



80	0	0	679.17369	0	603	-	679.17369	-	-	53s
81	0	0	679.18628	0	788	-	679.18628	-	-	54s
82	0	0	679.30891	0	944	-	679.30891	-	-	54s
83	0	0	679.32367	0	962	-	679.32367	-	-	54s
84	0	0	679.32432	0	970	-	679.32432	-	-	54s
85	0	0	683.35873	0	1060	-	683.35873	-	-	58s
86	0	0	683.35873	0	1041	-	683.35873	-	-	58s
87	0	0	684.34254	0	1688	-	684.34254	-	-	60s
88	0	0	686.87063	0	1545	-	686.87063	-	-	61s
89	0	0	688.31218	0	1446	-	688.31218	-	-	63s
90	0	0	689.01362	0	1485	-	689.01362	-	-	64s
91	0	0	689.22753	0	1439	-	689.22753	-	-	65s
92	0	0	689.43042	0	1464	-	689.43042	-	-	65s
93	0	0	689.68507	0	1792	-	689.68507	-	-	66s
94	0	0	689.88491	0	1833	-	689.88491	-	-	66s
95	0	0	690.08393	0	1872	-	690.08393	-	-	67s
96	0	0	690.28248	0	1906	-	690.28248	-	-	67s
97	0	0	690.48099	0	1939	-	690.48099	-	-	67s
98	0	0	690.52290	0	2043	-	690.52290	-	-	67s
99	0	0	690.64687	0	2067	-	690.64687	-	-	68s
100	0	0	690.88039	0	2089	-	690.88039	-	-	68s
101	0	0	690.91484	0	2082	-	690.91484	-	-	69s
102	0	0	691.14084	0	2039	-	691.14084	-	-	69s
103	0	0	691.40308	0	2330	-	691.40308	-	-	69s
104	0	0	691.62402	0	2253	-	691.62402	-	-	69s
105	0	0	691.82550	0	2253	-	691.82550	-	-	70s
106	0	0	692.02815	0	2253	-	692.02815	-	-	70s
107	0	0	692.02815	0	2252	-	692.02815	-	-	70s
108	0	0	697.54010	0	1313	-	697.54010	-	-	75s
109	0	0	699.86134	0	1804	-	699.86134	-	-	77s
110	0	0	701.37809	0	1820	-	701.37809	-	-	78s
111	0	0	701.86073	0	1788	-	701.86073	-	-	78s
112	0	0	702.51105	0	2133	-	702.51105	-	-	79s
113	0	0	702.94875	0	2123	-	702.94875	-	-	80s
114	0	0	703.40595	0	2099	-	703.40595	-	-	81s
115	0	0	703.98273	0	2191	-	703.98273	-	-	82s
116	0	0	704.12701	0	2219	-	704.12701	-	-	83s
117	0	0	704.26998	0	2095	-	704.26998	-	-	83s
118	0	0	704.40916	0	1383	-	704.40916	-	-	84s
119	0	0	704.67446	0	1938	-	704.67446	-	-	84s
120	0	0	704.75050	0	1359	-	704.75050	-	-	85s
121	0	0	704.95531	0	1943	-	704.95531	-	-	85s
122	0	0	705.18692	0	1936	-	705.18692	-	-	86s
123	0	0	705.43699	0	1897	-	705.43699	-	-	86s
124	0	0	705.43699	0	1935	-	705.43699	-	-	87s
125	0	0	706.25422	0	1722	-	706.25422	-	-	90s
126	0	0	706.25776	0	1692	-	706.25776	-	-	92s
127	0	0	706.89064	0	1785	-	706.89064	-	-	96s
128	0	0	706.89064	0	1771	-	706.89064	-	-	96s
129	0	0	706.91850	0	1687	-	706.91850	-	-	96s
130	0	0	706.93748	0	1812	-	706.93748	-	-	97s
131	0	0	706.93748	0	1820	-	706.93748	-	-	98s
132	0	0	706.93748	0	1817	-	706.93748	-	-	98s
133	0	0	707.46207	0	1910	-	707.46207	-	-	102s
134	0	0	707.51170	0	1782	-	707.51170	-	-	103s
135	0	0	707.54222	0	1810	-	707.54222	-	-	103s
136	0	0	707.72209	0	1824	-	707.72209	-	-	104s
137	0	0	707.72209	0	1808	-	707.72209	-	-	104s
138	0	0	707.72529	0	1818	-	707.72529	-	-	105s
139	0	0	708.50651	0	1196	-	708.50651	-	-	107s
140	0	0	708.85499	0	1139	-	708.85499	-	-	108s
141	0	0	708.85499	0	1132	-	708.85499	-	-	108s
142	0	0	709.02862	0	1231	-	709.02862	-	-	109s
143	0	0	709.07173	0	1198	-	709.07173	-	-	109s
144	0	0	709.09087	0	1214	-	709.09087	-	-	110s
145	0	0	709.09087	0	1247	-	709.09087	-	-	110s
146	0	0	709.19558	0	1228	-	709.19558	-	-	113s
147	0	0	709.19558	0	1225	-	709.19558	-	-	113s
148	0	0	709.19992	0	1245	-	709.19992	-	-	114s
149	0	0	709.58991	0	1203	-	709.58991	-	-	118s
150	0	0	709.79640	0	1212	-	709.79640	-	-	119s
151	0	0	709.79640	0	1210	-	709.79640	-	-	119s
152	0	0	709.80296	0	1266	-	709.80296	-	-	119s
153	0	0	709.80296	0	1263	-	709.80296	-	-	120s
154	0	0	709.91752	0	1177	-	709.91752	-	-	122s
155	0	0	709.91752	0	1187	-	709.91752	-	-	122s
156	0	0	709.94147	0	1194	-	709.94147	-	-	123s
157	0	0	709.94543	0	1189	-	709.94543	-	-	124s
158	0	0	710.72830	0	1097	-	710.72830	-	-	127s
159	0	0	710.72830	0	1092	-	710.72830	-	-	127s
160	0	0	710.81305	0	956	-	710.81305	-	-	128s
161	0	0	710.81305	0	1031	-	710.81305	-	-	129s
162	0	0	711.13498	0	1005	-	711.13498	-	-	132s
163	0	0	711.21539	0	1015	-	711.21539	-	-	133s

unknown

164	0	0	711.21674	0	966	-	711.21674	-	-	133s
165	0	0	711.85815	0	1083	-	711.85815	-	-	136s
166	0	0	712.02781	0	1069	-	712.02781	-	-	137s
167	0	0	712.03601	0	1009	-	712.03601	-	-	138s
168	0	0	712.17791	0	1079	-	712.17791	-	-	141s
169	0	0	712.34368	0	1164	-	712.34368	-	-	142s
170	0	0	712.39260	0	1099	-	712.39260	-	-	143s
171	0	0	712.39823	0	1089	-	712.39823	-	-	143s
172	0	0	712.75955	0	1044	-	712.75955	-	-	146s
173	0	0	712.76919	0	1141	-	712.76919	-	-	147s
174	0	0	712.76919	0	1108	-	712.76919	-	-	148s
175	0	0	712.83623	0	1185	-	712.83623	-	-	152s
176	0	0	712.83623	0	1184	-	712.83623	-	-	152s
177	0	0	712.85540	0	1185	-	712.85540	-	-	153s
178	0	0	712.86111	0	1077	-	712.86111	-	-	153s
179	0	0	712.93501	0	1096	-	712.93501	-	-	155s
180	0	0	712.93501	0	1086	-	712.93501	-	-	156s
181	0	0	712.93501	0	724	-	712.93501	-	-	158s
182	0	2	712.93501	0	687	-	712.93501	-	-	173s
183	19	24	828.54796	4	342	-	718.49702	-	245	175s
184	120	140	729.00000	29	114	-	718.86711	-	113	180s
185	249	247	739.00000	59	38	-	718.86711	-	109	185s
186	*	260	224	41	739.0000000	718.86711	2.72%	111	185s	
187	308	220	735.99420	10	282	739.00000	719.00000	2.71%	148	191s
188	338	213	722.48148	14	223	739.00000	719.00000	2.71%	173	195s
189	353	213	722.33333	9	228	739.00000	719.00000	2.71%	219	201s
190	378	201	cutoff	11	739.00000	719.00000	2.71%	260	205s	
191	400	191	723.67852	12	467	739.00000	719.00000	2.71%	284	211s
192	430	79	724.14286	14	724	739.00000	719.00000	2.71%	295	285s
193	432	80	721.71102	14	160	739.00000	719.00000	2.71%	294	293s
194	433	81	725.61136	5	171	739.00000	719.00000	2.71%	293	299s
195	434	82	729.00000	40	193	739.00000	719.00000	2.71%	292	301s
196	437	85	729.00000	30	724	739.00000	719.00000	2.71%	338	336s
197	439	86	723.94264	14	77	739.00000	719.00000	2.71%	336	344s
198	440	87	731.06770	11	120	739.00000	719.00000	2.71%	335	353s
199	441	88	728.84876	9	179	739.00000	719.00000	2.71%	335	355s
200	443	89	725.13513	4	296	739.00000	719.00000	2.71%	333	360s
201	444	90	727.12200	6	28	739.00000	719.00000	2.71%	332	370s
202	446	91	719.73073	10	84	739.00000	719.00000	2.71%	331	375s
203	448	92	729.00000	41	37	739.00000	719.43852	2.65%	329	381s
204	452	95	727.45050	5	333	739.00000	719.45737	2.64%	326	387s
205	453	96	725.69632	16	99	739.00000	719.63795	2.62%	326	392s
206	454	96	724.00000	25	295	739.00000	719.63795	2.62%	325	396s
207	455	97	729.00000	23	132	739.00000	719.63795	2.62%	324	402s
208	456	98	719.86916	11	267	739.00000	719.63795	2.62%	324	407s
209	457	98	724.00000	19	200	739.00000	719.70774	2.61%	323	414s
210	458	99	724.00000	21	338	739.00000	720.42550	2.51%	322	415s
211	460	100	734.00000	16	115	739.00000	722.95776	2.17%	321	427s
212	461	101	724.20833	11	283	739.00000	724.20833	2.00%	320	430s
213	462	102	725.66667	18	170	739.00000	725.66667	1.80%	319	437s
214	463	102	729.00000	24	206	739.00000	729.00000	1.35%	319	443s
215	464	103	729.00000	5	172	739.00000	729.00000	1.35%	318	450s
216	467	107	729.00000	24	27	739.00000	729.00000	1.35%	397	455s
217	498	116	729.00000	29	9	739.00000	729.00000	1.35%	388	460s
218	546	120	732.33333	33	48	739.00000	729.00000	1.35%	358	465s
219	598	128	732.33333	39	137	739.00000	729.00000	1.35%	331	470s
220	710	120	729.00000	44	12	739.00000	729.00000	1.35%	285	475s
221	807	125	729.00000	52	10	739.00000	729.00000	1.35%	251	480s
222	979	162	cutoff	47	739.00000	729.00000	1.35%	209	485s	
223	1116	209	729.00000	43	2	739.00000	729.00000	1.35%	186	491s
224	1142	210	729.00000	47	8	739.00000	729.00000	1.35%	185	495s
225	1230	231	729.00000	49	227	739.00000	729.00000	1.35%	178	501s
226	1330	292	729.00000	41	2	739.00000	729.00000	1.35%	168	506s
227	1411	318	729.00000	34	81	739.00000	729.00000	1.35%	161	510s
228	1531	367	737.33333	40	32	739.00000	729.00000	1.35%	150	517s
229	1583	396	729.00000	45	61	739.00000	729.00000	1.35%	147	520s
230	1848	494	729.00000	55	2	739.00000	729.00000	1.35%	128	525s
231	2127	625	729.00000	40	220	739.00000	729.00000	1.35%	114	532s
232	2255	663	729.00000	62	40	739.00000	729.00000	1.35%	108	535s
233	2483	783	cutoff	44	739.00000	729.00000	1.35%	100	540s	
234	2862	886	infeasible	30	739.00000	729.00000	1.35%	94.3	552s	
235	3404	1058	732.33333	36	90	739.00000	729.00000	1.35%	84.4	563s
236	4220	899	cutoff	41	739.00000	729.00000	1.35%	72.8	570s	
237	4381	801	729.00000	39	2	739.00000	729.00000	1.35%	82.6	585s
238	4780	569	729.00000	45	4	739.00000	729.00000	1.35%	76.9	595s
239	5372	323	cutoff	44	739.00000	729.00000	1.35%	70.9	607s	
240	5954	53	infeasible	38	739.00000	732.33333	0.90%	66.7	613s	
241										
242	Cutting planes:									
243	Learned: 1									
244	Gomory: 21									
245	Cover: 35									
246	Implied bound: 7									
247	Projected implied bound: 1									

```
248 Clique: 20
249 MIR: 12
250 StrongCG: 5
251 Flow cover: 37
252 GUB cover: 22
253 Inf proof: 1
254 Zero half: 18
255 RLT: 14
256 Relax-and-lift: 13
257
258 Explored 6277 nodes (476677 simplex iterations) in 614.65 seconds (516.37 work units)
259 Thread count was 8 (of 8 available processors)
260
261 Solution count 2: 739 739
262
263 Optimal solution found (tolerance 1.00e-04)
264 Best objective 7.390000000000e+02, best bound 7.390000000000e+02, gap 0.0000%
265 Optimal Obj: 739.0
266 Obj = 739.0
267 Solutions
268 Vessel i: 0: li: 6, pi: 8-14, ai-di: 3-37, taoi-deltai: 3-35, periodi: 32, taoPi_SP-deltaPi_SP: 3-11, periodPi: 8, betaNi: 19, bi: 32, Txijt:
192, o1i: 192, o2i: 160, o3i: -624, o4i: 380, Ti: 108
269 Vessel i: 1: li: 7, pi: 27-34, ai-di: 17-33, taoi-deltai: 17-31, periodi: 14, taoPi_SP-deltaPi_SP: 17-22, periodPi: 5, betaNi: 8, bi: 14,
Txijt: 98, o1i: 98, o2i: 100, o3i: -243, o4i: 160, Ti: 115
270 Vessel i: 2: li: 6, pi: 15-21, ai-di: 23-49, taoi-deltai: 23-47, periodi: 24, taoPi_SP-deltaPi_SP: 23-29, periodPi: 6, betaNi: 14, bi: 24,
Txijt: 144, o1i: 144, o2i: 120, o3i: -468, o4i: 280, Ti: 76
271 Vessel i: 3: li: 6, pi: 28-34, ai-di: 41-57, taoi-deltai: 41-55, periodi: 14, taoPi_SP-deltaPi_SP: 41-48, periodPi: 7, betaNi: 7, bi: 14,
Txijt: 84, o1i: 84, o2i: 140, o3i: -182, o4i: 140, Ti: 182
272 Vessel i: 4: li: 6, pi: 15-21, ai-di: 50-74, taoi-deltai: 50-72, periodi: 22, taoPi_SP-deltaPi_SP: 50-56, periodPi: 6, betaNi: 13, bi: 22,
Txijt: 132, o1i: 132, o2i: 120, o3i: -416, o4i: 260, Ti: 96
273 Vessel i: 5: li: 7, pi: 7-14, ai-di: 51-75, taoi-deltai: 53-75, periodi: 22, taoPi_SP-deltaPi_SP: 53-59, periodPi: 6, betaNi: 14, bi: 22,
Txijt: 154, o1i: 194, o2i: 120, o3i: -432, o4i: 280, Ti: 162
274 TimeSolveModel: 659.000000
275
276
277
278 TimeAll: 664.000000
279
280
281
282
```