

Solução do Problema Bandm1 - Solver HiGHS

Análise Computacional

17 de setembro de 2025

1 Informações do Problema

Informações do Problema:

- Nome: Bandm1
- Número de Variáveis: 472
- Número de Restrições: 305
- Inviabilidade Primal: 0.000e+00
- Inviabilidade Dual: 0.000e+00
- Valor Primal: -1.586e+02
- Valor Dual: -1.586e+02
- Gap: -6.193e-18
- Número de Iterações: 17

2 Variáveis Primais e Custos Reduzidos

Tabela 1: Variáveis primais e custos reduzidos do problema Bandm1

Coordenada x	Valor x	Coordenada z	Valor z
1	-0.000000	1	0.000000
2	-0.000000	2	0.000000
3	0.000000	3	0.401858
4	0.342000	4	0.000000
5	0.000000	5	0.194948
6	0.000000	6	0.286162
7	0.000000	7	0.053770
8	12.828894	8	0.000000
9	0.000000	9	0.548142
10	0.000000	10	0.467943
11	1.446000	11	0.000000
12	0.000000	12	0.185433

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Coordenada x	Valor x	Coordenada z	Valor z
13	0.000000	13	2.631393
14	0.461338	14	0.000000
15	0.000000	15	0.210000
16	1.239880	16	0.000000
17	0.000000	17	5.157953
18	0.000000	18	0.157953
19	1.192000	19	0.000000
20	0.000000	20	4.875280
21	3.379000	21	0.000000
22	-0.000000	22	0.000000
23	-0.000000	23	0.000000
24	0.000000	24	5.000000
25	0.675562	25	0.000000
26	0.090931	26	0.000000
27	0.000000	27	18.185226
28	0.000000	28	9.757979
29	0.000000	29	9.087065
30	0.000000	30	0.971136
31	0.000000	31	1.000000
32	0.000000	32	2.819132
33	0.000000	33	2.007081
34	0.000000	34	0.029655
35	0.000000	35	2.732806
36	0.000000	36	2.319621
37	0.000000	37	3.081852
38	0.000000	38	0.038349
39	0.000000	39	3.912047
40	0.000000	40	2.519885
41	0.000000	41	3.734317
42	0.000000	42	3.130176
43	0.000000	43	0.016739
44	0.172938	44	0.000000
45	0.000000	45	0.038408
46	0.000000	46	0.045424
47	0.000000	47	0.041586
48	0.000000	48	3.870368
49	0.000000	49	3.719137
50	0.000000	50	0.036767
51	0.000000	51	3.843054
52	0.000000	52	0.040478
53	0.000000	53	0.042263
54	0.000000	54	0.045238
55	0.000000	55	4.502614
56	0.000000	56	0.050845
57	0.000000	57	0.061595
58	0.000000	58	0.042824
59	0.000000	59	0.042286
60	0.000000	60	5.377174
61	0.000000	61	4.072062

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Coordenada x	Valor x	Coordenada z	Valor z
62	0.000000	62	2.166906
63	2.475110	63	0.000000
64	0.000000	64	0.286458
65	18.822343	65	0.000000
66	0.000000	66	1.256239
67	0.000000	67	0.708571
68	0.135903	68	0.000000
69	0.000000	69	0.145550
70	0.978499	70	0.000000
71	2.898836	71	0.000000
72	3.363584	72	0.000000
73	0.000000	73	0.028864
74	3.277321	74	0.000000
75	0.713679	75	0.000000
76	0.862810	76	0.000000
77	1.092309	77	0.000000
78	2.149754	78	0.000000
79	0.017378	79	0.000000
80	2.253022	80	0.000000
81	1.468851	81	0.000000
82	1.812418	82	0.000000
83	7.989826	83	0.000000
84	0.000000	84	0.048925
85	0.308021	85	0.000000
86	0.350785	86	0.000000
87	0.514950	87	0.000000
88	0.000000	88	0.280426
89	1.346107	89	0.000000
90	0.000000	90	1.282391
91	1.980489	91	0.000000
92	0.000000	92	0.066085
93	0.517424	93	0.000000
94	0.942086	94	0.000000
95	0.176233	95	0.000000
96	1.152243	96	0.000000
97	3.077255	97	0.000000
98	0.000000	98	0.158197
99	0.000000	99	0.120027
100	17.866145	100	0.000000
101	12.513496	101	0.000000
102	22.170936	102	0.000000
103	10.212902	103	0.000000
104	2.339175	104	0.000000
105	49.488256	105	0.000000
106	13.653129	106	0.000000
107	6.118395	107	0.000000
108	20.114532	108	0.000000
109	0.000000	109	0.052027
110	0.000000	110	0.014618

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Coordenada x	Valor x	Coordenada z	Valor z
111	0.000000	111	0.010899
112	3.641440	112	0.000000
113	0.000000	113	0.061996
114	17.424528	114	0.000000
115	5.135245	115	0.000000
116	0.000000	116	0.058609
117	17.636000	117	0.000000
118	0.000000	118	0.000609
119	0.000000	119	0.010720
120	0.000000	120	0.206656
121	0.000000	121	0.075619
122	9.901148	122	0.000000
123	0.000000	123	0.000000
124	0.136917	124	0.000000
125	14.235977	125	0.000000
126	48.486998	126	0.000000
127	6.451617	127	0.000000
128	0.000000	128	0.054094
129	14.189259	129	0.000000
130	6.388000	130	0.000000
131	-0.000000	131	0.000000
132	12.616253	132	0.000000
133	0.000000	133	0.191103
134	0.000000	134	0.071619
135	0.000000	135	0.070903
136	0.000000	136	0.025275
137	0.000000	137	0.009977
138	0.000000	138	0.358690
139	16.860845	139	0.000000
140	3.225059	140	0.000000
141	2.339188	141	0.000000
142	0.000000	142	0.244513
143	0.069808	143	0.000000
144	0.000000	144	0.028438
145	0.000000	145	0.006465
146	6.093055	146	0.000000
147	43.313014	147	0.000000
148	1.390012	148	0.000000
149	0.063922	149	0.000000
150	57.412364	150	0.000000
151	4.297832	151	0.000000
152	0.000000	152	0.290335
153	0.145000	153	0.000000
154	0.930000	154	0.000000
155	7.626912	155	0.000000
156	193.605245	156	0.000000
157	2.591213	157	0.000000
158	1.810509	158	0.000000
159	13.023550	159	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
160	2.872767	160	0.000000
161	0.171076	161	0.000000
162	15.342351	162	0.000000
163	2.598000	163	0.000000
164	4.792120	164	0.000000
165	0.356120	165	0.000000
166	16.861378	166	0.000000
167	0.000000	167	0.009770
168	2.038604	168	0.000000
169	0.000000	169	0.489092
170	-0.000000	170	0.000000
171	1.830337	171	0.000000
172	0.297438	172	0.000000
173	1.035438	173	0.000000
174	0.000000	174	0.175503
175	0.000000	175	0.487146
176	9.032624	176	0.000000
177	0.000000	177	0.035201
178	0.000000	178	0.032897
179	3.423000	179	0.000000
180	0.000000	180	0.064930
181	0.000000	181	0.219597
182	1.281000	182	0.000000
183	0.000000	183	0.032465
184	0.000000	184	0.349195
185	0.529064	185	0.000000
186	0.578000	186	0.000000
187	0.640000	187	0.000000
188	6.362133	188	0.000000
189	1.588000	189	0.000000
190	2.995447	190	0.000000
191	1.895553	191	0.000000
192	0.000000	192	0.032578
193	0.000000	193	0.294720
194	0.137911	194	0.000000
195	0.130174	195	0.000000
196	0.339882	196	0.000000
197	1.764262	197	0.000000
198	0.095341	198	0.000000
199	0.000000	199	0.054712
200	0.000000	200	0.772427
201	0.007305	201	0.000000
202	2.000000	202	0.000000
203	0.000000	203	0.794206
204	0.000000	204	0.137492
205	0.446000	205	0.000000
206	0.000000	206	0.012763
207	0.205000	207	0.000000
208	0.274773	208	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
209	0.023801	209	0.000000
210	0.000000	210	0.418031
211	0.189617	211	0.000000
212	0.078809	212	0.000000
213	0.000000	213	0.045469
214	0.000000	214	0.250303
215	0.000000	215	0.312406
216	0.000000	216	0.576817
217	0.102059	217	0.000000
218	0.591941	218	0.000000
219	0.000000	219	0.075400
220	4.082000	220	0.000000
221	0.000000	221	0.007472
222	0.000000	222	0.011533
223	18.557106	223	0.000000
224	18.557106	224	0.000000
225	0.000000	225	0.003539
226	-0.000000	226	0.000000
227	0.000000	227	0.030068
228	0.000000	228	0.076313
229	0.000000	229	0.038704
230	17.636000	230	0.000000
231	0.379621	231	0.000000
232	14.235977	232	0.000000
233	0.000000	233	0.029842
234	0.000000	234	0.020211
235	14.372894	235	0.000000
236	0.000000	236	0.032423
237	0.000000	237	0.054823
238	0.000000	238	0.093853
239	6.388000	239	0.000000
240	0.000000	240	0.061061
241	6.388000	241	0.000000
242	0.093264	242	0.000000
243	2.580000	243	0.000000
244	1.430805	244	0.000000
245	1.279000	245	0.000000
246	0.000000	246	0.100023
247	0.000000	247	0.187749
248	0.000000	248	0.763538
249	1.224052	249	0.000000
250	0.601383	250	0.000000
251	1.377731	251	0.000000
252	0.350000	252	0.000000
253	0.687000	253	0.000000
254	1.600000	254	0.000000
255	0.000000	255	0.299196
256	0.348485	256	0.000000
257	0.662769	257	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
258	3.545000	258	0.000000
259	0.000000	259	0.009899
260	1.758228	260	0.000000
261	0.811522	261	0.000000
262	0.833658	262	0.000000
263	0.000000	263	0.061143
264	0.000000	264	0.380265
265	7.399662	265	0.000000
266	-0.000000	266	0.000000
267	0.000000	267	2.659227
268	0.000000	268	2.837742
269	0.000000	269	2.633043
270	0.000000	270	2.776406
271	0.000000	271	2.839985
272	0.000000	272	2.683455
273	1.635928	273	0.000000
274	5.024313	274	0.000000
275	0.981011	275	0.000000
276	2.725852	276	0.000000
277	2.042333	277	0.000000
278	1.700255	278	0.000000
279	100.707700	279	0.000000
280	153.541367	280	0.000000
281	0.050354	281	0.000000
282	0.078002	282	0.000000
283	49.730000	283	0.000000
284	979.265367	284	0.000000
285	326.585000	285	0.000000
286	0.326585	286	0.000000
287	195.970597	287	0.000000
288	10.624670	288	0.000000
289	21.249340	289	0.000000
290	36.012011	290	0.000000
291	206.750183	291	0.000000
292	206.750183	292	0.000000
293	1033.750913	293	0.000000
294	0.156995	294	0.000000
295	1.362926	295	0.000000
296	0.018713	296	0.000000
297	4.039829	297	0.000000
298	20.199143	298	0.000000
299	15.249793	299	0.000000
300	12.468341	300	0.000000
301	0.000000	301	0.000100
302	6.953629	302	0.000000
303	20.274105	303	0.000000
304	26.962118	304	0.000000
305	0.037924	305	0.000000
306	15.169526	306	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
307	4.280530	307	0.000000
308	1.641669	308	0.000000
309	21.618000	309	0.000000
310	21.618000	310	0.000000
311	0.000000	311	0.759490
312	3.281000	312	0.000000
313	1.437000	313	0.000000
314	65.317000	314	0.000000
315	5.317000	315	0.000000
316	1.147000	316	0.000000
317	0.223963	317	0.000000
318	0.000000	318	0.848023
319	19.460000	319	0.000000
320	0.763000	320	0.000000
321	0.283000	321	0.000000
322	0.999963	322	0.000000
323	0.394000	323	0.000000
324	0.153000	324	0.000000
325	9.951037	325	0.000000
326	0.000000	326	0.058276
327	0.000000	327	0.618580
328	27.705000	328	0.000000
329	3.694000	329	0.000000
330	2.844383	330	0.000000
331	8.079657	331	0.000000
332	4.249868	332	0.000000
333	2.182622	333	0.000000
334	0.507260	334	0.000000
335	1.369000	335	0.000000
336	5.206570	336	0.000000
337	28.276157	337	0.000000
338	0.000000	338	0.021138
339	4.406000	339	0.000000
340	4.277719	340	0.000000
341	0.000000	341	0.005000
342	1.889281	342	0.000000
343	8.639396	343	0.000000
344	0.350982	344	0.000000
345	8.671604	345	0.000000
346	0.950070	346	0.000000
347	3.427547	347	0.000000
348	7.584763	348	0.000000
349	8.561061	349	0.000000
350	5.472176	350	0.000000
351	0.000000	351	0.002000
352	2.820000	352	0.000000
353	1.063032	353	0.000000
354	0.000000	354	0.227343
355	0.000000	355	0.408572

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Coordenada x	Valor x	Coordenada z	Valor z
356	0.000000	356	0.197183
357	5.351955	357	0.000000
358	1.937352	358	0.000000
359	1.295167	359	0.000000
360	0.000000	360	0.001730
361	1.371599	361	0.000000
362	1.777548	362	0.000000
363	0.000000	363	0.330156
364	0.000000	364	0.139691
365	0.000000	365	0.164018
366	0.603101	366	0.000000
367	0.498750	367	0.000000
368	2.962000	368	0.000000
369	0.885000	369	0.000000
370	0.345097	370	0.000000
371	1.018962	371	0.000000
372	2.317000	372	0.000000
373	1.544000	373	0.000000
374	0.000000	374	2.438055
375	1.394247	375	0.000000
376	5.653743	376	0.000000
377	1.655224	377	0.000000
378	0.036402	378	0.000000
379	1.498665	379	0.000000
380	2.209193	380	0.000000
381	2.879905	381	0.000000
382	0.000000	382	0.090943
383	0.000000	383	0.198352
384	3.229726	384	0.000000
385	0.000000	385	0.704012
386	0.000000	386	2.875347
387	0.270566	387	0.000000
388	0.666096	388	0.000000
389	0.000000	389	0.447614
390	6.159591	390	0.000000
391	0.000000	391	0.001059
392	0.000000	392	0.018584
393	0.000000	393	0.056902
394	0.000000	394	0.177127
395	4.450518	395	0.000000
396	0.928834	396	0.000000
397	2.548813	397	0.000000
398	2.611583	398	0.000000
399	1.000000	399	0.000000
400	0.000000	400	0.140246
401	-0.000000	401	0.000000
402	3.738000	402	0.000000
403	1.890000	403	0.000000
404	0.518000	404	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
405	0.228000	405	0.000000
406	0.138000	406	0.000000
407	0.664873	407	0.000000
408	4.579592	408	0.000000
409	0.000000	409	0.019894
410	1.984068	410	0.000000
411	1.456343	411	0.000000
412	5.688017	412	0.000000
413	0.000000	413	0.045021
414	0.000000	414	0.048616
415	0.000000	415	1.089657
416	0.000000	416	0.399001
417	0.096564	417	0.000000
418	0.000000	418	0.686537
419	1.779552	419	0.000000
420	0.000000	420	0.232771
421	1.576704	421	0.000000
422	0.348595	422	0.000000
423	0.113639	423	0.000000
424	1.776169	424	0.000000
425	0.000000	425	0.033906
426	0.696777	426	0.000000
427	0.534758	427	0.000000
428	0.198635	428	0.000000
429	0.290000	429	0.000000
430	0.374000	430	0.000000
431	13.189218	431	0.000000
432	1.749643	432	0.000000
433	1.426751	433	0.000000
434	6.362133	434	0.000000
435	6.508762	435	0.000000
436	2.073720	436	0.000000
437	0.000000	437	1.338639
438	2.000000	438	0.000000
439	0.000000	439	0.295293
440	9.465149	440	0.000000
441	0.000000	441	0.014810
442	0.000000	442	0.019425
443	0.087680	443	0.000000
444	0.000000	444	0.189762
445	5.013561	445	0.000000
446	0.000000	446	0.664343
447	0.156000	447	0.000000
448	1.282000	448	0.000000
449	1.057617	449	0.000000
450	1.903175	450	0.000000
451	0.421000	451	0.000000
452	0.265397	452	0.000000
453	0.115254	453	0.000000

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Coordenada x	Valor x	Coordenada z	Valor z
454	3.476293	454	0.000000
455	24.640387	455	0.000000
456	2.680870	456	0.000000
457	0.042184	457	0.000000
458	3.309000	458	0.000000
459	0.000000	459	0.010000
460	0.480000	460	0.000000
461	3.388000	461	0.000000
462	0.223000	462	0.000000
463	0.345000	463	0.000000
464	2.793000	464	0.000000
465	9.034249	465	0.000000
466	6.030343	466	0.000000
467	1.781397	467	0.000000
468	0.200000	468	0.000000
469	0.198578	469	0.000000
470	4.829430	470	0.000000
471	0.023164	471	0.000000
472	0.889292	472	0.000000

3 Variáveis Duais (Multiplicadores de Lagrange)

Tabela 2: Variáveis duais do problema Bandm1

Coordenada y	Valor y
1	-1.000000
2	-0.211107
3	-0.314217
4	-0.286162
5	0.091215
6	-0.038082
7	-0.573397
8	-0.496672
9	1.672873
10	-1.000000
11	-0.971446
12	-0.976015
13	-0.663266
14	0.046460
15	-0.962735
16	-0.310751
17	-0.259119
18	-0.098356
19	-0.499031
20	-0.539215
21	-0.422635

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Coordenada y	Valor y
22	-0.414850
23	-0.413026
24	-0.041586
25	-0.040478
26	-0.042263
27	-0.036767
28	-0.050845
29	-0.045238
30	-0.042824
31	-0.042286
32	-5.377174
33	-0.038349
34	-0.357841
35	-2.819132
36	-2.007081
37	-2.732806
38	-0.031278
39	-3.081852
40	-0.040759
41	-0.029655
42	-0.041679
43	-4.072062
44	-3.663490
45	-4.211753
46	-4.312786
47	-2.120822
48	-2.007208
49	-3.607580
50	-0.034328
51	-0.041333
52	-2.682132
53	-4.382281
54	-0.000000
55	-2.519885
56	-0.011576
57	-3.843054
58	-2.319621
59	-1.632159
60	-2.455565
61	-3.604204
62	-3.524014
63	-3.870368
64	-3.719137
65	-4.502614
66	-3.869505
67	-3.912047
68	-3.902603
69	-3.130176
70	-2.568628
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Coordenada y	Valor y
71	-2.666604
72	-2.465249
73	0.407146
74	-0.000000
75	-0.548142
76	-1.012706
77	2.465249
78	0.021619
79	0.242021
80	0.219597
81	-0.000000
82	0.269195
83	-0.000000
84	-1.845559
85	-0.039240
86	0.373460
87	-0.210000
88	-0.285659
89	-1.141369
90	-0.000000
91	-0.053770
92	-0.053770
93	-1.224582
94	-1.943335
95	-2.701635
96	-0.467943
97	-0.000000
98	-0.185433
99	-2.551393
100	-0.310774
101	-0.977050
102	0.080000
103	-0.000000
104	-0.157953
105	-0.157953
106	-0.000000
107	-0.000000
108	-0.113478
109	-0.394747
110	0.124720
111	-0.000000
112	-1.180431
113	-0.387695
114	-0.000000
115	-18.185226
116	-0.080056
117	1.632159
118	-0.434233
119	-2.122979

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Coordenada y	Valor y
120	-2.143037
121	-0.145550
122	-0.082897
123	-0.000000
124	-0.000000
125	-0.000000
126	-0.000000
127	-0.278728
128	-0.159255
129	-0.303512
130	-0.000000
131	-0.600505
132	-0.286458
133	0.172899
134	-0.000000
135	-0.000000
136	-0.000000
137	-0.000000
138	-1.256239
139	-0.708571
140	-0.000000
141	-0.028864
142	-0.000000
143	-0.000000
144	-0.000000
145	-0.662883
146	-0.292364
147	1.268758
148	-1.352373
149	-0.120027
150	-0.061595
151	1.792873
152	-0.000000
153	-0.295293
154	-0.000000
155	-0.000000
156	-0.048925
157	-0.444595
158	-0.000000
159	0.301083
160	-0.000000
161	-0.000000
162	-0.280426
163	-0.000000
164	-1.282391
165	-0.000000
166	-0.066085
167	-0.010000
168	-0.158197

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Coordenada y	Valor y
169	-0.000000
170	-0.000000
171	-0.000000
172	0.169336
173	0.482887
174	-0.000000
175	-0.000000
176	-0.548142
177	-0.152653
178	-0.000000
179	-0.000000
180	0.055351
181	-0.206656
182	-0.075619
183	-0.000000
184	-0.061996
185	-0.000000
186	-0.054094
187	-0.191103
188	-0.071619
189	-0.375688
190	-3.134000
191	-0.039650
192	-0.016739
193	-0.013886
194	-0.045424
195	-0.366544
196	-0.354430
197	-2.341418
198	-0.000000
199	-0.031900
200	0.100000
201	-0.032378
202	-0.039854
203	-0.021627
204	-0.026200
205	-0.030000
206	-0.024656
207	-1.930000
208	-0.011635
209	-0.000000
210	-0.049783
211	-0.000000
212	-0.005700
213	-0.191400
214	-0.129013
215	-0.000000
216	-0.010720
217	-0.000000

Continua na próxima página

Coordenada y	Valor y
218	-0.035839
219	-0.010899
220	-0.000000
221	-0.000000
222	-0.000000
223	-0.000000
224	-4.029564
225	-0.014618
226	-4.499131
227	-0.000609
228	1.000000
229	-0.044211
230	0.013263
231	-0.000000
232	-0.000000
233	-3.908595
234	-0.000000
235	-0.000000
236	-4.585599
237	-0.000000
238	-0.070903
239	-0.050410
240	-0.025275
241	-0.009977
242	-0.358690
243	-0.000000
244	-0.000000
245	-0.244513
246	-0.028438
247	-0.006465
248	-0.000000
249	-0.000000
250	-3.734317
251	1.000000
252	-0.340000
253	-0.700000
254	-0.000000
255	-0.050000
256	0.100000
257	-0.025710
258	-0.005010
259	-0.031890
260	-0.075000
261	-0.028030
262	-3.372839
263	-0.667609
264	0.002910
265	-0.000001
266	-0.009933

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Coordenada y	Valor y
267	-0.001007
268	-0.000003
269	-0.001008
270	0.002324
271	-0.000001
272	0.014185
273	0.012569
274	0.000003
275	-0.000000
276	-0.000000
277	-0.001015
278	-0.001629
279	-0.000087
280	0.026676
281	-0.015117
282	-0.009276
283	-0.007494
284	-0.026882
285	0.010199
286	-0.001033
287	0.002285
288	-0.000007
289	-0.002876
290	0.005127
291	-0.086006
292	-0.045870
293	-0.055033
294	-0.000000
295	-0.000000
296	-0.000000
297	-0.000000
298	-0.000000
299	-0.000000
300	-4.165013
301	-4.078115
302	-4.242133
303	-0.000000
304	-0.000000
305	-0.058609

4 Observações

- O solver HiGHS foi configurado com o método IPM (Interior Point Method).
- Este arquivo contém a solução detalhada para o problema Bandm1.
- As variáveis duais representam os multiplicadores de Lagrange das restrições.
- Os custos reduzidos (z) indicam o impacto de forçar variáveis não-básicas na base.