	810	0.000000
811	0.000000	811	7.809899
812	-0.000000	812	0.000000
813	250.787241	813	0.000000
814	0.000000	814	4.515200
815	1.333160	815	0.000000
816	4.466701	816	0.000000
817	8.933402	817	0.000000
818	0.000000	818	1.945200
819	0.000000	819	2.995200
820	0.000000	820	0.464794
821	0.000000	821	3.605097
822	0.000000	822	1.154033
823	0.000000	823	3.110442
824	0.000000	824	0.883029
825	0.000000	825	2.005667
826	0.000000	826	0.136236
827	0.000000	827	1.609275
828	26.028110	828	0.000000
829	0.000000	829	4.741388
830	0.000000	830	2.040502
831	0.000000	831	4.073639
832	0.000000	832	1.688243
833	0.000000	833	2.993763
834	0.000000	834	1.006275
835	0.000000	835	2.499237
836	0.000000	836	0.846021
837	0.000000	837	0.478335
838	0.000000	838	0.579809
839	0.000000	839	0.356387
840	0.000000	840	0.468801
841	0.000000	841	1.289351
842	0.000000	842	1.413602
843	26.028110	843	0.000000
844	10.457828	844	0.000000
845	17.555107	845	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
846	0.000000	846	1.274926
847	18.653194	847	0.000000
848	0.000000	848	1.761750
849	3.794378	849	0.000000
850	0.000000	850	0.143637
851	0.000000	851	5.388483
852	1.247397	852	0.000000
853	51.758461	853	0.000000
854	0.000000	854	3.240200
855	4.581299	855	0.000000
856	14498.067384	856	0.000000
857	13.683895	857	0.000000
858	0.000000	858	9.142374
859	0.000000	859	8.165710
860	0.000000	860	7.498875
861	0.000000	861	7.397903
862	13.666840	862	0.000000
863	-0.000000	863	0.000000
864	-0.000000	864	0.000000
865	0.000000	865	0.000000
866	0.000000	866	9.528192
867	0.000000	867	5.460000
868	-0.000000	868	0.000000
869	0.000000	869	3.181783
870	-0.000000	870	0.000000
871	49.229795	871	0.000000
872	-0.000000	872	0.000000
873	-0.000000	873	0.000000
874	5.938359	874	0.000000
875	49.171721	875	0.000000
876	0.000000	876	0.027407
877	0.000000	877	0.167851
878	0.000000	878	0.495904
879	0.000000	879	1.098288
880	3.921328	880	0.000000
881	149.915938	881	0.000000
882	1.120259	882	0.000000
883	0.000000	883	2.351260
884	0.000000	884	33.716515
885	0.000000	885	9.861265
886	1.958944	886	0.000000
887	0.000000	887	1.937567
888	0.000000	888	1.848617
889	4.138470	889	0.000000
890	4.357428	890	0.000000
891	0.000000	891	5.178483
892	5.127538	892	0.000000
893	0.000000	893	3.654304
894	0.000000	894	31.171082

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Coordenada x	Valor x	Coordenada z	Valor z
895	0.000000	895	4.620000
896	9.682457	896	0.000000
897	13072.353014	897	0.000000
898	0.000000	898	19.876895
899	13971.874096	899	0.000000
900	599.663753	900	0.000000
901	0.565331	901	0.000000
902	0.000000	902	2.949462
903	38.081820	903	0.000000
904	-0.000000	904	0.000000
905	0.000000	905	0.709794
906	131.346806	906	0.000000
907	701.825900	907	0.000000
908	30.000000	908	0.000000
909	393.000000	909	0.000000
910	1689.843209	910	0.000000
911	1.952108	911	0.000000
912	0.000000	912	0.245000
913	0.000000	913	0.388637
914	0.000000	914	0.100000

3 Variáveis Duais (Multiplicadores de Lagrange)

Tabela 2: Variáveis duais do problema scfxm2

Coordenada y	Valor y
1	-2.670000
2	-2.183235
3	-4.226195
4	-3.297607
5	-0.126024
6	-4.803333
7	-4.877187
8	-1.383789
9	-5.392240
10	-3.873700
11	-3.873700
12	-3.873700
13	-3.873700
14	-3.873700
15	-3.873700
16	-5.812889
17	-7.772030
18	-4.814296
19	-2.670000
20	-4.000000

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Coordenada y	Valor y
21	-3.703108
22	-0.136437
23	-4.997187
24	-3.873700
25	-0.000000
26	-1.361877
27	-0.230000
28	-0.001100
29	0.286678
30	-0.000000
31	-0.000000
32	-3.776682
33	-8.950000
34	-6.780000
35	-8.682900
36	-0.000000
37	-0.000000
38	-0.000000
39	-0.000000
40	-0.000000
41	-3.873700
42	-4.345453
43	-0.000000
44	-0.000000
45	-0.000000
46	-0.000000
47	0.702900
48	-0.085042
49	-0.172326
50	-0.000000
51	-0.049695
52	-0.147956
53	-0.000000
54	-3.873700
55	-0.000000
56	-0.000000
57	-0.000000
58	-0.000000
59	-0.000000
60	-0.000000
61	3.873700
62	-0.000000
63	-0.000000
64	-0.000000
65	1.634098
66	0.159185
67	-0.000000
68	2.670000
69	-0.000000

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Coordenada y	Valor y
70	-2.117187
71	0.099070
72	-4.530738
73	-5.009398
74	-4.761754
75	-25.000000
76	-4.699265
77	0.112870
78	-4.272389
79	-5.099070
80	0.112870
81	-2.285806
82	-4.769677
83	-3.432862
84	-4.863763
85	-0.000000
86	-0.000000
87	-0.000000
88	-0.000000
89	-0.000000
90	1.000000
91	1.000000
92	1.000000
93	-4.413577
94	-3.575760
95	-5.547842
96	-0.000000
97	5.000000
98	5.863474
99	5.565649
100	3.873700
101	3.873700
102	1.000000
103	1.000000
104	1.000000
105	-3.447761
106	-2.273799
107	-2.773338
108	0.120000
109	-0.290373
110	-3.253151
111	-4.765244
112	-4.273592
113	-4.422521
114	-4.035500
115	-4.035500
116	-3.663647
117	-3.748734
118	-3.884015

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Coordenada y	Valor y
119	-4.010952
120	-4.027915
121	-4.052581
122	-3.695760
123	-4.533577
124	-3.447761
125	-4.280907
126	-4.463606
127	-4.007844
128	-4.007844
129	-0.176181
130	-5.150209
131	-5.111039
132	-5.021757
133	-3.663647
134	-3.755390
135	-3.663647
136	-3.824478
137	-3.768346
138	-0.000000
139	0.381597
140	4.028586
141	-0.000000
142	3.663647
143	-0.000000
144	-0.000000
145	-0.000000
146	-0.003926
147	-0.003312
148	-0.093426
149	-0.095348
150	-0.065267
151	-0.041428
152	-0.094931
153	-0.068678
154	-0.000000
155	-3.663647
156	-3.876862
157	-0.225875
158	-0.886977
159	-0.000000
160	-0.000000
161	-0.000000
162	-3.447761
163	0.304015
164	-2.310000
165	-0.120000
166	-2.885978
167	-3.270992

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Coordenada y	Valor y
168	-4.251747
169	-4.372387
170	-1.000000
171	-0.000000
172	-0.000000
173	-0.000000
174	-0.000000
175	5.174674
176	4.035500
177	3.833800
178	4.620000
179	-5.000000
180	5.863474
181	5.565649
182	3.873700
183	3.873700
184	-1.000000
185	5.904434
186	4.856300
187	4.016300
188	4.016300
189	-7.085167
190	-5.601260
191	-0.000000
192	-0.000000
193	-5.954434
194	-4.906300
195	-4.016300
196	-4.021300
197	-0.286300
198	-0.286300
199	-4.016300
200	-4.021300
201	-0.141703
202	-0.098126
203	-7.794835
204	-6.987000
205	-0.000000
206	-0.000000
207	-5.305974
208	-4.848000
209	-4.182200
210	-4.096100
211	-0.131300
212	-0.228000
213	-4.182200
214	-4.096100
215	-0.262016
216	-0.236700

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Coordenada y	Valor y
217	5.954434
218	4.906300
219	4.016300
220	4.021300
221	5.954434
222	4.906300
223	4.016300
224	4.021300
225	5.934774
226	4.906300
227	3.945000
228	3.945000
229	5.305974
230	4.732000
231	4.182200
232	3.907300
233	5.305974
234	4.848000
235	4.182200
236	4.096100
237	-5.668134
238	-4.620000
239	-5.174674
240	-4.620000
241	5.000000
242	5.668134
243	4.620000
244	6.511419
245	3.780000
246	-0.350000
247	-5.104568
248	-1.890000
249	-11.821899
250	-3.255000
251	-1.513750
252	-0.649035
253	-0.212835
254	-0.123673
255	-0.000000
256	-0.000000
257	-0.061744
258	-0.000000
259	-0.000000
260	-0.003735
261	-7.568174
262	-5.462838
263	1.000000
264	-0.000000
265	-0.000000

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Coordenada y	Valor y
266	-0.000000
267	5.000000
268	-11.300000
269	5.000000
270	1.000000
271	1.000000
272	-0.000000
273	-0.000000
274	-6.000000
275	-6.993434
276	-6.993434
277	-6.993434
278	-0.000000
279	-6.511419
280	-3.780000
281	-0.000000
282	-0.000000
283	-2.479292
284	-4.012236
285	-3.753450
286	-0.000000
287	-23.316409
288	-14.500000
289	-40.000000
290	-4.455574
291	-9.802194
292	-5.515200
293	-2.694928
294	-0.000000
295	-3.165231
296	-2.522241
297	-0.350000
298	-153.632250
299	-0.000000
300	-0.000000
301	-0.000000
302	-0.000000
303	-0.000000
304	3.653253
305	-0.000000
306	-0.000000
307	-0.455522
308	-0.000000
309	-0.107825
310	-0.000000
311	-0.389698
312	-0.227761
313	-0.000000
314	-0.000000

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Coordenada y	Valor y
315	-0.227761
316	-0.000000
317	-0.000000
318	-0.185418
319	-0.000000
320	-0.000000
321	-36.769833
322	-0.000000
323	-0.000000
324	-0.033065
325	-0.000000
326	-0.000000
327	-3.780000
328	-0.000000
329	-0.000000
330	-0.000000
331	-1.763844
332	-2.311419
333	-0.208134
334	-0.092073
335	-0.083253
336	-0.293809
337	-4.852797
338	-0.192330
339	-5.283055
340	-3.873700
341	-3.873700
342	-3.873700
343	-3.873700
344	-3.873700
345	-3.873700
346	-5.786218
347	-3.776790
348	-4.088770
349	-1.763844
350	-4.000000
351	-3.026113
352	-0.090132
353	-4.139669
354	-3.873700
355	-4.669349
356	-0.961169
357	-0.121607
358	-0.014996
359	-0.421364
360	-0.000000
361	-0.000000
362	-3.758611
363	-8.950000

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Coordenada y	Valor y
364	-6.780000
365	-8.422332
366	-0.000000
367	-0.000000
368	-0.000000
369	-0.000000
370	-0.000000
371	-3.873700
372	-3.721304
373	-0.000000
374	-3.804617
375	-0.004072
376	-0.000000
377	0.442332
378	-0.074344
379	-0.178339
380	-0.000000
381	-0.049695
382	-0.147317
383	-0.000000
384	-3.873700
385	-0.000000
386	-0.000000
387	-0.000000
388	-0.000000
389	-0.000000
390	-0.000000
391	3.873700
392	-0.000000
393	-0.000000
394	-0.000000
395	0.951110
396	0.194494
397	-0.000000
398	1.763844
399	-0.000000
400	-1.259669
401	0.074644
402	-4.507545
403	-4.984722
404	-4.036478
405	-25.000000
406	-4.011985
407	0.088444
408	-4.239071
409	-5.074644
410	0.088444
411	-2.532556
412	-0.000000

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Coordenada y	Valor y
413	-0.000000
414	-0.274967
415	-0.000000
416	-0.000000
417	-0.000000
418	-0.000000
419	-0.000000
420	1.000000
421	1.000000
422	1.000000
423	-3.703262
424	-2.870518
425	-5.340506
426	-0.000000
427	5.000000
428	5.768970
429	5.541093
430	3.873700
431	3.873700
432	1.000000
433	1.000000
434	1.000000
435	-3.447761
436	-2.273799
437	-2.773338
438	0.120000
439	-0.290373
440	-3.253151
441	-4.837439
442	-4.266647
443	-4.412160
444	-4.035500
445	-4.035500
446	-3.803389
447	-4.024437
448	-3.886587
449	-4.043445
450	-3.974525
451	-4.010345
452	-3.386970
453	-3.823262
454	-3.447761
455	-4.280907
456	-4.463606
457	-3.893960
458	-4.124952
459	-0.176181
460	-5.150209
461	-5.111039

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Coordenada y	Valor y
462	-5.021757
463	-3.522193
464	-3.650455
465	-3.489857
466	-3.964903
467	-3.725356
468	-0.000000
469	0.108052
470	4.000115
471	-0.000000
472	3.447761
473	-0.000000
474	-0.000000
475	-0.011759
476	-0.011110
477	-0.000000
478	-0.121713
479	-0.090398
480	-0.037017
481	-0.066005
482	-0.094931
483	-0.068678
484	-0.000000
485	-3.447761
486	-3.965433
487	-0.204371
488	-0.809699
489	-0.000000
490	-0.000000
491	-0.000000
492	-3.447761
493	0.304015
494	-2.310000
495	-0.120000
496	-2.885978
497	-3.270992
498	-4.272650
499	-4.400317
500	-1.000000
501	-0.000000
502	-0.000000
503	-0.000000
504	-0.000000
505	5.085646
506	4.035500
507	3.833800
508	4.620000
509	-5.000000
510	5.768970

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Coordenada y	Valor y
511	5.541093
512	3.873700
513	3.873700
514	-1.000000
515	5.696300
516	4.856300
517	4.016300
518	4.016300
519	-6.825000
520	-5.601260
521	-0.000000
522	-0.000000
523	-5.746300
524	-4.906300
525	-4.016300
526	-4.021300
527	-0.286300
528	-0.286300
529	-4.016300
530	-4.021300
531	-0.136500
532	-0.098126
533	-7.661294
534	-6.987000
535	-0.000000
536	-0.000000
537	-5.216946
538	-4.848000
539	-4.182200
540	-4.096100
541	-0.131300
542	-0.228000
543	-4.182200
544	-4.096100
545	-0.257565
546	-0.236700
547	5.746300
548	4.906300
549	4.016300
550	4.021300
551	5.746300
552	4.906300
553	4.016300
554	4.021300
555	5.746300
556	4.906300
557	3.945000
558	3.945000
559	5.216946
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Coordenada y	Valor y
560	4.732000
561	4.182200
562	3.907300
563	5.216946
564	4.848000
565	4.182200
566	4.096100
567	-5.460000
568	-4.620000
569	-5.085646
570	-4.620000
571	5.000000
572	5.460000
573	4.620000
574	4.200000
575	3.780000
576	-0.350000
577	-6.043771
578	-1.890000
579	-15.369474
580	-3.255000
581	-1.513750
582	-0.458060
583	-0.382761
584	-0.168185
585	-0.000000
586	-0.000000
587	-0.083967
588	-0.000000
589	-0.000000
590	-0.000000
591	-13.800263
592	-0.840000
593	1.000000
594	-0.000000
595	-0.000000
596	-0.000000
597	5.000000
598	-11.300000
599	1.818217
600	1.000000
601	1.000000
602	-0.000000
603	-0.000000
604	-6.000000
605	-7.744073
606	-7.744073
607	-7.744073
608	-0.000000
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Coordenada y	Valor y
609	-4.200000
610	-3.780000
611	-2.940000
612	-0.000000
613	-2.663637
614	-5.132064
615	-3.753450
616	-0.000000
617	-23.311111
618	-14.500000
619	-40.000000
620	-6.779413
621	-10.229212
622	-5.515200
623	-2.984794
624	-0.000000
625	-3.980209
626	-2.520000
627	-0.350000
628	-182.835001
629	-0.000000
630	-0.000000
631	-0.000000
632	-0.000000
633	-0.000000
634	3.570000
635	-0.000000
636	-0.000000
637	-0.792642
638	-0.000000
639	-0.580686
640	-0.236617
641	-0.743674
642	-0.396321
643	-0.000000
644	-0.000000
645	-0.396321
646	-0.000000
647	-0.000000
648	-0.252152
649	-0.000000
650	-0.000000
651	-69.176657
652	-0.000000
653	-0.000000
654	-0.000000
655	-0.000000
656	-0.000000
657	-3.780000
Continua na próxima página	

Coordenada y	Valor y
658	-0.000000
659	-0.000000
660	-0.000000

4 Observações

- O solver HiGHS foi configurado com o método IPM (Interior Point Method).
- Este arquivo contém a solução detalhada para o problema scfxm2.
- As variáveis duais representam os multiplicadores de Lagrange das restrições.
- Os custos reduzidos (z) indicam o impacto de forçar variáveis não-básicas na base.