



80	0	0	670.27797	0 1855	- 670.27797	- - 34s
81	0	0	670.48401	0 1860	- 670.48401	- - 34s
82	0	0	670.67101	0 1854	- 670.67101	- - 34s
83	0	0	670.72115	0 1840	- 670.72115	- - 35s
84	0	0	670.76750	0 1821	- 670.76750	- - 35s
85	0	0	670.78592	0 1806	- 670.78592	- - 36s
86	0	0	670.80665	0 1820	- 670.80665	- - 36s
87	0	0	670.94488	0 1317	- 670.94488	- - 37s
88	0	0	671.12893	0 1726	- 671.12893	- - 37s
89	0	0	671.14077	0 1733	- 671.14077	- - 37s
90	0	0	671.15657	0 1772	- 671.15657	- - 37s
91	0	0	671.16702	0 1796	- 671.16702	- - 38s
92	0	0	671.17697	0 1793	- 671.17697	- - 38s
93	0	0	671.19970	0 1928	- 671.19970	- - 38s
94	0	0	671.29438	0 1902	- 671.29438	- - 39s
95	0	0	671.33336	0 1935	- 671.33336	- - 39s
96	0	0	671.34856	0 1862	- 671.34856	- - 40s
97	0	0	671.35818	0 1866	- 671.35818	- - 40s
98	0	0	671.37857	0 1895	- 671.37857	- - 40s
99	0	0	671.39352	0 1803	- 671.39352	- - 40s
100	0	0	671.40490	0 1801	- 671.40490	- - 40s
101	0	0	671.41845	0 1842	- 671.41845	- - 41s
102	0	0	671.45784	0 1829	- 671.45784	- - 41s
103	0	0	671.55809	0 1844	- 671.55809	- - 41s
104	0	0	671.58534	0 1871	- 671.58534	- - 41s
105	0	0	671.59577	0 1942	- 671.59577	- - 41s
106	0	0	671.61083	0 1942	- 671.61083	- - 42s
107	0	0	671.69515	0 1943	- 671.69515	- - 42s
108	0	0	671.73363	0 1917	- 671.73363	- - 42s
109	0	0	671.75442	0 1941	- 671.75442	- - 42s
110	0	0	671.77297	0 1937	- 671.77297	- - 42s
111	0	0	671.80593	0 1963	- 671.80593	- - 42s
112	0	0	671.91218	0 1889	- 671.91218	- - 43s
113	0	0	671.93002	0 1894	- 671.93002	- - 43s
114	0	0	671.96439	0 1919	- 671.96439	- - 43s
115	0	0	671.98176	0 1914	- 671.98176	- - 43s
116	0	0	671.99936	0 2004	- 671.99936	- - 44s
117	0	0	672.01269	0 1986	- 672.01269	- - 44s
118	0	0	672.03739	0 1965	- 672.03739	- - 44s
119	0	0	672.04634	0 1959	- 672.04634	- - 44s
120	0	0	672.05034	0 1955	- 672.05034	- - 44s
121	0	0	672.05722	0 1983	- 672.05722	- - 44s
122	0	0	672.06353	0 1900	- 672.06353	- - 45s
123	0	0	672.09462	0 1832	- 672.09462	- - 45s
124	0	0	672.14396	0 1626	- 672.14396	- - 45s
125	0	0	672.15784	0 1660	- 672.15784	- - 45s
126	0	0	672.16784	0 1853	- 672.16784	- - 45s
127	0	0	672.18210	0 1848	- 672.18210	- - 46s
128	0	0	672.18210	0 1858	- 672.18210	- - 46s
129	0	0	673.48112	0 1759	- 673.48112	- - 49s
130	0	0	673.48112	0 1742	- 673.48112	- - 49s
131	0	0	676.04928	0 2094	- 676.04928	- - 50s
132	0	0	678.23503	0 1941	- 678.23503	- - 52s
133	0	0	678.23506	0 1992	- 678.23506	- - 52s
134	0	0	678.68698	0 1946	- 678.68698	- - 52s
135	0	0	679.09663	0 1934	- 679.09663	- - 53s
136	0	0	679.13710	0 1529	- 679.13710	- - 53s
137	0	0	679.16606	0 1766	- 679.16606	- - 53s
138	0	0	679.17821	0 1776	- 679.17821	- - 54s
139	0	0	679.25439	0 1765	- 679.25439	- - 54s
140	0	0	679.26646	0 1827	- 679.26646	- - 54s
141	0	0	679.34019	0 1832	- 679.34019	- - 54s
142	0	0	679.34537	0 1843	- 679.34537	- - 54s
143	0	0	679.42213	0 1859	- 679.42213	- - 54s
144	0	0	679.43463	0 1886	- 679.43463	- - 55s
145	0	0	679.45089	0 1888	- 679.45089	- - 55s
146	0	0	679.46347	0 1884	- 679.46347	- - 55s
147	0	0	679.53405	0 1845	- 679.53405	- - 55s
148	0	0	679.54608	0 1822	- 679.54608	- - 55s
149	0	0	679.57825	0 1925	- 679.57825	- - 55s
150	0	0	679.64166	0 1919	- 679.64166	- - 55s
151	0	0	679.65331	0 1872	- 679.65331	- - 56s
152	0	0	679.72426	0 1811	- 679.72426	- - 56s
153	0	0	679.73595	0 1814	- 679.73595	- - 56s
154	0	0	679.74717	0 1732	- 679.74717	- - 56s
155	0	0	679.76808	0 1820	- 679.76808	- - 56s
156	0	0	679.83162	0 1509	- 679.83162	- - 56s
157	0	0	679.84347	0 1512	- 679.84347	- - 56s
158	0	0	679.91379	0 1514	- 679.91379	- - 56s
159	0	0	679.92580	0 1516	- 679.92580	- - 56s
160	0	0	679.98627	0 1504	- 679.98627	- - 57s
161	0	0	679.98627	0 1509	- 679.98627	- - 57s
162	0	0	682.99016	0 923	- 682.99016	- - 59s
163	0	0	682.99016	0 914	- 682.99016	- - 59s

164	0	0	683.32172	0 1609	- 683.32172	- - 60s
165	0	0	683.32172	0 1601	- 683.32172	- - 60s
166	0	0	683.83298	0 1351	- 683.83298	- - 61s
167	0	0	683.89601	0 2049	- 683.89601	- - 61s
168	0	0	684.07743	0 2043	- 684.07743	- - 61s
169	0	0	684.10721	0 2042	- 684.10721	- - 62s
170	0	0	684.22614	0 1906	- 684.22614	- - 62s
171	0	0	684.23246	0 1924	- 684.23246	- - 62s
172	0	0	684.27675	0 1918	- 684.27675	- - 62s
173	0	0	684.39183	0 1874	- 684.39183	- - 63s
174	0	0	684.39497	0 1853	- 684.39497	- - 63s
175	0	0	686.85462	0 1654	- 686.85462	- - 65s
176	0	0	686.85462	0 1651	- 686.85462	- - 66s
177	0	0	687.50195	0 1524	- 687.50195	- - 66s
178	0	0	687.50195	0 1523	- 687.50195	- - 66s
179	0	0	687.63815	0 1310	- 687.63815	- - 67s
180	0	0	687.67922	0 1475	- 687.67922	- - 67s
181	0	0	687.67922	0 1468	- 687.67922	- - 67s
182	0	0	687.69040	0 871	- 687.69040	- - 68s
183	0	0	687.69187	0 959	- 687.69187	- - 68s
184	0	0	687.92862	0 1101	- 687.92862	- - 69s
185	0	0	687.92862	0 1087	- 687.92862	- - 70s
186	0	0	689.19392	0 1032	- 689.19392	- - 70s
187	0	0	689.19392	0 1030	- 689.19392	- - 70s
188	0	0	689.38580	0 1001	- 689.38580	- - 71s
189	0	0	689.74017	0 940	- 689.74017	- - 72s
190	0	0	689.74017	0 948	- 689.74017	- - 72s
191	0	0	689.74686	0 932	- 689.74686	- - 72s
192	0	0	690.76073	0 1117	- 690.76073	- - 74s
193	0	0	690.76073	0 1065	- 690.76073	- - 74s
194	0	0	691.26190	0 1045	- 691.26190	- - 76s
195	0	0	691.26190	0 1019	- 691.26190	- - 76s
196	0	0	691.32370	0 1487	- 691.32370	- - 76s
197	0	0	691.34365	0 1340	- 691.34365	- - 77s
198	0	0	691.34605	0 1408	- 691.34605	- - 77s
199	0	0	691.56162	0 1210	- 691.56162	- - 79s
200	0	0	691.64431	0 985	- 691.64431	- - 80s
201	0	0	691.64431	0 978	- 691.64431	- - 80s
202	0	0	691.66214	0 984	- 691.66214	- - 80s
203	0	0	691.66214	0 978	- 691.66214	- - 80s
204	0	0	691.66914	0 873	- 691.66914	- - 81s
205	0	0	691.96525	0 803	- 691.96525	- - 82s
206	0	0	691.96829	0 813	- 691.96829	- - 83s
207	0	0	691.96829	0 807	- 691.96829	- - 83s
208	0	0	692.06953	0 911	- 692.06953	- - 84s
209	0	0	692.06953	0 899	- 692.06953	- - 84s
210	0	0	692.06999	0 848	- 692.06999	- - 85s
211	0	0	692.06999	0 843	- 692.06999	- - 85s
212	0	0	692.11527	0 928	- 692.11527	- - 86s
213	0	0	692.13783	0 911	- 692.13783	- - 87s
214	0	0	692.13783	0 912	- 692.13783	- - 87s
215	0	0	692.15421	0 810	- 692.15421	- - 87s
216	0	0	692.15421	0 878	- 692.15421	- - 88s
217	0	0	692.23185	0 909	- 692.23185	- - 89s
218	0	0	692.23185	0 905	- 692.23185	- - 90s
219	0	0	692.23185	0 901	- 692.23185	- - 90s
220	0	0	692.29772	0 855	- 692.29772	- - 91s
221	0	0	692.30378	0 1033	- 692.30378	- - 92s
222	0	0	692.30378	0 1022	- 692.30378	- - 92s
223	0	0	692.36388	0 1016	- 692.36388	- - 94s
224	0	0	692.36388	0 1048	- 692.36388	- - 94s
225	0	0	692.36388	0 491	- 692.36388	- - 96s
226	0	2	692.36388	0 463	- 692.36388	- - 103s
227	3	8	698.56241	2 466	- 698.56241	- 1334 107s
228	45	53	715.87439	12 301	- 701.50808	- 511 110s
229	141	155	714.55422	30 541	- 701.50808	- 332 115s
230	303	320	729.50000	43 220	- 701.50808	- 244 120s
231	471	466	719.35952	8 398	- 704.44335	- 233 125s
232	632	590	1079.24893	45 545	- 704.44335	- 233 130s
233	823	762	1112.00000	102 232	- 706.70357	- 219 135s
234	1008	888	1098.16274	36 354	- 706.70357	- 224 140s
235	1044	889	792.00000	168 491	- 706.70357	- 224 179s
236	1046	890	782.00000	124 640	- 706.70357	- 224 198s
237	1047	891	762.00000	30 510	- 706.70357	- 224 208s
238	1048	892	755.73781	16 1449	- 706.70357	- 224 215s
239	1049	892	762.00000	32 1533	- 706.70357	- 223 222s
240	1050	893	2012.00000	110 1883	- 706.70357	- 223 227s
241	1052	894	785.19848	84 1723	- 706.70357	- 223 232s
242	1056	897	820.29161	65 1577	- 706.70357	- 222 235s
243	1062	901	762.00000	40 1108	- 706.70357	- 221 240s
244	1065	903	793.09525	64 776	- 706.70357	- 220 253s
245	1066	904	1026.78745	70 282	- 708.73420	- 220 263s
246	1068	905	846.67583	201 474	- 709.50000	- 219 266s
247	1069	906	1050.05842	34 353	- 709.50000	- 219 272s

unknown

```
248 1070 906 1055.33333 39 526 - 709.50000 - 219 280s
249 1071 907 1172.00000 69 579 - 709.50000 - 219 285s
250 1072 908 910.75000 171 177 - 709.50000 - 219 293s
251 1073 908 1112.00000 68 555 - 709.50000 - 218 299s
252 1074 909 1120.00000 81 317 - 709.50000 - 218 310s
253 1076 910 796.28492 212 266 - 709.50000 - 218 321s
254 1077 911 1112.00000 114 418 - 709.77778 - 218 325s
255 1078 912 784.22222 136 297 - 709.97089 - 217 330s
256 1080 913 762.00000 29 134 - 709.97089 - 217 338s
257 1081 914 744.09073 23 266 - 709.97089 - 217 342s
258 H 1081 867 1099.0000000 709.97089 35.4% 217 347s
259 H 1081 823 1032.0000000 709.97089 31.2% 217 348s
260 1083 824 788.38889 108 253 1032.00000 709.97089 31.2% 216 351s
261 1084 825 793.09525 64 199 1032.00000 709.97089 31.2% 216 356s
262 1085 825 730.63403 27 183 1032.00000 709.97089 31.2% 216 361s
263 H 1085 783 752.0000000 709.97089 5.59% 216 363s
264 1087 786 752.00000 65 491 752.00000 710.35148 5.54% 357 382s
265 1089 787 724.60568 12 279 752.00000 710.35148 5.54% 356 389s
266 1090 788 752.00000 36 442 752.00000 710.35148 5.54% 356 397s
267 1092 789 752.00000 111 472 752.00000 710.35148 5.54% 355 400s
268 1094 791 736.44444 15 104 752.00000 710.35148 5.54% 355 407s
269 1096 792 752.00000 68 212 752.00000 710.72902 5.49% 354 415s
270 1099 794 752.00000 56 170 752.00000 711.99999 5.32% 353 425s
271 1100 795 752.00000 67 425 752.00000 711.99999 5.32% 353 430s
272 1101 795 752.00000 22 197 752.00000 711.99999 5.32% 353 439s
273 H 1101 755 732.0000000 711.99999 2.73% 353 440s
274 1103 757 732.00000 96 332 732.00000 711.99999 2.73% 352 448s
275 1104 757 732.00000 27 379 732.00000 712.00000 2.73% 352 452s
276 1105 758 732.00000 63 356 732.00000 712.00000 2.73% 351 457s
277 1107 759 732.00000 53 484 732.00000 712.00000 2.73% 351 461s
278 1109 761 712.00000 6 348 732.00000 712.00000 2.73% 350 466s
279 1112 764 732.00000 10 491 732.00000 712.00000 2.73% 415 480s
280 1115 766 732.00000 93 297 732.00000 712.00000 2.73% 414 492s
281 1117 767 732.00000 18 440 732.00000 712.00000 2.73% 413 495s
282 1119 769 732.00000 19 430 732.00000 712.00000 2.73% 412 500s
283 1122 771 732.00000 18 238 732.00000 712.00000 2.73% 411 506s
284 1125 773 732.00000 97 326 732.00000 712.00000 2.73% 410 510s
285 1128 775 732.00000 93 349 732.00000 712.00000 2.73% 409 516s
286 1130 776 732.00000 30 216 732.00000 712.00000 2.73% 408 522s
287 1132 777 732.00000 81 276 732.00000 712.00000 2.73% 408 526s
288 1134 779 732.00000 20 83 732.00000 712.00000 2.73% 407 531s
289 1137 781 725.33333 26 259 732.00000 712.00000 2.73% 406 536s
290 1149 793 712.31384 38 413 732.00000 712.00000 2.73% 491 540s
291 1175 800 717.08136 42 462 732.00000 712.00000 2.73% 517 545s
292 1195 800 719.77778 45 266 732.00000 712.00000 2.73% 534 551s
293 1225 795 cutoff 47 732.00000 712.00000 2.73% 562 555s
294 1266 788 716.87949 40 311 732.00000 712.00000 2.73% 587 561s
295 1306 776 712.00000 40 614 732.00000 712.00000 2.73% 600 566s
296 1321 772 712.68419 43 519 732.00000 712.00000 2.73% 611 570s
297 1382 756 727.07246 49 473 732.00000 712.00000 2.73% 620 577s
298 1419 742 712.19337 44 1095 732.00000 712.19337 2.71% 625 580s
299 1476 734 712.38953 51 796 732.00000 712.38953 2.68% 633 586s
300 1530 710 723.19588 43 788 732.00000 713.71688 2.50% 634 590s
301 1607 675 722.00000 41 172 732.00000 718.42857 1.85% 630 596s
302 1651 654 722.00000 44 298 732.00000 719.15729 1.75% 636 601s
303 1705 625 cutoff 49 732.00000 720.72585 1.54% 641 605s
304 1765 607 725.27490 45 857 732.00000 722.00000 1.37% 653 612s
305 1804 588 725.52567 48 551 732.00000 722.00000 1.37% 654 615s
306 1851 574 727.33333 47 389 732.00000 722.00000 1.37% 655 620s
307 1890 556 cutoff 43 732.00000 722.00000 1.37% 659 629s
308 1910 535 725.33333 45 254 732.00000 722.00000 1.37% 667 631s
309 1945 515 infeasible 46 732.00000 724.64424 1.00% 673 635s
310
311 Cutting planes:
312 Learned: 1
313 Gomory: 26
314 Cover: 45
315 Implied bound: 30
316 Projected implied bound: 3
317 Clique: 36
318 MIR: 30
319 StrongCG: 13
320 Flow cover: 66
321 GUB cover: 55
322 Zero half: 26
323 RLT: 16
324 Relax-and-lift: 24
325 BQP: 3
326
327 Explored 1975 nodes (1434107 simplex iterations) in 635.35 seconds (1050.85 work units)
328 Thread count was 8 (of 8 available processors)
329
330 Solution count 4: 732 752 1032 1099
331
```

```
332 Optimal solution found (tolerance 1.00e-04)
333 Best objective 7.3200000000000e+02, best bound 7.3200000000000e+02, gap 0.00000%
334 Optimal Obj: 732.0
335 Obj = 732.0
336 Solutions
337 Vessel i: 0: li: 6, pi: 8-14, ai-di: 1-20, taoi-deltai: 1-19, periodi: 18, taoPi_SP-deltaPi_SP: 1-6, periodPi: 5, betaNi: 11, bi: 18, Txijt:
108, o1i: 108, o2i: 100, o3i: -338, o4i: 220, Ti: 90
338 Vessel i: 1: li: 5, pi: 23-28, ai-di: 7-14, taoi-deltai: 7-12, periodi: 5, taoPi_SP-deltaPi_SP: 7-9, periodPi: 2, betaNi: 3, bi: 5, Txijt: 25
, o1i: 25, o2i: 40, o3i: -75, o4i: 60, Ti: 50
339 Vessel i: 2: li: 7, pi: 14-21, ai-di: 4-30, taoi-deltai: 4-28, periodi: 24, taoPi_SP-deltaPi_SP: 4-10, periodPi: 6, betaNi: 16, bi: 24, Txijt
: 168, o1i: 168, o2i: 120, o3i: -486, o4i: 320, Ti: 122
340 Vessel i: 3: li: 6, pi: 28-34, ai-di: 7-20, taoi-deltai: 8-19, periodi: 11, taoPi_SP-deltaPi_SP: 8-12, periodPi: 4, betaNi: 6, bi: 11, Txijt:
66, o1i: 86, o2i: 80, o3i: -182, o4i: 120, Ti: 104
341 Vessel i: 4: li: 6, pi: 14-20, ai-di: 31-44, taoi-deltai: 31-42, periodi: 11, taoPi_SP-deltaPi_SP: 31-35, periodPi: 4, betaNi: 6, bi: 11,
Txijt: 66, o1i: 66, o2i: 80, o3i: -182, o4i: 120, Ti: 84
342 Vessel i: 5: li: 5, pi: 22-27, ai-di: 21-43, taoi-deltai: 21-27, periodi: 6, taoPi_SP-deltaPi_SP: 21-24, periodPi: 3, betaNi: 3, bi: 6, Txijt
: 30, o1i: 30, o2i: 60, o3i: -75, o4i: 60, Ti: 75
343 Vessel i: 6: li: 7, pi: 7-14, ai-di: 37-78, taoi-deltai: 37-71, periodi: 34, taoPi_SP-deltaPi_SP: 37-46, periodPi: 9, betaNi: 20, bi: 34,
Txijt: 238, o1i: 238, o2i: 180, o3i: -675, o4i: 400, Ti: 143
344 Vessel i: 7: li: 6, pi: 28-34, ai-di: 25-57, taoi-deltai: 25-38, periodi: 13, taoPi_SP-deltaPi_SP: 25-29, periodPi: 4, betaNi: 7, bi: 13,
Txijt: 78, o1i: 78, o2i: 80, o3i: -234, o4i: 140, Ti: 64
345 TimeSolveModel: 657.000000
346
347
348
349 TimeAll: 661.000000
350
351
352
353
```